STANDARD TREATMENT GUIDELINE
FOR
GENERAL HOSPITALS

Drug Administration and Control Authority of Ethiopia Contents

2010
Contents

Acknowledgments.................................................................................................................. X
Abbreviations.......................................................................................................................... XIII
Forward....................................................................................................................................... XIV
Introduction................................................................................................................................. XV
General Guidance...................................................................................................................... XVI
How to USE the STG.................................................................................................................. XXVIII

Chapter I

INFECTIOUS DISEASES......................................................................................................... 1

Acquired Immuno Deficiency Syndrome.................................................................................. 2
Amebiasis..................................................................................................................................... 14
Amebic liver Abscess .................................................................................................................. 15
Bacillary Dysentry ..................................................................................................................... 15
Bronchitis Acute)....................................................................................................................... 17
Brucellosis................................................................................................................................... 19
Cholera....................................................................................................................................... 21
Gastro-enteritis.......................................................................................................................... 22
Giardiasis..................................................................................................................................... 23
Intestinal Parasitic Infestations................................................................................................. 24
Leishmaniasis............................................................................................................................. 28
Leprosy....................................................................................................................................... 30
Malaria....................................................................................................................................... 34
Meningitis.................................................................................................................................... 37
Onchocerciasis............................................................................................................................ 42
Pneumocystis carinii( jirovecii) Pneumonia............................................................................ 44
Pneumonia................................................................................................................................... 46
Myocardial infarction.................................................................127
Osteoarthritis.................................................................130
Peptic ulcer.................................................................131
Portal hypertension.................................................................133
Rheumatic fever(Acute).................................................................135
Rheumatic heart disease(Chronic).................................................................136
Rheumatoid arthritis.................................................................137
Schizophrenia ........................................................................140
Thyrotoxicosis......................................................................142

Chapter III

PEDIATRIC DISEASES.................................................................144

Bronchial Asthma........................................................................145
CROUP (Acute laryngotracheobronchitis).................................................................147
Diarrheal disease (Acute)......................................................................148
Foreign body aspiration......................................................................154
Heart failure................................................................................155
HIV/ AIDS in Children...................................................................157
Jaundice in neonates........................................................................165
Malnutrition (Severe)......................................................................167
Measles......................................................................................177
Meningitis....................................................................................178
Oral thrush..................................................................................181
Osteomyelitis...............................................................................182
Pertusis.......................................................................................182
Pneumocystis carinii pneumonia.................................................................183
Pneumonia in children.....................................................................184
Rickets........................................................................................186
Seizures (Neonatal).......................................................................188
Sepsis (Neonatal).........................................................................189
Septic arthritis.............................................................................190
Tetanus (Neonatal).........................................................................191
Chapter IV

DERMATOLOGICAL DISORDERS

Acne vulgaris ................................................................. 197
Bacterial folliculitis ............................................................. 199
Candidiasis ........................................................................ 200
Balanoposthitis ................................................................. 200
Candidal intertrigo .............................................................. 200
Candidal paronychia ........................................................... 201
Genital candidiasis ............................................................. 202
Oral candidiasis ................................................................. 202
Carbuncle ........................................................................... 203
Cellulites ........................................................................... 203
Cutaneous leishmaniasis ....................................................... 204
Dermatophytes .................................................................... 206
Eczema ................................................................................ 208
Atopic dermatitis ............................................................... 208
Contact dermatitis ............................................................. 209
Allergic contact dermatitis ..................................................... 209
Irritant Contact Dermatitis ..................................................... 211
Erysipelas ............................................................................ 212
Furunclosis ......................................................................... 213
Herpes simplex ..................................................................... 214
Herpes zoster ....................................................................... 215
Impetigo ............................................................................... 216
Molluscum contagiosum ......................................................... 217
Pediculosis corporis and capitis ................................................. 219
Pityriasis versicolor ............................................................ 220
Psoriasis ............................................................................. 221
Scabies ................................................................................. 222
Urticaria ............................................................................... 224
Verruca vulgaris .................................................................... 226
Chapter V

SEXUALLY TRANSMITTED INFECTIONS ..............................................................228
Acute Epididymitis.......................................................................................229
Ectoparasitic infection................................................................................230
Pediculosis pubis.........................................................................................230
Exophytic processes...................................................................................231
External genital warts (Condylomata acuminata)......................................231
Genital ulcer disease syndrome.................................................................231
Chancroid....................................................................................................232
Genital herpes............................................................................................232
Granuloma inguinale (donovanosis)..........................................................234
Lymphogranuloma venereum.................................................................236
Syphilis.......................................................................................................238
Urethritis (urethral discharge) syndrome.................................................240
Chlamydial.................................................................................................240
Gonorrhea..................................................................................................241
Non-gonococcal urethritis.......................................................................243

Chapter VI

OPHTHALMOLOGICAL PROBLEMS..............................................................245
Acute Dacryocystitis..................................................................................246
Acute Infectious Dacryoadenitis.................................................................248
- Bacterial or infectious..............................................................................248
- Viral........................................................................................................249
Allergic Conjunctivitis.............................................................................249
Atopic Keratoconjunctivitis.....................................................................249
Hey fever and Perennial allergic Conjunctivitis.....................................253
- Vernal Keratoconjunctivitis.................................................................254
Bacterial Conjunctivitis...........................................................................255
Conjunctivitis in Children and Adults....................................................255
Neonatal Conjunctivitis.........................................................................256
Blepharitis.................................................................................................257
Seborrhoeic blepharitis................................................................. 258
Staphylococcal blepharitis............................................................ 259
Chemical Burns........................................................................... 260
External Hordeolum (Stye)............................................................. 261
Internal Hordeolum.................................................................... 262
Mebomian Cyst (Chalazion)............................................................. 263
Molluscum Contagiosum .............................................................. 263
Ophthalmic Zoster (Herpes Zoster Ophthalmicus)............................ 264
Orbital Cellulitis.......................................................................... 266
Preseptal Cellulitis....................................................................... 268
Trachoma....................................................................................... 270
Vitamin A deficiency..................................................................... 272

CHAPTER VII

EAR, NOSE AND THROAT PROBLEMS................................................. 275

I. EAR PROBLEMS........................................................................ 276
Acute otitis media ....................................................................... 276
Acute tubal occlusion................................................................. 277
Acute vestibular paralysis............................................................ 278
Bacterial and Viral diffuse otitis externa....................................... 280
Barotrauma ................................................................................ 281
Chronic otitis media..................................................................... 281
Foreign bodies in the ear............................................................. 281
Idiopathic facial paralysis........................................................... 283
Masoiditis..................................................................................... 284
Meniere’s disease....................................................................... 284
Nonspecific inflammation of the external ear............................... 285
Herpes zoster oticus (specific forms)............................................ 286
Temporal bone fracture............................................................... 287

II. NOSE AND NASAL SINUSES PROBLEMS.................................... 288
Acute rhinitis............................................................................... 288
Acute rhinosinusitis................................................................. 288
Allergic rhinitis.................................................................................................................................................. 289
Atrophic rhinitis and ozena.................................................................................................................................. 291
Chronic sinusitis.................................................................................................................................................. 291
Epistaxis.............................................................................................................................................................. 291
Foreign bodies in the nose.................................................................................................................................... 293

III. MOUTH and PHARYNX PROBLEMS.............................................................................................................. 294
Acute tonsillitis.................................................................................................................................................... 294
Peritonsilar abscess............................................................................................................................................ 295

IV. LARYNX and HYPOPHARYNX PROBLEMS..................................................................................................... 296
Acute epiglottitis.................................................................................................................................................. 296
Acute laryngitis................................................................................................................................................... 297
Croup or larngotracheitis..................................................................................................................................... 298

V. SALIVARY GLAND PROBLEMS.......................................................................................................................... 299
Mumps................................................................................................................................................................. 299
Sialadenitis of the parotid and submandibular glands...................................................................................... 299

Chapter VIII

OBSTETRICS AND GYNACOLOGICAL DISORDERS ................................................................................................. 301
Common obstetric disorders

........................................................................................................................................................................... 302
Hypertensive disorders in pregnancy.................................................................................................................. 302
Nausea and vomiting of pregnancy ...................................................................................................................... 308
Pain during labour and delivery .......................................................................................................................... 311
Premature rupture of membrane......................................................................................................................... 313
Preterm labour..................................................................................................................................................... 316
Prolonged Pregnancy and Prolonged Labour..................................................................................................... 320
Common medical disorders in pregnancy

- Anemia in pregnancy
- Cardiac disease in pregnancy
- Coagulation disorders in pregnancy (dvt/te)
- Diabetes mellitus in pregnancy
- Thyroid disease in pregnancy

Infections in obstetrics and gynecology

- HIV/AIDS in pregnancy
- Malaria in pregnancy
- Pelvic inflammatory disease
- Post-abortal and puerperal sepsis
- Puerperal mastitis
- Urinary tract infection (uti) in pregnancy
- Syphilis in pregnancy
- Vaginal discharge syndromes
  - Bacterial vaginosis
  - Mucopurulent cervicitis
  - Trichomonal vaginosis
  - Vulvovaginal candidiasis

Contraception, gynecologic endocrinology and infertility

- Contraceptives
- Dysfunctional uterine bleeding
- Dysmenorrhea
- Infertility (male and female)
- Premenstrual syndrome
- Sexual assault

CHAPTER IX
EMERGENCY CONDITIONS

Animal bites.................................................................368
Rabies...........................................................................370
Snake bites.....................................................................372
Burns...........................................................................373
Drowning....................................................................378
Hypoglycemia..............................................................381
Poisoning....................................................................382
Barbiturates................................................................384
Carbon monoxide.........................................................386
Pesticides.....................................................................387
Sepsis..........................................................................389
Shock..........................................................................392
Stroke..........................................................................395
UGI Bleeding................................................................397

ANNEXES ........................................................................399 - 424

INDEX BY DISEASES.......................................................425-428

INDEX BY DRUGS...........................................................429-433
The second edition of standard treatment guidelines for Ethiopia have been compiled through the collaborative efforts of different stakeholders at various levels, such as Drug Administration and Control Authority, the consultant, STG core committee, experts in different disciplines and workshop participants. Had it not been for the this collaborative effort, it wouldn’t have been realised.

It is also our pleasure to thank World Health Organization for providing financial support for the preparation of this guideline. The stakeholders who participated in the preparation of the revised STGs one way or the other are listed below:

i) **Drug Administration and Control Authority (DACA)**

ii) **Consultant**

   Professional Management Contractors

iii) **STG Core Committee**

   - Prof. Eyasu Makonnen - Pharmacologist (Chairperson)
   - Dr. Kassahun Kiros - Gynecologist
   - Dr. Yilikal Adamu - Ophthalmologist
   - Dr. Yewondwossen Tadesse - Internist (Secretary)

iv) **Experts**

   - Dr. Endale Teferra - Pediatrician
   - Dr. Hailubeza Alemu - Internist
   - Dr. Girma Tesema - ENT Specialist
   - Dr. Mesfin Hunegnaw - Dermatologist

v) **Workshop participant**
<table>
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<tr>
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<th>Name</th>
<th>Position</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1.</td>
<td>Abebe Melaku, Dr.</td>
<td>Faculty of Medicine, AAU</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Aelaf Mentesnot, Dr.</td>
<td>F. Police Hospital, GP</td>
<td></td>
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<tr>
<td>3.</td>
<td>Aynalem Abraha Dr.</td>
<td>Black Lion Hospital,</td>
<td></td>
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<td></td>
<td></td>
<td>Onchologist</td>
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<tr>
<td>4.</td>
<td>Azmeraw Aberra</td>
<td>Mota Hospital, Druggist</td>
<td></td>
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<tr>
<td>5.</td>
<td>Bekele Tefera</td>
<td>WHO, Pharmacist</td>
<td></td>
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<tr>
<td>6.</td>
<td>Bekele Wordofa, Dr.</td>
<td>Adama Hospital</td>
<td></td>
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<tr>
<td>7.</td>
<td>Bizualem Adamu</td>
<td>Amhara Health Bureau,</td>
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<td></td>
<td>Pharmacist</td>
<td></td>
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<tr>
<td>8.</td>
<td>Daniel Belihu, Dr.</td>
<td>Minilik II Hospital, Internist</td>
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<td>9.</td>
<td>Daniel Fiseha Dr.</td>
<td>I-TECH</td>
<td></td>
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<td>10.</td>
<td>Endale Tefera, Dr.</td>
<td>Faculty of Medicine, AAU, Pediatric</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Eyasu Makonnen, Prof.</td>
<td>Faculty of Medicine, AAU, Pharmacologist</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Fekade Biruk</td>
<td>School of Pharmacy, AAU, Pharmacologist</td>
<td></td>
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<td>13.</td>
<td>Fitsum Tadios,</td>
<td>EPA, Pharmacist</td>
<td></td>
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<td>14.</td>
<td>Genet Deres,</td>
<td>FMOH, Health Officer</td>
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<td>15.</td>
<td>Getachew Mekasha</td>
<td>Debremarkos Hospital,</td>
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<td></td>
<td></td>
<td>Pharmacist</td>
<td></td>
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<td>16.</td>
<td>Getachew Muluneh, Dr.</td>
<td>Fenoteselam Hospital, GP</td>
<td></td>
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<td>17.</td>
<td>Habtamu Degefa</td>
<td>Jimma Health Center,</td>
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<td></td>
<td></td>
<td>Health Officer</td>
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<td>18.</td>
<td>Haddis Solomon, Dr.</td>
<td>Amanuel Specialized</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Hospital, Psychiatrist</td>
<td></td>
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<td>Hailemariam Eshete</td>
<td>Gambella Hospital,</td>
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<td></td>
<td>Pharmacist</td>
<td></td>
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<tr>
<td>20.</td>
<td>Hailu Tadege</td>
<td>MSH/SPS, pharmacist</td>
<td></td>
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<tr>
<td>21.</td>
<td>Hailubeza Alemu, Dr.</td>
<td>Faculty of Medicine, AAU, Internist</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Hamza Adus, Dr</td>
<td>I-TECH, Internist</td>
<td></td>
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<td>23.</td>
<td>Kassahun Kiros, Dr</td>
<td>Black Lion Hospital,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Gynecologist</td>
<td></td>
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<tr>
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<td>Title/Position</td>
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</tr>
<tr>
<td>24.</td>
<td>Mesay Mekonnen, Dr.</td>
<td>Surgeon</td>
<td>Faculty of Medicine, AAU,</td>
</tr>
<tr>
<td>25.</td>
<td>Mesfin Hunegnaw, Dr.</td>
<td>Dermatologist</td>
<td>Faculty of Medicine, AAU,</td>
</tr>
<tr>
<td>26.</td>
<td>Roman Betre, Dr.</td>
<td></td>
<td>Arada Health Center</td>
</tr>
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<td>27.</td>
<td>Samson Legesse</td>
<td></td>
<td>Tigray RHB, Pharmacist</td>
</tr>
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<td>28.</td>
<td>Seid Tesfaw, Dr.</td>
<td>Health Officer</td>
<td>Dessie Hospital, Health Officer</td>
</tr>
<tr>
<td>29.</td>
<td>Sofia Yoseph, Dr.</td>
<td></td>
<td>St. Paul Hospital, Ophthalmologist</td>
</tr>
<tr>
<td>30.</td>
<td>Solomon, Tamiru, Dr.</td>
<td>University Internist</td>
<td>Faculty of Medicine, Jimma</td>
</tr>
<tr>
<td>31.</td>
<td>Tasew Tadesse, Dr.</td>
<td>Surgeon</td>
<td>Yekatit 12 Hospital,</td>
</tr>
<tr>
<td>32.</td>
<td>Tatek Yitagessu</td>
<td>Pharmacist</td>
<td>Hiwot Fana Hospital,</td>
</tr>
<tr>
<td>33.</td>
<td>Tesfaye Tadesse, Dr.</td>
<td>Medical</td>
<td>Ethiopian Society of General Medical practitioner</td>
</tr>
<tr>
<td>34.</td>
<td>Tigist Disasa</td>
<td>Nurse</td>
<td>Kazanchis Health Center,</td>
</tr>
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<td>35.</td>
<td>Tsegaye Bedane</td>
<td></td>
<td>FMOH, Health Officer</td>
</tr>
<tr>
<td>36.</td>
<td>Wodaje Mekonnen, Dr.</td>
<td></td>
<td>BHC, Health Officer</td>
</tr>
<tr>
<td>37.</td>
<td>Yewondwossen Tadesse, Dr.</td>
<td></td>
<td>EMA, Internist</td>
</tr>
<tr>
<td>38.</td>
<td>Yibeltal Zewde, Dr.</td>
<td></td>
<td>Zewditu Hospital, GP</td>
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<td>Yilikal Adamu, Dr.</td>
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<td>OSE,</td>
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<td>40.</td>
<td>Yitayih Berhane, Dr.</td>
<td></td>
<td>Felege Hiwot</td>
</tr>
<tr>
<td>41.</td>
<td>Zelalem Demeke, Dr.</td>
<td></td>
<td>AAHB, MPH</td>
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# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADR</td>
<td>Adverse Drug Reactions</td>
</tr>
<tr>
<td>BID</td>
<td>Two times a day</td>
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<tr>
<td>C/I</td>
<td>Contraindication</td>
</tr>
<tr>
<td>CNS</td>
<td>Central nervous system</td>
</tr>
<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
</tr>
<tr>
<td>DACA</td>
<td>Drug Administration and Control Authority</td>
</tr>
<tr>
<td>D/I</td>
<td>Drug interaction</td>
</tr>
<tr>
<td>D/S</td>
<td>Dextrose in Saline solution</td>
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<tr>
<td>D/W</td>
<td>Dextrose in water solution</td>
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<tr>
<td>ENT</td>
<td>Ear, nose and throat</td>
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<td>G</td>
<td>Gram</td>
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<td>GI</td>
<td>Gastrointestinal</td>
</tr>
<tr>
<td>Hrs</td>
<td>Hours</td>
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<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>IU</td>
<td>International Unit</td>
</tr>
<tr>
<td>Kg</td>
<td>Kilogram</td>
</tr>
<tr>
<td>Mg</td>
<td>Milligram</td>
</tr>
<tr>
<td>MI</td>
<td>Milliliter</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>N/S</td>
<td>Normal saline solution</td>
</tr>
<tr>
<td>P/C</td>
<td>Precaution</td>
</tr>
<tr>
<td>PCP</td>
<td>Pneumocystis carinii pneumonia</td>
</tr>
<tr>
<td>P.O</td>
<td>Per Os (mouth)</td>
</tr>
<tr>
<td>PRN</td>
<td>As required</td>
</tr>
<tr>
<td>QD</td>
<td>Once a day</td>
</tr>
<tr>
<td>QID</td>
<td>Four times a day</td>
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<tr>
<td>S/E</td>
<td>Side effect</td>
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<tr>
<td>STG</td>
<td>Standard Treatment Guideline</td>
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<tr>
<td>TID</td>
<td>Three times a day</td>
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<td>WHO</td>
<td>World Health Organization</td>
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**Note:** Other abbreviations are defined in the text where they are first used.
Forward

The Standard Treatment Guidelines (STG) serves as one of the means by which quality of care can be provided for patients seeking health care. Through the use of well-established methods of prevention, diagnosis and treatment of common diseases seen in our health facilities, this edition brings together essential and current knowledge necessary for prescribers to provide the best of care to patients. Furthermore, by developing this document within the framework of the essential medicines program, it serves as an effective way of containing cost of treatment for both patients and the health sector and can also be used as a training material for health care providers.

This 2nd edition of the Standard treatment guidelines is aimed at 3 levels of health care based on the new healthcare-tier system, i.e General Hospital, Primary Hospital and Health Centers, both for public and private throughout the country and will assist health care professionals in their treatment choices. Care was taken in the process of the review of this edition to ensure a guide that will be acceptable and useful to all.

It gives me a great pleasure to introduce the second edition of the Standard treatment guidelines to all beneficiaries.

Finally, I would like to take this opportunity to thank all members of the technical task force expert groups and Institutions for their valuable input in the development of this important guidelines.

YEHULU DENEKEW ALAMNEH
GENERAL DIRECTOR
Introduction

Irrational use of drugs has been perceived to be a major problem in the Ethiopian health care system for a long time. Among the strategies devised to improve the situation and promote more rational drug use by the Drug Administration and Control Authority (DACA) was the preparation and distribution of Standard Treatment Guidelines (STGs) for the different levels of health institutions in the country. The 1st edition of the STGs was published in January 2004 after wide consultation among the medical community. There has been a continuous demand for copies of the STGs dictating several reprints. This hopefully indicates that the STGs are feeling the gap in the unavailability of reference materials for prescribers and dispensers.

To keep up with changes in the practice of medicine it has now been judged appropriate to revise the STG, and accordingly the STG has been thoroughly revised by a panel of experts. The revision includes the addition of several new topics under the different subheadings as well as changes in the definition, diagnostic criteria and drug choices of many conditions. Diseases have been classified into infectious diseases, non-infectious diseases, skin conditions, pediatric problems, obstetrics and gynecology problems, ophthalmologic and Ear, Nose and Throat (ENT) disorders as well as acute/emergency problems. Just like in the first edition, the revised STG addresses common health problems and include a brief description/definition of a condition, diagnostic criteria (when applicable), and non-drug and drug treatment with first line and alternative drugs clearly indicated. Drug doses, dosage forms, course of treatment, side effects, contraindications and drug interactions are given for the first line and alternative drugs whenever applicable.

These standard treatment guidelines are designed to be used as a guide to treatment choices and as a quick reference to help in the overall management of patients. Utmost care has been made by the panel of experts to ensure that the recommendations given in this STG are evidence based.

It is envisaged that the STG will undergo continuous improvement through the input of users. Users are, therefore, encouraged to send their comments and suggestions
together with the scientific evidence for the recommendations they make to the following address.

The Drug Administration and Control Authority (DACA) of Ethiopia
P.O. Box 5681
Addis Ababa, Ethiopia

GENERAL GUIDANCE

Prescription writing
A prescription is a written therapeutic transaction between the prescriber and dispenser. It is a written order by the prescriber to the dispenser on how the drug should be dispensed. It serves as a means of communication among the prescriber, dispenser and drug consumer pertaining to treatment or prophylaxis.

A prescription should be written on a standard prescription blank, in ink and in generics. It should be legible and not ambiguous.

A prescription should contain

- Date
- Full name, age and address of the drug consumer,
- Name, dose, formulation, strength of the drug (in standard unit, without decimals as much as possible; if decimal should be given a zero should be written in front of the decimal point), and quantity of the drug to be dispensed
- Directions specifying the route, dose, frequency and course of treatment (avoid non standard abbreviations and phrases like “take as directed” or “take as before”), prescriber’s name, signature and address for easy access to the prescriber.

Rational use of drugs
Rational use of drugs is a tool through which safe, effective and economic medication is provided. It is promoted by the collaborative efforts of prescribers,
dispensers and drug consumers. Rational prescribing ensures adherence to treatment and protects drug consumers from unnecessary adverse drug reactions. The prescriber could be a physician, a nurse or health officer. Rational dispensing, on the other hand, promotes the safe, effective and economic use of drugs. The dispenser could be a pharmacist, pharmacy technician or an assistant. Prior to prescribing or dispensing any drug, it is important to identify oneself which level of prescriber or dispenser he/she belongs to as the type of drugs to be prescribed or dispensed is dictated by the level of the prescriber or dispenser.

The role played by the policy maker should not be overlooked. Drugs should only be prescribed when they are necessary, and the benefit-risk ratio of administering the drug should always be considered prior to prescribing it. Irrational prescribing leads to ineffective, unsafe and uneconomical treatment. Thus it is very important that steps are taken to promote rational drug use in order to effectively promote the health of the public and to use the meager resources efficiently. One way of promoting rational drug use is developing standard treatment guidelines.

Rational approach to therapeutics requires careful evaluation of the health problems and selecting appropriate therapeutic strategies. Making the right diagnosis is the cornerstone for choosing the right kinds of therapy. Based on the diagnosis, health workers may select more than one treatment and the patient should agree with the selected treatment. The treatment could be non-drug or drug treatment. It is important to consider the total cost of treatment in the selection process. The process should also consider efficacy, safety and suitability. Drug treatment should be individualized to the needs of each patient as much as possible. The concept of good clinical practice has to be incorporated within rational prescribing.

**Patient adherence**

Patient compliance is the extent to which the patient follows a prescribed drug regime, while adherence is participation of patients in their care plan resulting
in understanding, consent and partnership with the provider. There are different factors which contribute to patients’ non-adherence. These factors include:

- nature of treatment, which in turn depends on the
  - complexity of the regime (more frequency of administration and more number of drugs prescribed)
  - adverse effects

- characteristics of the patient such as
  - forgetfulness about taking the medication
  - unable to finish because of feeling better
  - lack of understanding of the prescription
  - fear of dependence
  - social or physical problems to go to drug shops
  - unable to pay prescription charges
  - inconvenience of taking drugs everyday

- type of illness like schizophrenia

- health care system (long waiting times, uncaring staff, uncomfortable environment, exhausted drug supply, inaccessibility of the health institution)

- behavior of prescribers
  - not winning confidence of drug consumers
  - irrational prescribing
  - giving inadequate information on the treatment
  - poor attitude to patients
  - negligence
  - poor perception to team work

Patient adherence can be improved by
- supervising drug administration
- simplifying therapeutic regime
- educating patients on the importance of adhering to the prescribed medication
- improving behavior of prescribers
Group of people who adhere less to their medication include:

- Men
- Youngsters
- Elderly patients
- People living alone

**Adverse drug reactions**

Adverse drug reactions (ADRs) are noxious unwanted effects that occur at therapeutic doses. They could be mild (where no intervention is required), moderate (where switch to another drug is necessary) or severe (where antidote should be employed to alleviate the situation). They could also be predicted (extensions of pharmacological effects) or unpredicted (bizarre reactions which are not expected in all patients taking the drug, such as hypersensitivity and idiosyncratic reaction).

ADRs are different from toxic reactions, which occur at higher doses due to accidental or intentional reasons. The two extreme age groups, i.e., pediatric and geriatric patients are more susceptible to ADRs due to physiological and pathological factors. Special precaution should be taken for coexisting illnesses, such as kidney and liver disease, as they could contribute to ADRs development

**Monitoring ADRs**

Pre-marketing clinical trials cannot be exhaustive as far as detection of all ADRs is concerned due to

- Recruitment of small population(< 2500 patients)
- The remote chance of low incidence reactions to be picked up before marketing
- Shorter duration of assessment
- Exclusion of patients who may take the drug after marketing

Only the most common ADRs are detected during pre-marketing trials. It is, therefore, important to devise methods for quick detecting ADRs. This could be carried out by post-marketing surveillance, i.e., ADRs monitoring. Hence, all health professionals have the responsibility to report any unique ADR observed to Drug Control and Administration Agency (DACA).
Drug Interactions

Though some drug interactions could be beneficial most are harmful. Hence it is always important to note the possible drug interactions prior to concomitant drug/food or drink administration.

Drug interactions could occur at different levels including:

- Pharmaceutics, which are physicochemical interactions in an IV infusion or in the same solution,
- Pharmacokinetics, which may take place at the level of absorption, distribution, biotransformation or excretion.
- Pharmacodynamics, which could occur directly at receptor level or indirectly where a drug induced disease alters the response to another drug.

Drug interactions could be summation (the effect is simple algebraic sum), synergism (the total effect is more than the algebraic sum) potentiation (the effect of one drug increases by the presence of another drug), or antagonism (the effect of the agonist is blocked by the antagonist when given together). Drug interactions are some of the most common causes of adverse reactions. As drug reactions could also occur between a drug and food or a drug and drink. we should always inform our patients the type of food or drink which they have to avoid while taking the drug.

Prescribing for pregnant women

The kinetics of drug are altered during pregnancy. The rate of absorption decreases, while volume of distribution, metabolism and glomerular filtration rate increase during pregnancy. The embryonic period, where, organogenesis takes place, is the most susceptible period of pregnancy to drug effects. Administration of drugs, except those proved safe, in the first trimester, is therefore not generally recommended. It is advisable not to prescribe any drug during at any stage of pregnancy if possible. This, however, should not preclude the importance of prescribing in life threatening conditions of the mother. Prior to prescribing any
drug for pregnant women, the benefit risk ratio of prescribing should be considered.

**Prescribing for nursing women**

Most drugs administered are detectable in breast milk. The concentration, however, is low. If the woman has to take the drug and the drug is relatively safe, she should optimally take it 30-60 minutes after nursing, and 3-4 hours before next feeding in order to allow time for many drugs to be cleared from the mother’s blood, and the concentration in breast milk to be relatively low. Drugs for which no data are available on safety during lactation should be avoided or breast feeding discontinued while they are being given. Most antibiotics taken by nursing mothers can be detected in breast milk. e.g., tetracycline and chloramphenichol. Most sedative hypnotics achieve concentrations in breast milk. Opioids also achieve concentrations in breast milk. Antineoplastic drugs are contraindicated in breast feeding. So it is worth noting not to prescribe drugs secreted in milk to the nursing mother.

**Prescribing for infants/children**

Physiologic processes that influence drug kinetics in the infant change significantly in the first year of life, specially the first few months, while there is no much difference in the dynamics. All the four parameters of kinetics are, therefore, affected in children: Gastric acid secretion begins soon after birth and increases gradually over several hours in full term infants. In premature infants, however, the secretion is slower, with the highest concentration occurring on the fourth day. So drugs, which are partially or totally inactivated by the low pH of gastric content should not be administered orally. GI enzymes are lower in the neonates than in adults. Neonates have less bile acids so that absorption of lipid soluble drugs is less. Gastric emptying time is prolonged in the first day. So drugs, which are absorbed primarily in the stomach may be absorbed more completely. For drugs absorbed in the small intestine, therapeutic effects may be delayed. Peristalsis in neonates is slow. More drug, therefore, will get absorbed from the small intestine. The volume of distribution is low in children, and drug metabolizing enzymes are not well developed. The glomerular filtration rate is
slower than adults (30-40%). So the clearance of drugs is slower in children than in adults. This definitely demands for dose adjustment in this age group.

**Dose adjustment in pediatrics:**
The most reliable pediatric doses are those given by the manufacturer. If no such information is given, the dose can be calculated using formulae based on age, weight or surface area. Calculations of doses based on age or weight are conservative and tend to underestimate the required dose. Doses based on surface area are more likely to be adequate. This is available in form of chart. Pediatric doses can be calculated as follow:

- **Dose calculations based on Age:**
  \[ \text{Dose} = \text{adult dose} \times \frac{\text{age (years)}}{\text{Age} + 12} \]

- **Dose calculations based on weight**
  \[ \text{Dose} = \text{adult dose} \times \frac{\text{weight (kg)}}{70} \]

**Prescribing for elderly patients**
There is no major alteration in drug absorption in elderly patients. Conditions associated with age may alter the rate of absorption of some drugs. Such conditions include altered nutritional habits, alteration in gastric emptying, which is often slower and the concurrent administration of other drugs. Aged people have reduced lean body mass, reduced body water and an increase in fat as a percentage of body mass. There is a decrease in serum albumin, and the ratio of bound to free drug is significantly changed. Phase I reactions are more affected in elderly patients than phase II. There is a decline with age of the liver’s ability to recover from injury. Diseases that affect hepatic function like congestive cardiac failure are more common in the elderly. Severe nutritional deficiencies in the elderly may impair hepatic function. Creatinine clearance declines in the elderly leading to marked prolongation of the half life of drugs. The increased incidence of active pulmonary disease in the elderly could compromise drug elimination through exhalation. There is also a change in the sensitivities of receptors to drugs in aged people. The quality and quantity of life in elderly patients can be improved by intelligent use of drugs. Compliance to the doses is absolutely required in these patients.
Unfortunately patient noncompliance in the elderly is common because of forgetfulness, confusion, deliberate skipping of doses and physical disabilities as in the case of tremors which cause errors in measurement by spoon.

**Prescribing in renal failure**

Many drugs are excreted through the kidneys and impairment of renal function alters the excretion of these drugs and may result in renal as well as nonrenal toxicity unless doses are adjusted on the basis of the degree of renal impairment. There are two principal pathways for drug excretion by the kidneys: glomerular filtration and tubular excretion. Glomerular filtration plays a major role in the excretion of small, non-protein bound molecules whereas protein bound molecules that are renally excreted are eliminated by secretion into the proximal tubules.

For dose adjustment in renal failure it may occasionally be necessary to measure drug levels and adjust doses accordingly but generally doses are adjusted on the basis of the estimated glomerular filtration rate (GFR). Among the various formulae used to estimate the GFR from the serum creatinine, the Cockcroft Gault formula is the easiest to use although not the most accurate. The GFR in the C&G formula is calculated as follows:

\[
GFR = \frac{(140 - \text{age}) \times \text{lean body weight (kg)}}{\text{Serum creatinine (mg/dl)} \times 72}
\]

The value is multiplied by 0.85 in women to account for the smaller muscle mass.

Factors that potentiate renal dysfunction and contribute to the nephrotoxic potential of renally excreted drugs include i) intravascular volume depletion either due to external losses or fluid sequestration (as in ascites or edema) ii) concomitant use of 2 or more nephrotoxic agents e.g. Nonsteroidal anti-inflammatory agents, aminoglycosides, radio contrast agents.

In general in the presence of renal impairment to avoid worsening of renal dysfunction

1) Avoid potentially nephrotoxic drugs and use alternative drugs that are excreted through other routes.
2) If there are no alternative drugs to use calculate the GFR and adjust the dose on the basis of the estimated GFR. (Many textbooks, formularies have tables showing dose adjustment on the basis of estimated GFR). Dose adjustment may be accomplished in three different ways i) Decreasing each individual dose and maintaining the same dose frequency ii) Maintaining the same individual dose but administering each dose less frequently and iii) Modifying both individual doses and the frequency of administration, which is a combination method.

3) Avoid concomitant use of 2 or more potentially nephrotoxic agents.

4) Insure that the patient is adequately hydrated.

5) If the patient is on dialysis check if the drug is eliminated by the specific dialysis modality and consider administering a supplemental dose at the end of the dialysis session.

6) Serially monitor kidney function.

**Prescribing in liver disease**

The liver is a site for the metabolism and elimination of many drugs but it is only in severe liver disease that changes in drug metabolism occur. Unfortunately, routine determination of liver enzymes and other tests of liver function can not predict the extent to which the metabolism of a certain drug may be impaired in an individual patient.

In general terms drug prescription should be kept to a minimum in all patients with severe liver disease as liver disease may alter the response to drugs in several ways. Major problems occur in patients with advanced liver disease who have ascites, jaundice or hepatic encephalopathy.

- The hypoproteinemia in patients with severe liver disease is associated with reduced protein binding and with increased toxicity when highly protein bound drugs are used.
- One must exercise caution in the use of some drugs like sedatives, opioids and diuretics which may precipitate hepatic encephalopathy in patients with advanced liver disease.
It is always advisable to consult tables in standard textbooks or drug formularies before prescribing drugs for patients with severe liver disease.

**Prescribing in Palliative Care**

Palliative care is the active total care of patients whose disease is not responsive to curative treatment. Focus on four main domains: 1) Control of pain and other physical symptoms 2) Mental or psychological symptoms 3) Social needs and 4) Spiritual needs are fundamental to the provision of quality palliative care. This requires careful assessment of the symptoms and needs of the patient by a multidisciplinary team. The family should be included in the care of such terminally ill patients.

The number of drugs should be as few as possible. Oral medications are usually satisfactory unless there is severe nausea and vomiting, dysphagia, weakness, or coma, in which case parenteral medications may be necessary. The most common drug classes used in palliative care are strong opioids, nonopioids, corticosteroids, laxatives, antiemetics, gastric protection agents, neuroleptics, sedatives/anxiolytics, antidepressants and diuretics.

**Pain management in palliative care**

Interventions for pain must be tailored to each individual with the goal of preempting chronic pain and relieving breakthrough pain. Pain relief in palliative care may require nonpharmacologic interventions such as radiotherapy or neurosurgical procedures such as peripheral nerve blocks. Pharmacologic interventions follow the World Health Organization three-step approach involving nonopioid analgesics, mild opioids and strong opioids with or without adjuvants.

Analgesics are more effective in preventing pain than in the relief of established pain; it is important that they are given regularly. Nonopioid analgesics, especially nonsteroidal anti-inflammatory drugs, are the initial management for mild pain. Ibuprofen, up to 1600mg/day, has a minimal risk of gastrointestinal bleeding and renal impairment and is a good initial choice. If nonopioid analgesics are insufficient,
then weak opioids such as Codeine should be used. However, if weak opioids are escalated and also fail to relieve pain, then strong opioids such as Morphine should be used. When using opioids start with short acting formulations and once pain relief is obtained switch to extended release preparations can be made. Opioids have no ceiling dose and the appropriate dose is the dose needed to achieve relief of pain. When using opioids side effects like constipation, nausea and vomiting have to be anticipated and treated preemptively.

Constipation is another physical symptom that may require pharmacologic management and one may use stimulant laxatives such as Bisacodyl or osmotic laxatives, such as Lactulose or Magnesium Hydroxide.

**General guidelines for use of topical steroids**

- Absorption from the skin depends on the sites (high at axilla, face and scalp; medium at limbs and trunk; and low at palm, elbow and knee) and nature of lesion (high in exfoliative dermatitis and low in hyperkeratinised skin)
- Strong preparations should be avoided at highly absorption sites and on acute lesions, they may, however, be used for chronic lesions.
- Lotions/creams are better for exudative lesions for they allow evaporation, have a cooling, drying and antipruritic effect
- Sprays and gels are good for hairy regions
- Ointments form occlusive film and are good for chronic scaly conditions
- Occlusive dressing enhances steroid absorption, retains moisture and results in maceration of horny layer
- Absorption is more in pediatric patients, hence milder preparations should be used
- Do not use strong steroids routinely
- Strong preparations should be restricted for short term use only
- Sudden withdrawal should be avoided
- Upon improvement, milder preparations should be substituted
- Twice a day application is enough, do not exceed three times application a day
Drug incompatibilities

Drugs should not be added to blood, amino acid solutions or fat emulsions. Some drugs, when added to IV fluids, may be inactivated due to change in pH, precipitate formation or chemical reaction. For example, benzylpenicillin and ampicillin loose potency after 6-8 hours if added to dextrose solutions, due to the acidity of the solutions. Some drugs, such as diazepam and insulin, bind to plastic containers and tubing. Aminoglycosides are incompatible with penicillins and heparin. Hydrocortisone is incompatible with heparin, tetracycline and chloramphenicol.

Narcotics and controlled substances

The prescribing of a drug that is liable to be abused requires special attention and may be subject to specific legal requirements. Authorized health workers must use these drugs with a full sense of responsibility. The strength, directions and quantity of the controlled substance to be dispensed should be stated clearly. Required details must be filled in the prescription form carefully to avoid alteration and abuse.

Antimicrobial prophylaxis

Postoperative wound infections are the major source of infectious morbidity in the surgical patient. Surgical site infections (SSIs) are associated with prolonged hospital stays and increase cost. The use of antimicrobial prophylaxis has become an essential component of the standard of care in virtually all surgical procedures and has resulted in a reduced risk of postoperative infection when sound and appropriate principles of prophylaxis are applied which include:

I. There is probable risk of infection in the absence of a prophylactic agent.
II. There must be knowledge of the probable contaminating flora associated with the operative wound or organ site.
III. The activity of the chosen prophylactic agent should encompass the majority of pathogens likely to contaminate the wound or operative site.
IV. When more than one choice is given as a prophylactic agent, the agents or agents selected should be based on the most likely contaminating organisms.
V. Single antimicrobial agent is preferable.
VI. The prophylactic agent must be administered in a dose which provides an effective tissue concentration prior to intra-operative bacterial contamination. **Administration must occur 30-45 minutes prior to incision** (usually with the induction of anesthesia).
VII. The effective dose should be governed by the patient’s weight.

VIII. In procedures lasting 3 hours or less, a single prophylactic dose is usually sufficient. Procedures lasting greater than three hours require an additional effective dose. Procedures in which there is rapid blood loss and/or fluid administration will dictate more frequent prophylactic dosing. Under no circumstance should any prophylactic agent be given on-call because it often results in less than effective tissue levels at the time of incision. Postoperative prophylaxis is strongly discouraged except in the scenario of a bioprosthetic insertion in which case 2 or 3 additional prophylactic doses may be deemed sufficient (Warning: there are no standard rules on prophylaxis following prosthetic insertion and clinical experience strongly dictates practice).

IX. Vancomycin may be used for patients with severe penicillin/cephalosporin allergy.

X. An effective and thoughtful prophylactic regimen is no substitute for exquisite surgical technique and competent postsurgical management.

**Antimicrobial prophylaxis in selected surgeries**

<table>
<thead>
<tr>
<th>Type of procedure</th>
<th>Agent</th>
<th>Route</th>
<th>Dosage</th>
<th>Time of administration</th>
<th>Rationale (likely infective agent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Clean surgery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Insertion of synthetic biomaterial device/prosthesis</td>
<td>Cefazolin Or Cefuroxime</td>
<td>IV</td>
<td>750mg</td>
<td>30-45min before skin incision, 2nd dose if procedure lasts &gt; 3hrs</td>
<td>Gm positive cocci (S. aureus and epidermidis), aerobic coliforms (E. coli)</td>
</tr>
<tr>
<td>b. Patients with impaired immunity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Upper GIT and elective bowel surgeries (stomach, small bowel, pancreas, hepatobiliary etc)</td>
<td>Ciprofloxacin Or Cefazolin Plus Metronidazole</td>
<td>IV</td>
<td>400mg and 750mg or 500mg</td>
<td>**</td>
<td>Coliforms &gt; Enterococcus &gt; Streptococci &gt; Aerobic enterococci &gt; Clostridia &gt; Peptostreptococci</td>
</tr>
<tr>
<td>III. Large bowel resection</td>
<td>Bisacodyl Neomycin Plus Erythromycin Cefazolin Or Ceftetan</td>
<td>PO</td>
<td>2tablets (500mg) and 1-2gm (500mg) and 1-2gm (1-2gm)</td>
<td>2days before surgery 1pm, 2pm and 10pm before surgery 30-45min before skin incision, 2nd dose if procedure lasts &gt; 3hrs</td>
<td>Coliforms, enterococci, Bacteriodes, peptostreptococci, Clostridia</td>
</tr>
<tr>
<td>IV. Acute appendicitis (Non-perforated)</td>
<td>Cefazolin Plus Metronidazole</td>
<td>IV</td>
<td>1gm and 500mg</td>
<td>30-45min before skin incision</td>
<td>Coliforms, anaerobes</td>
</tr>
<tr>
<td>NB: In perforated or gangrenous cases treatment should continue as clinically indicated</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>V. Trauma surgery (penetrating abdominal trauma)</strong></td>
<td>Ampicillin Or Cefazolin Plus metronidazole</td>
<td>IV</td>
<td>3gm</td>
<td>2nd dose if surgery lasts &gt; 3hrs</td>
<td>Coliforms and anaerobes (gm positive and negative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-2gm</td>
<td>500mg</td>
<td></td>
</tr>
<tr>
<td><strong>VI. Gynecology and Obstetrics</strong></td>
<td>Ceftriaxone Or Cefazolin</td>
<td>IV</td>
<td>1gm</td>
<td>1gm</td>
<td>“</td>
</tr>
<tr>
<td>a. Vaginal and abdominal hysterectomy including radical hysterectomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In high risk patients 2gm may be used after clamping the umbilical</td>
</tr>
<tr>
<td>b. Cesarean section/ hysterectomy</td>
<td></td>
<td>1gm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VII. Urology</strong></td>
<td>Cefazolin Or Ciprofloxacin Or Pencillin G</td>
<td>IV</td>
<td>1gm</td>
<td>cord 30-45min before skin incision</td>
<td>Coliforms, staphylococci, Pseudomonads</td>
</tr>
<tr>
<td>Prostatectomy</td>
<td>Cefazolin Or Pencillin G</td>
<td>IV</td>
<td>400mg</td>
<td>2-4MU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone Or Cefazolin</td>
<td>IV</td>
<td>1gm</td>
<td>2-4MU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone Or Cefazolin</td>
<td>IV</td>
<td>2gms</td>
<td>20-45min before skin incision</td>
<td></td>
</tr>
<tr>
<td><strong>VIII. Head and neck surgery</strong></td>
<td>Cefazolin Or Ceftriaxone</td>
<td>IV</td>
<td>1gm</td>
<td>“</td>
<td>Staphylococci</td>
</tr>
<tr>
<td>a. Clean procedure (skin incision and dissection)</td>
<td></td>
<td></td>
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<td></td>
<td>“</td>
</tr>
<tr>
<td>b. Mandibular fracture</td>
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</tr>
<tr>
<td><strong>IX. Orthopedics (Traumatic open fractures)</strong></td>
<td>Cefazolin Or Ceftriaxone</td>
<td>IV</td>
<td>1gm</td>
<td>“</td>
<td>Staphylococci</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>X. Neurosurgery</strong></td>
<td>Cefazolin</td>
<td>IV</td>
<td>1gm</td>
<td>“</td>
<td>“</td>
</tr>
</tbody>
</table>
HOW TO USE THE STANDARD TREATMENT GUIDELINE

This standard treatment guideline has been prepared and subsequently revised to improve on the treatment practice of health workers at various levels in the national health care system. The guideline has been prepared with the assumption that health workers at various levels have the required training and competence to make a diagnosis that is appropriate at their level. It does not, therefore, provide very detailed information on how to make a diagnosis. In line with the organization of health services in the public sector the STGs have been prepared for Zonal Hospital, District Hospital and Health Center.

Once a diagnosis has been made the STG helps the health worker to choose the most appropriate drug and gives him/her information on the dose, duration of treatment, common side effects, contraindications, drug interactions, etc. All drugs that are recommended in the standard treatment guideline are those that are included in the current National Drug List for Ethiopia.

Diseases in the STG have been chosen primarily on the basis of their prevalence as well as perceived importance at each level of the health care system. Diseases in the STG have been categorized under infectious diseases, non-infectious diseases, common skin conditions, common pediatric problems, common obstetrics and gynecology problems, common ophthalmologic and Ear, Nose and Throat (ENT) disorders and acute/emergency problems. To obtain information on a specific disease the user is advised to look under the relevant chapter but for a faster reference the index can be used to find the right page/s.

Users are encouraged to send their comments/suggestions on the content as well as the format of the STG to the Drug Administration and Control Authority of Ethiopia.
CHAPTER I

INFECTIOUS DISEASES

Acquired Immuno Deficiency Syndrome
Amebiasis
Amebic liver Abscess
Bacillary Dysentry
Bronchitis (Acute)
Brucellosis
Cholera
Gastroenteritis
Giardiasis
Intestinal Parasitic Infestations
Leishmaniasis
Leprosy
Malaria
Meningitis
Onchocerciasis
Pneumocystis carinii( jirovecii) Pneumonia
Pneumonia
Pneumonias (Aspiration) and Lung Abscesses
Pyogenic Osteomyelitis
Relapsing Fever
Schistosomiasis
Septic Arthritis
Subacute Bacterial Endocarditis
Tetanus
Toxoplasmosis(CNS)
Tuberculosis
Typhoid Fever
Typhus
Urinary Tract Infection
Viral hepatitis
Acquired Immuno Deficiency Syndrome (AIDS)

AIDS is a chronic infectious disease caused by the Human Immuno-deficiency Virus type 1 and 2. It is transmitted largely by sexual contacts. Other important means of transmission are direct contact to contaminated blood and blood products and from infected mother to child. It is essentially a disease of the immune system, which results in progressive immunodeficiency state. This immunodeficiency fails to control various types of infections from causing diseases and the development of malignancies. The clinical manifestation is quite variable depending on the degree of immunodeficiency which determines the clinical stage of the disease. At advanced immunodeficiency, patients are at a very high risk of being infected with less virulent organisms (opportunistic infections). Refer to Table I for a list of clinical conditions in the four WHO stages of HIV disease.

Diagnosis

- Demonstration of antibodies to HIV by Rapid test using the National HIV test algorism
- HIV antigen detection
- Direct detection of the virus using PCR
Table I: Clinical Staging of HIV Disease. World Health Organization Classification System

**Clinical Stage 1**
1. Asymptomatic infection
2. Persistent generalized lymphadenopathy
3. Acute Retroviral(HIV) Syndrome
   
   **Performance Status 1: asymptomatic, normal activity**

**Clinical Stage 2**
1. Unintentional weight loss < 10% body weight
2. Minor mucocutaneous manifestations (e.g., PPE seborrhicdermatitis, prurigo, fungal nail infections, cheilitis)
3. Herpes zoster within previous 5 years
4. Recurrent upper respiratory tract infections
   
   **Performance Status 2: symptoms, but nearly fully ambulatory**

**Clinical Stage 3**
1. Unintentional weight loss > 10% body weight
2. Chronic diarrhea > 1 month
3. Prolonged fever > 1 month (constant or intermittent)
4. Oral candidiasis
5. Oral hairy leukoplakia
6. Pulmonary tuberculosis within the previous 2 years
7. Severe bacterial infections
8. Vulvovaginal candidiasis
9. Unexplained Anemia, Neutropenia or chronic thrombocytopenia
   
   **Performance Status 3: in bed more than normal but < 50% of normal daytime during the previous month**

**Clinical Stage 4**
1. HIV wasting syndrome
2. Pneumocystis carinii pneumonia
3. Toxoplasmosis of the brain
4. Cryptosporidiosis with diarrhea > 1 month
5. Isosporiasis with diarrhea > 1 month
6. Cryptococcosis, extrapulmonary
7. Cytomegalovirus disease of an organ other than liver, spleen or lymph node
8. Herpes simplex virus infection, mucocutaneous
9. Progressive multifocal leukoencephalopathy
10. Any disseminated endemic mycosis (e.g., histoplasmosis)
11. Candidiasis of the esophagus, trachea, bronchi, or lung
12. Atypical mycobacteriosis, disseminated
13. Non-typhoid Salmonella septicemia
14. Extrapulmonary tuberculosis
15. Lymphoma
16. Kaposi's sarcoma
17. HIV encephalopathy
18. Viseral Leishmaniasis
19. HIV-associated cardiomyopathy
20. HIV-associated nephropathy
   
   **Performance Status 4: in bed > 50% of normal daytime during previous month**
Treatment

Management of HIV disease includes prevention and treatment of opportunistic infections (OIs) and controlling viral replication with Anti Retroviral Drugs (ARVDs) as Highly Active Antiretroviral Therapy (HAART).

Indications for initiation of ART

General Considerations for Anti-Retroviral Therapy (ART):

The goal of anti-retroviral therapy (ART) is to attain maximal and durable suppression of the viral replication. Effective ART should restore and/or preserve immunologic function. The effectiveness of ART is assessed by clinical observations, CD4 cell count and determination of plasma viral load. ART initiation should be timed appropriately and not delayed until the immune system is irreversibly damaged. Consideration to the stage of the HIV disease and the degree of immune damage determine the timing of initiation of ART.

For ART naïve patients, treatment is initiated with a combination of 3 drugs (Triple Therapy); consisting of two Nucleoside Reverse Transcriptase Inhibitors (NRTIs) and a third drug from the Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI) or Protease Inhibitors (PI).

Criteria for initiating ART in Adults and Adolescents:

Criteria for initiating antiretroviral therapy in adults and adolescents with documented HIV infection are as follows:

1. If CD4 Testing is Available
   - WHO Stage 4 disease irrespective of CD4 cell count
   - WHO Stage 3 disease with CD4 cell count <350/mm³
   - WHO Stage 1, and 2 or with CD4 cell count <200/mm³

2. If CD4 testing is Unavailable
   - WHO Stage 3 and 4 disease irrespective of total lymphocyte count
   - WHO Stage 2 disease with a total lymphocyte count <1200/mm³
Drug regimens

First-line regimens for adults and adolescents (Table II)
First line regimen is the combination of ARVs started for treatment naive patient for the first time.

Table II: Recommended first line antiretroviral regimens in adults and adolescents

<table>
<thead>
<tr>
<th>Recommended ARV Regimens for Adults and Adolescents: One of the following should be used unless there are contraindications:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred</strong></td>
</tr>
<tr>
<td>TDF+FTC+EFV = triple Fixed Drug Combination (FDC)</td>
</tr>
<tr>
<td>ZDV+3TC+EFV= double FDC +EFV</td>
</tr>
<tr>
<td>ZDV+3TC+NVP = triple FDC</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table III. Dosages of anti-retroviral drugs for adults and adolescents

<table>
<thead>
<tr>
<th>Drug class/Drug</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nucleoside &amp; Nucleotide RTI's</strong></td>
<td></td>
</tr>
<tr>
<td>Zidovudine (ZDV)</td>
<td>300 mg twice daily</td>
</tr>
<tr>
<td>Stavudine (d4T)</td>
<td>30 mg twice daily</td>
</tr>
<tr>
<td>Lamivudine (3TC)</td>
<td>150 mg twice daily</td>
</tr>
<tr>
<td>Didanosine (ddl)</td>
<td>400 mg once daily (250 mg once daily if &lt; 60 kg)</td>
</tr>
<tr>
<td>Abacavir (ABC)</td>
<td>300 mg twice daily</td>
</tr>
<tr>
<td>Tenofovir(TDF)</td>
<td>300 mg daily</td>
</tr>
<tr>
<td>Emtricitabine(FTC)</td>
<td>200 mg daily</td>
</tr>
<tr>
<td><strong>Non-Nucleoside RTI's</strong></td>
<td></td>
</tr>
<tr>
<td>Efavirenz (EFZ)</td>
<td>600 mg once daily</td>
</tr>
<tr>
<td>Nevirapine (NVP)</td>
<td>200 mg once daily for 14 days, then 200 mg twice daily</td>
</tr>
<tr>
<td><strong>Protease Inhibitors</strong></td>
<td></td>
</tr>
<tr>
<td>Nelfinavir (NFV)</td>
<td>1250 mg twice daily</td>
</tr>
<tr>
<td>Indinavir/Ritonavir (IDV/r)</td>
<td>800mg/100 twice daily b,d</td>
</tr>
<tr>
<td>Lopinavir/ritonavir (LPV/r)</td>
<td>400 mg/100 mg twice daily (533 mg/133 mg twice daily when combined with EFZ or NVP)</td>
</tr>
<tr>
<td>Saquinavir/ritonavir (SQV/r)</td>
<td>1000 mg/100 mg twice daily c,d</td>
</tr>
</tbody>
</table>

a. These dosages are in common clinical use. The dosages featured in this table were selected based on the best available clinical evidence. Dosages that can be given on a once or twice daily basis were preferred in order to enhance adherence to therapy. The doses listed are those for individuals with normal renal and hepatic function. Product specific information should be consulted for dose adjustments that may be indicated with renal or hepatic dysfunction or for potential drug interactions with other HIV and non-HIV medications.

b. This dosage regimen is in common clinical use. Other IDV/r dosage regimes that range from 800 mg/200 mg bid to 400 mg/100 mg bid are also in clinical usage.

c. Both the hard-gel and soft-gel capsule formulations can be used when SQV is combined with RTV.

d. Dosage adjustment when combined with an NNRTI is indicated but a formal recommendation cannot be made at this time. One consideration is to increase the RTV
component to 200 mg bid when EFZ or NVP is used concomitantly. More drug interaction data are needed.

**Second-line ARV combination regimens for adults and adolescents (Table IV)**
Second line regimen is the combination of ARVs given for a patient who has been taking ART and developed treatment failure, or severe side effects

**Table IV: First and Second-Line ARV Regimens in Adolescents and Adults**

<table>
<thead>
<tr>
<th>First-line Regimen</th>
<th>Second-line Regimen (during treatment failure)</th>
</tr>
</thead>
</table>
| TDF+FTC or 3TC +EFV or NVP | ZDV ±3TC +LPV/r or ATV/r  
Or ZDV+ABC+LPV/r or ATV/r |
| ZDV or d4T+3TC+EFV or NVP | TDF+3TC±ZDV+LPV/r or ATV/r  
Or ABC + ddI +LPV/r or ATV/r |
| ABC + 3TC + ZDV | EFV or NVP + LPV/r or ATV/r |

*a* Didanosine alone must be taken on an empty stomach, at least one hour before or at least 2 hours after (<50% absorbed after) a meal. Tablets should be dissolved in at least 30 ml of water; no other liquids may be used to dissolve the tablets. The enteric coated version will not need to be dissolved.

*b* LPV/r use the heat stable tablet (200/50 mg).

- Atazanavir/ritonavir has equivalent efficacy to LPV/r and has advantage of being given once a day and in patients with dyslipidemia.
- If TDF and ABC have been used in the first-line regimen, patients may be referred to experienced physicians for selection of the second-line drugs.
- Drug hypersensitivity and high-level cross-resistance to long term use of thymidine analogues (ZDV and d4T) are concerns when using ABC.
- TDF can be compromised by multiple nucleoside analogue mutations (NAMs) but often retains activity against nucleoside-resistant viral strains. It is attractive in that, like ddI, it is administered once daily.

**Monitoring ARV Treatment**

**Drug Adherence**
- Patient and attendant or family education and counseling before initiation of therapy is mandatory to maximize future adherence
• Ongoing attention and counseling is crucial to enforce adherence throughout the entire course of treatment.

• Strategies to enhance adherence include:
  ▪ Minimizing pill counts and dosage frequencies, preferentially using combination pills on a once or twice daily basis.
  ▪ Enlisting the assistance of family or community members to support patients in taking their medications.
  ▪ Tackling psychosocial issues that can contribute to low adherence to therapy.

• WHO recommends that innovative approaches to enhance adherence to ART be developed and used.

• It is advisable for patients on triple therapy to be seen:
  ▪ Bi-monthly; particularly at the initiation of treatment. Once stabilized, patients may then be seen every three months.
  ▪ At each visit, side effects and adherence to the treatment should be discussed in depth.

**Baseline Clinical assessment:**
It should include the following:-

• Documentation of past medical history (including major illnesses, tuberculosis, hospitalizations and surgeries)
• Length of time since the diagnosis of HIV,
• Current medications
• Identification of co-existing medical conditions that may influence choice of therapy (such as TB or pregnancy)
• Current symptoms or physical signs

• This clinical assessment should be supplemented with review of the expected benefits and potential side-effects of regimen to be chosen, possible drug interactions (e.g. with contraceptives, ant-tuberculosis drugs), patient-caregiver partnership, commitment to long-term treatment and adherence to drug therapy, any perceived side-effects, and maintenance of safe sexual practices.
• **Once on ART:** first follow-up visit will be two weeks after initiation of treatment and every one to two months thereafter. The visits should be combined with drug dispensing, and should be used also as an opportunity to reinforce adherence.

During each visit, patient should be evaluated for new symptoms that may be related to drug side effects, the disease progression, and clinical improvements/deterioration, development of OIs or recurrent problems that may exist.

**Monitoring for toxicity of ART**

**Clinical monitoring for toxicity of ART**

- All patients require clinical evaluation every month in the first 6 months for ARV related toxicity. Subsequent follow-up can be done every 3 months.

**Laboratory monitoring for toxicity of ART:**

- **Baseline:** Hemoglobin/hematocrit, white blood cell count and differential, serum alanine aminotransferase, serum creatinine and/or blood urea nitrogen, serum glucose, pregnancy test. **Resources permitting:** serum bilirubin, amylase, triglycerides, and cholesterol.

- **Follow-up:** The above investigations need to be repeated bi-monthly, particularly at the start of treatment. Once stabilized, investigations may then be performed every three months and at any time when they are indicated.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Major S/E</th>
<th>C/I</th>
<th>Dosage forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRTIs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zidovudine</td>
<td>Anemia, nausea, hyperpigmentation</td>
<td>Severe anemia</td>
<td>Tablet, 150mg, 300mg; Capsule, 100mg, 250mg; Syrup, 50mg/ml; I.V. infusion, 10mg/ml</td>
</tr>
<tr>
<td>Didanosine</td>
<td>Pancreatitis, neuropathy</td>
<td></td>
<td>Tablet, 25mg, 150mg; chewable/dispersable, 100mg</td>
</tr>
<tr>
<td>Lamivudine</td>
<td>GI disturbances</td>
<td></td>
<td>Tablet, 150mg; Oral solution, 100mg/ml</td>
</tr>
<tr>
<td>Stavudine</td>
<td>Pancreatitis, neuropathy, liver damage</td>
<td></td>
<td>Capsule, 15mg, 20mg, 30mg, 40mg; Oral solution, 100mg/ml</td>
</tr>
<tr>
<td>Abacavir</td>
<td>hypersensitivity</td>
<td>Hyper-sensitive to it</td>
<td>Tablet, 300mg</td>
</tr>
<tr>
<td>Emitricitabine</td>
<td>Headache, diarrhea, nausea, rash</td>
<td></td>
<td>Tablet, 100mg</td>
</tr>
<tr>
<td>Tenofovir</td>
<td>GI disturbances</td>
<td></td>
<td>Tablet, 300mg</td>
</tr>
<tr>
<td>NNRTIs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efavirenz</td>
<td>Skin rashes</td>
<td></td>
<td>Capsule 50mg, 100mg, 200mg</td>
</tr>
<tr>
<td>Nevirapine</td>
<td>Hepatitis, rash, fever, artralgia, myalgia</td>
<td></td>
<td>Tablet, 200mg; Oral suspension, 50mg/5ml</td>
</tr>
<tr>
<td>Pis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indenavir</td>
<td>Nephrolithiasis, thrombocytopenia, GI disturbances</td>
<td></td>
<td>Capsule, 200mg, 400mg</td>
</tr>
<tr>
<td>Nelfinavir</td>
<td>Parasthesia, altered taste, GI disturbances, hyperlipidemia, liver damage</td>
<td></td>
<td>Tablet, 250mg; Oral solution, 50mg/ml</td>
</tr>
<tr>
<td>Ritonavir</td>
<td></td>
<td></td>
<td>Capsule, 100mg; Oral solution, 80mg/ml</td>
</tr>
<tr>
<td>Saquinavir</td>
<td>GI disturbances</td>
<td></td>
<td>Capsule, 200mg; Tablet, 500mg; Oral suspension, 80mg/5ml</td>
</tr>
<tr>
<td>Atazanivir</td>
<td>Headache, nausea, vomiting, diarrhea, rash, itching, swelling</td>
<td>Known hypersensitivity</td>
<td>Tablet, 100mg, 150mg, 200mg</td>
</tr>
<tr>
<td>Fixed Combinations</td>
<td>The combination of individual S/Is</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emitricitabine+Tenofovir</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Tablet, 200mg+300mg</td>
</tr>
<tr>
<td>Lamivudine+Stavudine</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Tablet, 150mg+30/40mg</td>
</tr>
<tr>
<td>Lopinavir+Ritonavir</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Capsule, 133.33mg+33.33mg; Tablet, 200mg+50mg; Oral suspension, 80mg+20mg/5ml</td>
</tr>
<tr>
<td>Efavirenz+Emitricitabine+Tenofovir</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Tablet, 600mg+200mg+300mg</td>
</tr>
<tr>
<td>Lamivudine+Nevirapine+Stavudine</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Tablet, 150mg+200mg+30/40mg</td>
</tr>
<tr>
<td>Lamivudine+Zidovudine+Nevirapine</td>
<td>The combination of individual S/Is</td>
<td></td>
<td>Tablet, 150mg+300mg+200mg</td>
</tr>
</tbody>
</table>
Monitoring Effectiveness of ART

Response to ART is monitored using both clinical and laboratory parameters.

Laboratory parameters

a. The concentration of HIV - RNA in plasma (the "viral load")
   - The desirable *virologic* endpoint is a plasma viral load that is: "below the limits of detection", within 3 to 4 months of starting treatment, and
   - The achievement of a minimum decline from the baseline viral load of $1.5 \text{ to } 2.0 \log_{10} \text{ by the end of the first month of treatment.}$
   - The plasma viral load is checked at baseline then after one month of initiating therapy and two-monthly thereafter until the virologic goal of therapy is achieved. Following this, plasma viral load may be checked every 3 to 4 months.

   **N.B.** In patients with higher baseline plasma viral loads (e.g. above 100,000 copies/ml by RT-PCR) maximal suppression of viral replication may take a longer time.

b. CD4+ cell count
   - When optimal therapy is achieved, the median CD4+ cell rise is 50-100 cells within the first year.
   - The CD4+ cell response may lag behind the “virologic response” in timing and at times the two responses may even be discordant.
   - In general CD4+ count, is checked at baseline, thereafter it may be checked every 3 month in 1st year the every 6 month in the 2nd year and every 12 months
   - In places where CD4+ count can not be done, total lymphocyte count can be used.

Clinical Parameters:

- An increase in body weight.
- Decrease in frequency and severity of OIs.
- Decrease in frequency and severity of HIV related malignancies.
Table VI: Definitions of treatment failure in adults and adolescents

<table>
<thead>
<tr>
<th>Definition</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Failure</strong></td>
<td>New or recurrent WHO stage 4 condition (^{b,c})</td>
</tr>
<tr>
<td><strong>Immunologic Failure</strong></td>
<td>* Fall of CD4 count to pre-therapy baseline (or below);</td>
</tr>
<tr>
<td></td>
<td>• 50% fall from the on-treatment peak value (if known);</td>
</tr>
<tr>
<td></td>
<td>• Persistent CD4 levels below 100 cells/mm(^3)</td>
</tr>
<tr>
<td><strong>Virological Failure</strong></td>
<td>Plasma viral load above 10,000 copies/ml in duplicates after six months on ART.</td>
</tr>
</tbody>
</table>

a. Should be differentiated from Immune Reconstitution Inflammatory Syndrome (IRIS).
b. Certain WHO clinical conditions (e.g. pulmonary TB, severe bacterial infections), may indicate treatment failure and should be investigated.
c. Some WHO clinical stage 4 conditions (lymph node TB, uncomplicated TB pleural disease, oesophageal candidiasis, recurrent bacterial pneumonia) may not be indicators of treatment failure and thus do not require consideration of second-line therapy.
d. Without concomitant infection to cause transient CD4 cell decrease. If patient is asymptomatic and treatment failure is being defined by decreased CD4 cell criteria alone, consideration should be given to performing a repeat CD4 cell count before establishing diagnosis of treatment failure.

Post-exposure prophylaxis (PEP)

Universal precaution is the most effective way of protecting individuals from accidental transmission of HIV and other blood borne pathogens. The priority therefore must be put on training health care giver in prevention methods and to provide them with necessary safe materials and protective equipment.
Assessment of risk of exposure

Low risk exposure:

- Exposure to a small volume of blood or blood contaminated with fluids from asymptomatic HIV positive patients.
- Following an injury with a solid needle.
- Any superficial injury or muco-cutaneous exposure.

High risk exposure

- Exposure to a large volume of blood or other potentially infectious fluid.
- Exposure to a large volume of blood or blood contaminated with fluids from a patient with clinical AIDS or early sero-conversion phase of HIV.
- Injury with a hollow needle
- Deep and extensive injuries.

Timing of initiation of treatment:

- Should be given in the shortest time possible (within the first 1-4 hours of exposure)
- Do not consider PEP beyond 72hrs.

Doses for post exposure prophylaxis (see Table VII)

Table VII: Post exposure prophylaxis

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>ARV Prophylaxis</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk (2 drug regimen)</td>
<td>ZDV 300 mg bid + 3TC 150 mg bid or ZDV + 3TC 1 tab bid</td>
<td>For 28 days</td>
</tr>
<tr>
<td>High risk (3 drug regimen)</td>
<td>ZDV 300 mg bid +3TC 150 mg bid + EFZ 600 mg daily Lopinavir/ritonavir (LPV/r) can be used as alternative to EFZ if available.(LPV/r 400/100mg</td>
<td>For 28 days</td>
</tr>
</tbody>
</table>
AMEBIASIS
Amebiasis is an acute and chronic cause of diarrheal diseases caused by the protozoa *Entamoeba histolytica*. It is transmitted by the faeco-oral route, and infection is usually caused by ingestion of cysts from contaminated foods or drinks. Symptoms range from mild diarrhea to severe dysentery producing abdominal pain, diarrhea, and bloody stools. Weight loss and fever occurs rarely. Fulminant colitis with bowel necrosis leading to perforation and peritonitis can occur and is associated with a mortality rate of more than 40%.

Diagnosis
By identification of the RBC ingesting trophozoites of *E. histolytica* by direct stool examination.

Intestinal amoebiasis

Treatment

Drug Treatment

*First line*

**Metronidazole**, 500 - 750 mg P.O. TID for 5-7 days. For children: 7.5 mg/kg P.O. TID for 5-7 days.

*S/Es*: metallic taste, nausea and vomiting;

*C/I*s: epilepsy, hepatic malfunction, pregnancy several means including and hematological disorders.

*D/I*s: with disulfiram, confusion; with alcohol, disulfiram like reaction; with Cimetidine, decreased metabolism; with Phenobarbital, increased metabolism.

**Dosage forms**: Tablet, capsule, 250mg, Oral suspension, 125 mg/5ml; Syrup, 4% W/V, 250mg/5ml; intravenous infusion, 5 mg/ml in 100 ml.
Alternative

**Tinidazole**, 2g P.O. QD for 3 consecutive days. For children: 50-60 mg/kg daily for 3 days.

(For **S/Es** and **C/I**s, see under Metronidazole, page 14).

**Dosage forms**: tablet, 150 mg, and 500 mg

**AMEBIC LIVER ABSCESS**

Amebic liver abscess is the most common extra-intestinal manifestations of amebiasis. It is 7 to 10 times more common in adult men. In symptomatic patients, fever and right upper quadrant pain are the usual manifestations. Point tenderness over the liver with or without right side pleural effusion is also common.

**Treatment**

**Non-Drug treatment**: Aspiration of the abscess can be done whenever necessary.

**Drug treatment**

*First line*

**Metronidazole**, 500-750 mg, P.O. TID or 500 mg IV QID for 10 days.

For children: 7.5 mg/kg, P.O. TID for 5 days.

(For **S/Es**, **C/I**s and **dosage forms**, see page 14)

*Alternative*

**Tinidazole**, 2g P.O. QD for 3 consecutive days. For Children: 50-60 mg/kg daily for 3 days.

(For **S/Es**, **C/I**s and **dosage forms**, see above)

**BACILLARY DYSENTERY**

Bacillary dysentery is diarrheal disease caused by bacteria, which invade and destroys the intestinal epithelium. It is often caused by Shigella spp. Other less important causes are Campylobacter species, non-typhoidal Salmonella species and entero-invasive Escherichia coli. Transmission occurs via contaminated water or food. Common clinical manifestations include severe abdominal cramps, fever, watery, mucoid or bloody diarrhoea with tenesmus.
Diagnosis: Direct stool examination and stool culture

Treatment

Supportive treatment
- Correct dehydration with ORS or IV fluids
- Relieve pain and fever if necessary

(For the analgesic/antipyretic, and its dosage schedule, S/Es, C/Is and Dosage forms, see under paracetamol)

Drug treatment

First line

**Ciprofloxacin**, 500 mg P.O. BID for 3-5 days. For children: 7.5–15 mg/kg/day P.O. in 2 divided doses for only 3 days.

**S/Es**: mild GI upset; rash and pruritus; hypersensitivity reactions including fever, joint pain, urticaria. Discontinue the drug if psychiatric, neurological or severe hypersensitivity reactions occur.

**C/Is**: renal impairment, pregnancy, lactation, hypersensitivity to quinolones

**Dosage forms**: tablet, 250mg, 500mg; intravenous infusion, 2 mg/ml in 50 ml and 100 ml bottle

Alternatives

**Sulfamethoxazole+trimethoprim**, 800 mg/160 mg P.O. BID for 5-7 days. For children 6 weeks – 5 months: 100/20 mg; 6 months – 5 yrs, 200/40 mg; 6 – 12 yrs, 400/80 mg BID.

**S/Es**: nausea, vomiting; rash; blood disorders including neutropenia, thrombocytopenia and rarely agranulocytosis; antibiotic associated colitis.

**C/Is**: hepatic failure, porphyria; blood disorders.

**Dosage forms**: Mixture, 200 mg +40 mg in each 5 ml, Tablet (pediatric), 100 mg + 20 mg; Tablet (adult), 400 mg + 80 mg; 800 mg + 160 mg.
OR

**Ceftriaxone**, 1-2g stat or 2 divided doses IM or slow IV. For children: 20-50 mg/kg/day as a single dose or 2 divided doses IM or slow IV.

**S/Es:** diarrhea, nausea vomiting; Allergic reactions including rash, disturbance of liver enzymes, transient hepatitis and cholestatic jaundice.

**C/Is:** cephalosporin hypersensitivity and porphyria.

**Dosage form:** Injection, 0.2 g, 0.5g, 1gm, 2g in vial.

**N.B.** Antidiarrheals are best avoided in the treatment of patients with bacillary dysentery as they may slow the clearance of the organisms and may increase the risk of toxic megacolon.)

### BRONCHITIS (ACUTE)

Acute infection of the trachea and the bronchi is often caused by viruses. Therefore, treatment is often symptomatic. Anti-microbial treatment is indicated when patients develop high-grade fever and purulent sputum.

**Diagnosis:** Clinical

**Drug Treatment:** Drug treatment should not be routinely employed

1. **For Dry Cough**
   
   **First line**

   **Dextromethorphan hydrobromide**, 15 – 30 mg P.O. TID to QID for adults. For children: 6-12 yrs, 7.5-15 mg; 2-6 yrs, 7.5 mg TID or QID

   **S/Es:** sedation

   **C/Is:** hepatic disorder, severe asthma, children under 6 years of age.

   **Dosage forms:** tablet, 15 mg; syrup, 5 mg, 7.5 mg, 15 mg/5ml; drops, 15mg/ml.

   **Alternative**

   **Codeine phosphate**, 10 - 20 mg P.O TID or QID. For children: 0.5 mg/kg P.O. QID

   **S/Es:** constipation and sedation; it may lead to dependence.
C/Is: respiratory insufficiency, liver disease, children under 6 years of age
Dosage forms: tablets, 30 mg; linctus, 15 mg/5ml (expectorant)

2. For productive cough
Guaifenesin, 200-400 mg P.O. QID; for children: 6-12 yrs, 100-200 mg; 2-Yrs, 50-100 mg P.O. QID
S/Es: dizziness, headache, rash, GI disturbances
P/C: During driving, operating machine
C/Is: pregnancy
Dosage forms: tablet, 100 mg, 200 mg; capsule, 200 mg; syrup, 100 mg/5ml.

3. For infection
Antibiotic treatment is indicated when bronchitis is complicated by bacterial infections. In general, the choice of antibiotics should be based on gram stain result of the sputum.

First line
Amoxicillin, 250-500 mg P.O.TID for adults. For children: 20-40 mg/kg/day P.O. in 3 divided doses.
S/Es: hypersensitivity reactions including urticaria, fever, joint pains, rashes, angioedema, anaphylaxis, paraesthesia, with prolonged use, diarrhea and antibiotic associated colitis.
C/Is: Penicillin hypersensitivity.
Dosage forms: capsule, 250 mg, 500 mg; syrup, 250 mg/5ml.

Alternatives
Ampicillin, 500 mg P.O. QD, in 4-divided dose for 5-7 days.
S/Es: allergy
C/Is: Known hypersensitivity reactions to penicillins or cephalosporins
Dosage forms: drop, 100 mg/ml; capsule, 250 mg, 500 mg; injection, 250mg, 500mg, 1mg in vial; oral suspension, 125 mg/ml, 250 mg/ml.
**Sulfamethoxazole+trimethoprim, 800mg/160 mg. P.O.BID for 7 days.**

For children 6 weeks – 5 months, 100/20 mg; 6 months – 5 yrs, 200/40 mg; 6 – 12 yrs, 400/80 mg BID.

(For **S/Es** and **C/Is** and dosage forms, see page 16).

**Erythomycin, 250-500 mg P.O. QID for 7 days.** For children: 30-50 mg/kg/day P.O. in 4 divided doses; 15-20 mg/kg/day IV over 5 minutes in 3-4 divided doses.

**S/Es:** nausea, vomiting, abdominal discomfort, diarrhea (antibiotic-associated colitis), rash and other allergic reactions, cholestatic jaundice.

**C/Is:** Liver disease.

**Dosage forms:** Capsule 250 mg; tablet (stearate), 250 mg, 500 mg; oral suspension, 125 mg/5 ml, 200 mg/ml, 250 mg/5 ml; Injection, 50 mg/ml in 2 ml ampoule.

**Tetracycline, 250-500 mg P.O.QID, for 5-7 days**

**S/Es:** teeth discoloration, hypersensitivity reactions, GI disturbances

**D/Is:** forms complexes with drugs like antacids and iron preparations, which decreases its absorption.

**C/Is:** children under 8 yrs.

**Dosage forms:** tablet, 500 mg; capsule, 250 mg, 500 mg,

**BRUCELLOSIS**

Brucellosis is a zoonotic infection caused by different species of the gram negative bacteria, *Brucella*. Brucellosis is transmitted from animals to humans by ingestion of infected food products, direct contact with an infected animal, or inhalation of aerosols. Transmission from mother to child via breast milk has been recently reported. Brucellosis has a long incubation period of 1-8 weeks and the most common symptoms are prolonged fever classically referred to as ‘undulating’ fever, chronic fatigue and arthralgia. Osteomyelitis of the vertebrae is commonly seen.
Mortality, though rare, is due to neurologic complications (e.g. meningoencephalitis) or infective endocarditis.

**Diagnosis:** Clinical and laboratory tests including cultures of blood and other body fluids (CSF, urine) and serology.

Cultures need to be kept for prolonged periods of time. Antibody Titers of 1:160 or higher are very highly suggestive of the diagnosis of brucellosis.

**Treatment**

**Nondrug Treatment**

Surgical intervention e.g. abscess drainage, joint replacement will be needed for focal infections.

**Drug Treatment**

*First Line:*

- **Doxycycline** 100 mg PO bid PLUS **Rifampicin** 600-900mg/day for 6 weeks.
- The relapse rate is 10-20%.

(For S/Es, C/Is and dosage forms, see pages 21 and 31, respectively).

*Alternative:*

- **Doxycycline** 100 mg PO bid PLUS **Streptomycin** (750mg- 1 gram/d IM for 2-3 weeks)

(For S/Es, C/Is and dosage forms, see pages 21 and 64 - 70, respectively).

For children **Trimethoprim-Sulfamethoxazole** 8-10mg/kg PO divided into 2 doses for 3 weeks PLUS **Gentamicin** 5-mg/kg/day IM or IV for 5-7 days.

(For S/Es, C/Is and dosage forms, see page 39).
CHOLERA

Cholera is an acute diarrheal disease that can cause severe dehydration and death in a few hours. It is caused by *Vibrio cholera* and often occurs as epidemics under conditions of poor hygiene. It is often diagnosed based on clinical grounds. Sudden onset of explosive diarrhoea is the hallmark of the disease. The diarrhoea is classically voluminous, non-offensive, and somewhat looks gray or “rice water”. Fever is absent.

**Diagnosis**

Clinical and if possible stool culture.

**Treatment**

**Prevention:** The promotion of adequate hygienic conditions in the community is important to prevent an outbreak and spread of the disease.

**Non-drug Treatment**

Advise patients to take fluid.

**Symptomatic/Supportive Treatment**

For dehydration in mild cases give ORS, PRN; for children: < 2yrs: 50-100ml; 2-10yrs: 100-200ml after each loose stool. For severe cases Ringer lactate IV infusion (alternatively Normal Saline) should be given 50 - 100 ml/min until shock is reversed; thereafter, according to fluid loss. KCl solution 20 - 40 mmol/litre may be added as required.

In the absence of IV infusion aggressive rehydration with ORS is vital.

**Drug treatment**

*First line*

- **Doxycycline**, 100 mg, P.O. BID for 3 days. For children: 6mg/kg daily for 3 days.
- **S/Es:** nausea, vomiting, hepato-toxicity, hypersensitivity reactions.
- **C/I:** renal impairment, pregnancy and breast-feeding.
- **Dosage forms:** Capsule, 100 mg ; tablet, 100mg.
Alternatives

- **Tetracycline**, 500mg P.O. QID for 3-5 days.
  (For S/Es, C/Is and dosage forms, see under Tetracycline, page 19).

  OR

- **Sulfamethoxazole+trimethoprim**, 800 mg/160 mg P.O. BID for 5 days.
  For children 6 weeks – 5 months: 100/20 mg; 6 months – 5 yrs: 200/40 mg; 6 – 12 yrs: 400/80 mg BID for 5 days.
  (For S/Es, C/Is and dosage forms, see page 16).

  OR

- **Ciprofloxacin**, 500 mg PO BID, for 3-5 days
  (For S/Es and C/Is dosage forms, see page 16).

GASTRO-ENTERITIS

Gastro-enteritis is characterized by a brief but explosive diarrheal illness in subjects following exposure to a common food source contaminated with viruses, bacteria or bacterial toxins. Common organisms include *S. aureus*, *Salmonella*, *Clostridium perfringens* and *Bacillus cereus*, which are responsible for more than 90% of cases.

Diagnosis

Diagnosis is often made by history. Stool examination is also helpful to exclude other diagnosis and to guide the right antibiotic choice. Except in special cases (e.g. Botulism), isolation of the toxin is not cost effective.

Treatment

Non drug treatment

Supportive Treatment: is often adequate for milder cases
- Correct dehydration, if any
- Give analgesics, if required (For the analgesic, its dosage schedule, S/Es, C/Is and Dosage forms, see page 311).

Drug treatment (For the infection): Antibiotic treatment is indicated for more severe cases:
First line

**Sulfamethoxazole+trimethoprim**, 800mg/160 mg P.O.BID for 5-7 days.
For children 6 weeks – 5 months: 100/20 mg; 6 months – 5 yrs: 200/40 mg; 6 – 12 yrs: 400/80 mg BID
(For S/Es, C/Is and dosage forms, see page 16)

Alternatives

**Ciprofloxacin**, 500 mg P.O. BID for 3-5 days.
(For S/Es, C/Is and dosage forms, see page 16).

OR

**Chloramphenicol**, 500mg, P.O QID, for 7 days: For children: 25 mg/kg/d.
S/Es: bone marrow depression, grey baby syndrome.
C/Is: impaired hepatic function, bone marrow depression.
D/Is: inhibits hepatic metabolism of several drugs like phenytoin and warfarin.
Dosage forms: Capsule, 250 mg; injection 1g in vial; oral suspension, 125 mg/5ml.

GIARDIASIS

*Giardia lamblia* is a ubiquitous gastrointestinal protozoa that results in clinical pictures ranging from asymptomatic colonization to acute or chronic diarrheal illness. It can occur both sporadically and in epidemics. *Giardia lamblia* infects humans through ingestion of as few as 10 cysts. The infection is more prevalent in children than adults. Asymptomatic infection occurs in approximately 60 % of people exposed to Giardia. The most common presentation is diarrhea which is foul-smelling with fatty stools (steatorrhea), flatulence, weight loss, crampy abdominal pain with bloating and failure to thrive.

**Diagnosis:** Established by identifying *Giardia lamblia* trophozoite or cyst from fecal or duodenal samples.
**Drug Treatment**

*First Line*

**Metronidazole**, 250-500 mg P.O. TID for five days) (has an efficacy of 80 to 95 percent). For children, 1-3 years: 500 mg daily; 3-7 years: 600-800 mg daily; 7-10 years: 1 g daily, all for 3 days

(For S/E, C/I and dosage forms, see page 14)

*Alternative*

**Tinidazole**, single oral dose of 2 g. For children, 50-75 mg/kg as a single dose (may be repeated once if necessary).

(For S/Es, C/Is and dosage forms, see page 15).

**INTESTINAL PARASITIC INFESTATIONS**

These are infections caused by intestinal worms (nematodes and cestodes), which are commonly associated with poor personal and environmental hygiene. Although they may not be fatal, they contribute to malnutrition and diminished work capacity. Clinical manifestations include abdominal cramps, nausea, bloating, anorexia, Anemia etc.

**Diagnosis:** mainly by direct stool microscopy

**Treatment:** see table VIII
<table>
<thead>
<tr>
<th>NAME OF INFECTION; ETIOLOGY; MODE OF TRANSMISSION</th>
<th>TREATMENT</th>
<th>REMARK</th>
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<tbody>
<tr>
<td><strong>Ascariasis</strong></td>
<td><strong>First line</strong></td>
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<tr>
<td><strong>Ascaris lambricoids</strong></td>
<td><strong>Piperazine</strong>, 4 g in a single dose: For children: 9 – 12 years, 3.75 g; 6 – 8 yrs, 3 g; 4-5 yrs, 2.25 g; 1 – 3 yrs, 1.5 g; &lt;1yr, 120 mg/kg as a single dose. <strong>S/Es</strong>: nausea, vomiting, colic, diarrhea; allergic reactions; drowsiness, confusion. <strong>Caution</strong>: known hypersensitivity, epilepsy, and renal or hepatic impairment. <strong>D/Is</strong>: piperazine and pyrantel are antagonistic. <strong>Dosage forms</strong>: tablet (adipate), 300mg; elixir (citrate), 500mg/5ml, 622.5mg/5ml, 706mg/5ml, 750mg/5ml, 937.5mg/5ml, 1gm/5ml <strong>Alternatives</strong></td>
<td><strong>Levamisole, 120 – 150 mg</strong> (3 – 4 tablets) P.O. to be taken as a single dose <strong>S/Es</strong>: mild nausea and vomiting <strong>Dosage form</strong>: Levamisole tablets, 40 mg <strong>OR</strong> **Albendazole, 400 mg P.O. as a single dose, for children: 1 – 2 years, 200 mg as a single dose. (For S/E, C/I and dosage forms, see page 27). <strong>OR</strong> **Mebendazole, 100 mg P.O.BID for 3 days (S/Es, C/I) and dosage forms, see page 26). <strong>OR</strong> <strong>Pyrantel, 700 mg P.O. as a single dose, S/Es</strong>: minor GI disturbances, C/I: known hypersensitivity. D/Is: piperazine and pyrantel are antagonistic. <strong>Dosage forms</strong>: tablet, 125 mg; oral suspension, 250 mg base/5 ml. <strong>Presence of migrating larvae in the lungs can provoke pneumonia</strong></td>
</tr>
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</table>

**NAME OF INFECTION; ETIOLOGY; MODE OF TRANSMISSION** | **TREATMENT** | **REMARK** |
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<tr>
<td>Enterobiasis</td>
<td><strong>First line</strong></td>
<td><strong>Mebendazole</strong>, 100 mg P.O. BID for 3 days (S/Es, C/Is and dosage forms, see page 26).</td>
</tr>
</tbody>
</table>
| **Enterobius Vermicularis** | **Alternatives** | Albendazole, 400 mg P.O. as a single dose, for children: 1 – 2 years, 200 mg as a single dose. (For S/Es, C/Is and dosage forms, see page 27)  
Or | Piperazine, 4 g in a single dose: For children: 9 – 12 years, 3.75 g, 6 – 8 yrs, 3g, 4–5 yrs, 2.25 g, 1 – 3 yrs, 1.5 g, <1yr, 120mg/kg as a single dose. (For S/Es, C/Is and dosage forms, see page 25) |
| **Hookworm Infestation** | **First line** | **Mebendazole**, 100 mg P.O. BID for 3 days (For S/Es, C/Is and dosage forms, see page 26). |
| **Necator americanus** or **Ancylostoma duodenale** | **Alternatives** | Albendazole, 400 mg P.O. as a single dose, for children: 1 – 2 years, 200 mg as a single dose. (For S/Es, C/Is and dosage forms, see page 27).  
Or | Pyrantel, 700 mg P.O. as a single dose, (S/Es, C/Is and dosage forms, see page 25) |
| **Strongyloidiasis** | **First line** | **Thiabendazole**, 1500 mg, P.O. BID, for children: 25 mg/kg p.o. for two consecutive days.  
**S/Es:** dizziness, nausea, vomiting, drowsiness, pruritis, headache, neuro-psychiatric disturbances, hepatitis and hypersensitivity reactions. **Caution:** hepatic and renal impairment  
**Dosage forms:** tablet, 500 mg; oral suspension, 500 mg/5ml.  
**Alternative** | Albendazole, 400 mg P.O.BID for three consecutive days. For children: 1 – 2 years, 200 mg as a single dose. (For S/Es, C/Is and dosage forms, see page 27). |
<p>| <strong>Strongloidex stercolaries</strong> | | Larvae migrate to the lungs where they cause tissue destruction and bleeding. Treat concomitant anemia if any |
| | <strong>Remark</strong> | Common in children and auto infection may occur |
| <strong>Anemia if any</strong> | | Treat concomitant Anemia if any |</p>
<table>
<thead>
<tr>
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<th>Alternative</th>
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<tbody>
<tr>
<td><strong>Mebendazole</strong>, 100 mg P.O.BID. for 3 days (For S/Es C/Is, and dosage forms, see below).</td>
<td><strong>Heavy infestation leads to bloody diarrhea, bleeding and weakness</strong></td>
</tr>
<tr>
<td><strong>Albendazole</strong>, 400 mg P.O. as a single dose, for children: 1 – 2 years, 200 mg. As a single dose. (For S/Es, C/Is and dosage forms, see below).</td>
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<td><strong>Niclosamide</strong>, 2 g in a single dose P.O..</td>
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<td><strong>S/Es</strong>: minor GI upset, and purities.</td>
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<td><strong>Dosage forms</strong>: chewable tablet, 500mg</td>
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</tr>
<tr>
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<tr>
<td><strong>C/Is</strong>: pregnancy.</td>
</tr>
<tr>
<td><strong>Dosage forms</strong>: tablet, 200 mg; syrup, 100 mg/5 ml</td>
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Hymenolepis nana

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<tr>
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<tbody>
<tr>
<td><strong>Niclosamide</strong>, 2 g P.O. on the first day followed by 1g QD for 6 days</td>
</tr>
<tr>
<td><strong>S/Es</strong>: minor GI upset, and purities.</td>
</tr>
<tr>
<td><strong>Dosage forms</strong>: chewable tablet, 500mg</td>
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</tbody>
</table>
LEISHMANIASIS

Leishmaniasis is a zoonotic disease caused by protozoa, which belong to the genus *Leishmania*. Mode of transmission is by the bite of phlebotomites (sand flies) from animals to humans. It has two major clinical forms: visceral and cutaneous leishmaniasis.

- **Visceral Leishmaniasis (Kalazar):** Its cardinal manifestations include fever, marked weight loss, splenomegally and features of pancytopenia;
- **Cutaneous Leishmaniasis:** This form is characterized by the development of single or multiple firm, erythematous papules which occur on the exposed parts of the body. The papules may ulcerate later in the course of the illness.

Visceral Leishmaniasis

**Diagnosis:**
It requires the demonstration of the organism by smear or culture of aspirates or tissue. Serological tests like ELISA and direct agglutination tests are very helpful.

**Drug Treatment**

**General:**
Supportive care includes treatment of concomitant infections and blood transfusions

**Specific:**
*First line*

**Sodium stibogluconate**, 20 mg/Kg/day given IV OR IM in a single dose for 28 consecutive days. Therapy should be repeated using the same dose for another 40 to 60 days in patients with relapse or incomplete response.

**S/Es:** nausea, vomiting, abdominal pain; muscle pain, joint stiffness, and less commonly cardiac or hepatic toxicity; rarely anaphylaxis.

**C/Is:** significant renal impairment, breast-feeding.
**Dosage forms:** injection, 33% w/v in 2 and 6-ml ampoules and 100ml vials.

**Alternatives**

**Amphotericin B**, 0.25 to 1 mg/kg by slow infusion QD OR QOD, or three times a week for up to 8 weeks depending on the response.

*S/Es:* anorexia, nausea and vomiting; febrile reaction, headache, muscle and joint pain; disturbance in renal function; cardio-vascular toxicity, blood dyscariasis, neurological disorders including hearing loss, diplophia, convulsion, peripheral neuropathy, abnormal liver function (discontinue treatment), rash and anaphylactic reaction.

**Caution:** when given parenterally, toxicity is common and therefore close supervision is necessary; a test dose is required. Monitor renal and hepatic functions closely. Blood counts and plasma electrolyte monitoring is also required.

**Dosage forms:** Powder for injection, 50mg in vial.

OR

**Pentamidine Isethionate,** 3 to 4 mg/kg IM QD OR QOD for up to 15 doses.

*S/Es:* reversible nephrotoxicity, acute hypotension, pancreatitis, hypoglycemia, cardiac arrhythmias, blood dyscariasis, and sterile abscesses at the injection sites.

**P/Caution:** risk of severe hypotension following administration (establish baseline blood pressure and administer with the patient lying down; monitor blood pressure at regular intervals, until treatment concluded); hepatic and renal impairment;

**Dosage forms:** powder for injection, 200 mg in vial.

**N.B.** The condition called "Post Kalazar Dermal Leishmaniasis" should be treated in the same way as the initial illness of kalazar.
**Cutaneous Leishmaniasis**

(Oriental leishmaniasis, Oriental Sore, Leishmaniasis Tropica)

Cutaneous Leishmaniasis is caused by *Leishmania tropica*, which is transmitted by phlebotomus. Before ulceration occurs, there appears dermal infiltrates consisting of large histiocytes filled with many leishman-donovan (L-D) bodies, while during ulceration an influx of neutrophils occurs. Older lesions develop a tuberculoid infiltrate and at this stage either the organisms are scanty or absent.

**Diagnosis:** It is established by:
- The clinical presentation in endemic areas,
- The leishmanin intra-dermal test (Leishman Montenegro-Donovan), and
- The demonstration of the organisms in smears.

**Drug Treatment**

*Sodium stibogluconate*, given intramuscularly IM OR IV QD for 10 days.

(For S/Es, C/Is and, Ddosage forms, see page 28)

**LEPROSY**

Leprosy is a chronic infectious disease of man which predominantly affects peripheral nerves and the skin, although other tissues, such as the eye, mucosa of the upper respiratory tract, muscles, bone and testis can also be involved. It is caused by *Mycobacterium leprae*. Infection with *M. leprae* is considered to occur through the nasal mucosa from droplet infection. The earliest clinically detectable lesion usually occurs in the skin and invasion of other organs takes place in lepromatous leprosy (mainly, affecting the eye, testis and muscle). The bacilli multiply inside macrophages - in the histocytes (skin) and Schwann cells (nerves). The major types of leprosy are:

1. **Multibacillary Leprosy:**
   - Usually presents with multiple (>5) poorly defined, hypopigmented or erythematous lesions associated with hypoesthesia.
   - May present with loss of eyelashes or eyebrows and nasal septum perforation in advanced cases.
   - Associated with the presence of papules, macules, and nodular lesions.
2. Paucibacillary leprosy:

- Presents with one or few (usually <5) hypopigmented and hypoesthetic lesions.
- Sensory loss is frequently observed around the lesions
- Patients have a characteristic normal cell-mediated response to *M leprae* antigens.

The Cardinal Signs of Leprosy are:

- Anaesthesia of the individual skin lesions or in the distribution of peripheral nerves
- Thickened nerves, at the sites of predilection
- Skin lesions, macular or infiltrated hypopigmentation in Blacks or copper coloured (or red) macules in the fairer coloured races
- Presence of the acid-fast bacilli *Mycobacterium leprae* in skin smears in lepromatous and border line lesions.

The presence of at least one of the cardinal signs suggests a diagnosis of leprosy. The presence of at least two of the first three cardinal signs indicates a definite diagnosis. Confirmation is, however, by the fourth criteria.

Drug Treatment

1. Multibacillary Leprosy:

Use three drugs as below for a minimum of 2 years (or 24 monthly doses within a 36-month period) in all cases, but wherever possible until slit-skin smears are negative. According to the National Guideline treatment should be given for one year only.

   **Rifampicin**, 600 mg P.O. once-monthly, supervised.
   **S/Es:** hepatotoxicity, GI disturbances
   **C/Is:** hepatic dysfunction, known hypersensitivity to rifampicin
   **Dosage forms:** Capsule, 150 mg, 300 mg, and 600 mg.

   PLUS

   **Dapsone**, 100 mg daily, self-administered.
S/Es: Hypersensitivity reactions, hemolytic Anemia may occur in individual with G6PD- deficiency. May also cause bone marrow depression and monitoring of the CBC is required; nephrotoxicity

C/Is: Hypersensitivity reactions to sulphonamides

Dosage forms: Tablet, 25 mg, 50 mg, 100 mg; Injection, 20 % in 50 ml ampoule

PLUS

Clofazimine, 300 mg once-monthly, supervised and 50mg daily, self-administered.

S/Es: nausea, vomiting, abdominal pain, rash, pruritis, elevation of blood sugar, reddish discoloration of body fluids; photosensitivity; hepatic and renal impairment.

Dosage forms: Tablet, 100 mg.

2. Paucibacillary leprosy:

Use two drugs as below for a minimum of 6 months.

Rifampicin, 600 mg once-monthly, supervised

(For S/Es, C/Is and dosage forms, see page 31)

PLUS

Dapsone 100 mg daily, self-administered (For S/Es, C/Is and dosage forms, see page 31-32)

Treatment of reactions

Mild reactions consisting of type 1 reactions in the absence of pain and tenderness in nerves or type 2 reactions confined to minor skin lesions with little systemic disturbances are treated as follows:

First Line

Aspirin, 600 mg to 1200 mg is given 4 to 6 times daily until the reaction is controlled and then the dose decreased gradually.

S/Es: GI irritation; skin reaction; broncho-spasm.

C/Is: GI ulceration; hemophilia; children under the age of 12.

Dosage forms: Tablet, 75 mg, 100mg (soluble), 300mg, 500mg (enteric coated), 324 (microfined)
Alternative

**Chloroquine**, 150 mg chloroquine base is given upto 3 times daily.

**S/Es**: dizziness, GI discomfort and pruritus.

**C/Is**: history of hypersensitivity, epilepsy and psoriasis.

**D/Is**: Antacids reduce absorption and cimetidine reduces metabolism.

**Dosage forms**: Tablet, 150mg base; syrup 50 mg base /5ml; injection, 150 mg base in 5 ml ampoule.

*Chloroquine it is often helpful in weaning patients off corticosteroids.*

**Severe reactions** may be considered when there is:

1. Risk of paralysis or anaesthesia in a patient who has neuritis,
2. Danger of skin ulcerations,
3. Risk of development of iridocyclitis or orchitis.

**Treatment of severe reactions**

**Type 1 reaction**

*Prednisone* is started in a single dose of 40-80 mg, according to severity and this starting high dose should be reduced to 40 mg after a few days. Thereafter, the dose is reduced by 5-10 mg every 2-4 weeks, ending with 10mg every 2-4 weeks.

**S/Es**: peptic ulceration; hypertension, diabetes, osteoporosis; myopathy;

**C/Is**: Peptic ulcer, diabetes, Cushing's disease.

**Dosage form**: Tablet, 1mg, 5mg.

**Type 2 reactions**

*Prednisone* (20-40 mg QD) may be used.

(For **S/Es, C/Is** and **dosage forms**, see above).

**N.B. Clofazimine** is indicated in patients who cannot be weaned off corticosteroids or in those who are troubled by continuous erythema nodosum leprosum (ENL), and also in those in whom thalidomide is contraindicated.

**Clofazimine**, initially 300 mg P.O. given daily in divided doses for 2 weeks, reducing to 200 mg QD for a month or two and then to 100 mg QD according to response.

(For **S/Es, C/Is** and **dosage forms**, see page 32)
MALARIA

Malaria is a parasitic infection caused by four main species of plasmodium known to affect humans. The most serious and life-threatening disease occurs from Plasmodium Falciparum infection, which usually presents with acute fever, chills, sweating and headache progressing to icterus, coagulation defects, shock, renal and liver failure, acute encephalopathy, pulmonary and/or cerebral edema, coma and death. Prompt diagnosis and treatment is essential even in mild cases to prevent complications. The other species, Plasmodium vivax (benign tertian), Plasmodium malarea (quartan) and Plasmodium ovale, are not life-threatening, except in the very young, very old and immuno-deficient cases.

Diagnosis

It can be confirmed by demonstration of malaria parasites in the blood film. Often, repeated microscopic examinations may be necessary. It is also helpful to estimate the degree of parasitemia, which is extremely useful not only to predict severity but gauge response to treatment as well.

I. Treatment

P. Falciparum

1. Uncomplicated P. Falciparum malaria

First line

Artemether + Lumefantrine, 40 + 240mg P.O. BID for 3 days

S/Es: nausea, vomiting, diarrhea

C/Is: first trimester pregnancy

Dosage forms: Tablet, 20mg +120mg

Alternative

Quinine dihydrochloride, 600 mg TID for 7 days.

S/Es: Cinchonism, including tinnitus, headache, nausea, abdominal pain, rashes, visual disturbances, confusion, blood disorders (including thrombocytopenia and intra-vascular coagulation), and acute renal failure.

C/Is: Hemoglobinuria, optic neuritis

Dosage forms: Tablet (dihydrochloride or sulphate), 300mg, and 600mg; injection, 300mg/ml in 1 ml ampoule.
2. Severe and complicated P. falciparum malaria

Non-Drug treatment
- Clear and maintain the airway.
- Position semi-prone or on side.
- Weigh the patient and calculate dosage.
- Make rapid clinical assessment.
  - Exclude or treat hypoglycemia (more so in pregnant women).
  - Assess state of hydration.
- Measure and monitor urine output.
  - If necessary insert urethral catheter.
  - Measure urine specific gravity.
- Take blood for diagnostic smear, monitoring of blood sugar ('stix' method), haematocrit and other laboratory tests.
- Plan first 8 hrs. of intravenous fluids including diluents for anti-malarial drug, glucose therapy and blood transfusion.
- If rectal temperature exceeds 39°C, remove patient's clothes, use tepid sponge,
- Lumbar puncture to exclude meningitis or cover with appropriate antibiotic.
- Consider other infections.
- Consider need for anti-convulsant treatment

Drug Treatment
Quinine dihydrochloride:
Loading dose: 20 mg/kg in 500 ml of isotonic saline or 5 % dextrose over 4 hours (4 ml/minute). The pediatric dose is the same but the fluid replacement must be based on body weight.
Maintenance dose: should be given 8 hours after the loading dose at a dose of 10 mg / kg and it should be given 8 hourly diluted in 500 ml of isotonic saline or 5 % dextrose over 4 hours. The parenteral treatment should be changed to P.O. as soon as the patient's condition improves and if there is no vomiting. Oral treatment should be given with Artemether + Lumefantrine in the doses as indicated above. However,
if a patient has a history of intake of *Artemether + Lumefantrine* before complications developed, give *Quinine* tablets 10 mg salt per kg TID to complete 7 days treatment.  (For *S/Es* and *Dosage forms*, see page 34)

**P. Vivax**

*Chloroquine phosphate*, 1 g, then 500 mg in 6 hours followed by 500 mg QD for 2 days, or 1 g at 0 and 24 hrs followed by 0.5 g at 48 hrs P.O.  
(For *S/Es*, *C/s*, and *dosage forms*, see page 33).

**Followed by**

*Primaquine*, 15mg base P.O.QD for 14 days.  
*S/Es*: Nausea, vomiting anorexia, and less commonly hemolytic Anemia, especially in patients with G6PD deficiency.  
*P/Caution*: In patients with G6PD deficiency; systemic diseases associated with granulocytopenia, e.g. rheumatoid arthritis, and pregnancy and breast feeding)  
*Dosage forms*: Tablet, 7.5mg base, 15mg base

**II. Chemo-prophylaxis**

**P. Falciparum**

*First Lline*  
*Mefloquine*, 5 mg base per kg weekly (1tablet for adults >50kg, for children doses according to weight and age ¼ tablet ages 3to 23 months,1/2 tablet ages 2 to7 years,3/4 tablet ages 8 to 10 years and adult doses age 11 and above))  
*S/Es*: Dizziness, mild to moderate gastrointestinal disturbances (nausea, vomiting, abdominal pain and diarhorrea).  
*C/Is*:  
- persons with known hypersensitivity;  
- persons with a history of severe neuropsychiatric disease;  
- pregnant women in the first trimester;  
- infant less than 3 months;
• persons who have received treatment with mefloquine in the previous 4 weeks;
• persons performing activities requiring fine coordination and spatial discrimination.

**Dosage form:** Tablet, 250mg

**Alternate**

**Doxycycline**, 100mg QD

(For S/Es and C/Is see under tetracycline, page 19)

Dosage forms: Tablet, 100mg; capsule, 100mg

**P. vivax**

**Primaquine phosphate**, 15 mg base P.O. QD for 14 days after travel.

(For S/Es, C/Is and dosage forms, see page 36)

**MENINGITIS**

1. **Acute Bacterial Meningitis**

Acute Bacterial Meningitis is an inflammation of the meninges in response to bacterial infection. It is mainly caused by *N. meningitides, S. pneumoniae, and H. influenzae*. The disease is characterized by an intense headache, fever, vomiting, photophobia and photophobia with nuchal pain or rigidity and positive meningeal signs.

**Diagnosis:**

High index of clinical suspicion is very important for early diagnosis of Acute Bacterial meningitis. CSF analysis including gram stain, culture and sensitivity required to make a definite diagnosis.
Treatment

Specific antibiotic treatment for bacterial meningitis depends upon identification of the causative organism. Empirical coverage of broad spectrum antibiotic is life saving.

Supportive Measures

The patient should be closely supervised with regular monitoring of vital signs and neurological state. Coma care should be instituted for complicated cases.

Drug treatment

A. Community acquired, bacterial etiology unknown

First line

Benzyl penicillin, 20-24 million IU/day I.V. in 4-6 divided doses for 7 - 10 days.

S/Es: hypersensitivity reactions including urticaria, fever, joint pains, rashes, angio-edema, anaphylaxis, paraesthesia, with prolonged use, diarrhea and antibiotic associated colitis.

C/Is: Penicillin hypersensitivity.


PLUS

Chloramphenicol, 500mg I.V. QID. In severe infections, up to 100 mg/kg/day in 4 divided doses, may be used for 7 days.

(For S/Es, C/Is and Dosage forms, see page 23)

Alternative

Ceftriaxone, 4 g/day I.V., divided in 2 doses for 7 days.

(For S/Es, C/Is and Dosage forms, see page 38)

B. Community Acquired Etiology known

N. meningitides and S. pneumonia

Benzyl penicillin, 20-24 MU/day I.V. in 4-6 divided doses for 7-10 days.

(For S/Es, C/Is and Dosage forms see page 38)
**H. Influenzae:**

Chloramphenicol, 100 mg/kg/day I.V. in 4 divided doses for the first 48-72 hours, then 50 mg /kg/day for 7-10 days.

(For S/E,s C/Is and Dosage forms, see page 23)

**For resistant strains of N.meningitides, S. pneumonia and H. Influenzae:**

*First line*

Ceftriaxone, 4 g/day I.V. divided in 2 doses for at least 10-14 days.

(For S/Es, C/Is and Dosage forms, see page 17)

*Alternative*

Cefotaxime, 8-12 g/day I.V. in 4 divided doses, 6 hourly

(For S/Es, C/Is and Dosage forms, see under Ceftriaxone)

C. Hospital acquired meningitis, etiology unknown

*First line*

Ceftriaxone, 4 g/day I.V. divided in two doses.

(For S/Es, C/Is and Dosage forms, see page 17)

PLUS

Gentamicin, 3-5 mg/kg/day I.V. in 3 divided doses for 7-10 days

*S/Es*: ototoxicity, nephrotoxicity

*C/Is*: myastenia gravis

Dosage forms: Injection, 40mg/ml, 40mg/2ml

*Alternative*

Cefotaxime, 8-12 g/day I.V. in 4 divided doses, QID.

(For S/Es, C/Is and Dosage forms, see under ceftriaxone, page 17)

PLUS

Gentamicin, (For dosage schedule, S/Es, C/Is and dosage forms, see above)

Hospital acquired, etiology known

*Staphylococcus aureus*

Cloxacillin, 9-12 g/day I.V. in 4 divided doses. For 2-3 weeks
**S/Es:** hypersensitivity reactions including urticaria, fever, joint pains rashes, angio-edema, anaphylaxis, paraesthesia, with prolonged use, diarrhea and antibiotic associated colitis.

**C/Is:** Penicillin hypersensitivity.

**Dosage forms:** Capsule, 250 mg, 500 mg; injection, 250 mg, 500 mg in vial; syrup, 125 mg, 250 mg, in each ml.

**For methicillin-resistant Staph aureus,**
- **Vancomycin,** 1 g I.V. BID for 2 - 3 weeks
- **S/Es:** hypotension, palpitations, urticaria, nausea
- **C/Is:** patients with hearing problem

**Dosage forms:** Injection, 500 mg in vial.

**PLUS**
- **Rifampicin,** 600 mg P.O. QD for 3 weeks.

(For S/Es, C/Is and Dosage forms, see page 31)

**Pseudomonas aeruginosa**

**First Line**
- **Ceftazidime,** 8-12 g/day I.V. in 4 divided doses for 10 - 14 days.

(For S/Es, C/Is and Dosage forms, see under ceftriaxone, page 17)

**PLUS**
- **Gentamicin,** 3-5 mg/kg/day I.V. in 3 divided doses for 7-10 days.

(For S/E, C/I and Dosage forms, see page 39)

**Alternative**
- **Ceftriaxone,** 4 g/day I.V. divided in 2 doses for 7 - 10 days.

(For S/Es, C/Is and Dosage forms, see page 17)

**PLUS**
- **Gentamicin,** 3-5 mg/kg/day I.V. in 3 divided dose for 7-10 days

(For S/Es, C/Is and Dosage forms, see page 39)

**Enterobacteriaceae**

**First Line**
- **Ceftriaxone,** 4 g/day I.V. divided in 2 doses for 7-10 days.
Alternative

**Cefotaxime**, 8-12 g/day I.V. in 4 divided doses, QID.

(For **S/Es, C/Is** and **Dosage forms**, see page 17)

**Adjuvant Therapy**
Dexamethasone 10mg IV QID for 5 days

2. **Cryptococcal Meningitis**
Cryptococcal Meningitis is a chronic meningitis caused by **Cryptococcus neoformans** that is seen in patients with underlying immunosuppression of different causes but most commonly HIV.

**Diagnosis:**
Clinical and Lumbar Puncture with CSF analysis including India ink staining, CSF cryptococcal antigen detection and fungal culture.

**Treatment:**
**Non-drug treatment:**
- If CSF opening pressure greater than 250 H\textsubscript{2}O mm, drain 20-30ml of CSF daily until less than 200mm H\textsubscript{2}O.

**Drug treatment:**

*First Line*
- **Amphotericin B**, 0.7-1.0mg/kg/day I.V. for 2 weeks
  (For **S/Es, C/Is** and **Dosage forms**, see page 29 & 205)

**PLUS**
- **Flucytosine**, 25mg/kg P.O. QID for 14 days
**S/Es:** nausea, vomiting, diarrhea, skin rashes, alterations in liver function tests, blood dyscrasias, occasionally confusion, hallucination, convulsion.
**C/Is:** Pregnancy, lactation, renal impairment, hepatic impairment
**P/Cauti:** May cause bone marrow depression (especially in AIDS patients); weekly blood counts are necessary on prolonged use.

**Dosage forms:** Capsule, 250mg, 500mg; IV infusion 10mg/ml; solution for injection, 2.5g/250ml.

**Followed by**

Fluconazole, 400mg P.O. QD for 8 weeks, then 200 mg QD indefinitely

**S/Es:** nausea, abdominal discomfort, diarrhoea, and abnormalities of liver enzymes, cutaneous reactions

**C/Is:** Pregnancy, lactation, renal impairment

**Dosage forms:** Capsule/tablet, 50mg, 100mg, 200mg; oral suspension, 50mg/5ml, 200mg/5ml.

**Alternative**

Fluconazole, 400-800 mg P.O. QD for 6-10 weeks, then 200 mg P.O. QD indefinitely. (For **S/Es, C/Is** and **dosage forms**, see above)

**N.B.** In patients with Cryptococcal Meningitis related to HIV infection initiation of ART would very much improve the overall prognosis.

**ONCOCERCIASIS**

Oncocerciasis is a disease caused by *Onchocerca volvulus*, transmitted by several species of simulium ("Black flies") and manifested by onchodermatitis. Mature worms and microfilariae are found in granulomatous dermal nodules mainly on the bony prominences, the trunks and extremities in Africans and the scalp in Central Americans. Inflammatory cells and sometimes giant cells accumulate around the worms and occasionally calcification may occur. Perivascular inflammatory response occurs in the dermis as a result of the presence of microfilariae. With chronicity, these reactions are replaced by fibrosis and atrophy of the dermis and epidermis. The presence of microfilariae in the eye causes keratitis, iritis and choroiditis, which may eventually lead to blindness.

**Diagnosis:** Diagnosis is established by:-

1. Clinical presentation (pruritusis, oncocercoma and oncophthalmia), with leucocytosis with relative eosinophilia.
2. Demonstration of microfilariae by examination of skin snips.
3. Histological examination of the nodule (presence of adult worms and microfilariae),

**Treatment**

*Ivermectin*, single oral dose of 150 micrograms/kg is the drug of choice. Moreover, it should be continuously given once or twice a year for people residing in endemic area. On the other hand, for those no more living in endemic area, single dose treatment is enough and a repeat dose should only be given in cases of relapse.

*S/Es*: itching and rash.

*C/Is*: children younger than 5 years, pregnancy, nursing mothers, particularly during the first few weeks after confinement.

**Dosage forms**: Tablet, 3 and 6 mg (scored)

PLUS

*Antihistamines* may be required in the first few days of treatment if there is severe exacerbation of the diseases.

*Promethazine*, 25 mg BID OR TID until the pruritis subsides.

*S/Es*: drowsiness, sedation, headache, blurring of vision GI disturbance

*P/Caution*: Close monitoring of the patient is required during the first few days of therapy.

**Dosage forms**: Elixir, 5mg/5ml; injection, 25mg/ml 1ml and 2 ml ampoules; suppository, 25mg, 50mg; tablet, 10mg, 25mg.

**N.B.** Nodulectomy may have a place for eradication of the adult worm.
PNEUMOCYSTIS CARINNI (P. jiroveci) PNEUMONIA:

PCP frequently causes pneumonia among immuno-compromised individuals. It is caused by the fungus *Pneumocystis jiroveci*. The onset is typically subacute over 2 to 4 weeks, with prominent symptoms of fever, non-productive cough, progressive dyspnoea, and fatigue. Patients will have an increasing tachypnea, tachycardia and cyanosis as the disease progresses.

**Diagnosis:**
The clinical presentation of PCP is non-specific. Therefore, it should always be considered in those patients with evidence of moderate to severe immuno-suppression who come up with one or more of the above symptoms. Definite diagnosis requires demonstration of the organism in secretions or tissue by using appropriate stain.

**Treatment**

**Supportive treatment:**
Oxygen should be given in moderate and severe cases.

**Drug treatment:**

*First line*

Trimethoprim+Sulphamethoxazole, 15-20 mg/kg/day based on the trimethoprim component and administered in divided doses QID OR TID. The duration of treatment is about 21 days depending on severity. This drug could be given IV if the patient is not able to swallow the drug. Pay due attention to side effects which at times could be life threatening. Steven Johnson syndrome may occur if the patient is allowed to take the drug after the development of rash.

(For S/Es, C/Is and dosage forms, see page 16).

*Alternative:*

Clindamycin, 300-450 mg P.O. TID for 3 weeks

S/Es: diarrhoea (discontinue treatment); GI upset, Antibiotic-associated colitis; jaundice and altered liver function tests.
**C/Is:** diarrhea

**Dosage forms:** Capsule, 75 mg, 150 mg; injection, 150 mg/ml in ampoule; oral solution, 15 mg/ml.

**PLUS**

**Primaquine**, 30 mg base P.O. QD for 3 weeks.

Typically a mild rash with fever develops 7 to 10 days after initiation of therapy. Bone marrow suppression may occur, and CBC monitoring is useful. Possible hepato-toxicity and nephro-toxicity may also be evaluated at the third week of therapy.

(For **S/Es**, **C/Is** and **dosage forms**, see page 36).

**OR**

**Pentamidine Isethionate**, 4 mg/kg I.V. QD for three weeks. It should be given to those who fail to tolerate the above regimen.

(For **S/Es**, **C/Is** and **dosage forms**, see page 29).

**OR**

**Dapsone**, 100 mg P.O. QD for 3 weeks

(For **S/Es**, **C/Is** and **dosage forms**, see page 31-32)

**PLUS**

**Trimethoprim**, 20 mg/kg administered P.O. in divided doses QID for 3 weeks.

**S/Es:** GI disturbances, pruritis, rash, bone marrow suppression

**Dosage forms:** Tablets, 100 mg, 200 mg; suspension, 50 mg/ml; injection, 20 mg/ml.

**Adjuvant treatment**

In moderate and severe cases, steroids should be added, regardless of the drug regimen used, in the following manner:

- 40 mg BID for 5 days,
- Then 20 mg BID for 5 days,
- Then 20 mg QD until therapy is complete (for 11 days).
- No tapering from the 20 mg dose is necessary.
Prophylaxis: Prophylaxis against PCP should be commenced in patients with HIV infection with the following conditions:

- When the CD4 cell count drops below 350 cells/ml or
- When there are clinical signs of advanced immune deficiency.

The following regimen is recommended:

**First line**

Trimethoprim+Sulphamethoxazole

One double strength tablet P.O. QD OR 3 times weekly.

(For S/Es, C/Is and Dosage forms, see page 16)

**Alternative**

Dapsone, 100 mg P.O. QD

(For S/Es, C/Is and Dosage forms, see page 31-32)

OR

Aerosol pentamidine - 300 mg via nebulizer every 4 weeks.

(For S/Es, C/Is and Dosage forms, see page 184)

N.B. Secondary prophylaxis should be continued for all patients who have completed a full course treatment for PCP.

**PNEUMONIA**

Pneumonia refers to acute inflammation of the distal lung-terminal airways, alveolar spaces, and interstitium. The clinical presentation and the etiology vary greatly depending on the age of the patient, the infecting organism, the site/s the infection has involved, the immune status of the patient and the place of acquisition of infection. The most important pathogens which cause community acquired pneumonia in immuno-competent adults include Strep. Pneumoniae, followed by Mycoplasma Pneumoniae, Chlamydia Pneumoniae, Legionella spp and others. It is also important to remember that Pneumocystis jiroveci and Mycobacterium Tuberculosis have now become common causes of community acquired pneumonia in immuno-compromised individuals.
Hospital acquired pneumonia refers to the type of pneumonia, which occurs after 48 hours of admission to a hospital. Multi-resistant bacteria such as *staphylococci*, *enterococci*, *enterobacteria*, *Pseudomonas aeruginosa* and other aerobic bacteria may be responsible for such infections. The most important symptoms include cough, fever, chest pain and tachypnoea. Extra-pulmonary features such as confusion or disorientation may be the only signs in the elderly, immuno-compromised patients, persons with renal or hepatic failure and malnourished children.

**Diagnosis:**
Gram stain of the sputum remains the main stay of diagnosis. Blood culture may be positive in ¼ to 1/3 of cases and is important to isolate the causative agent for proper antibiotic choice. Chest X-ray may also be helpful not only to confirm the diagnosis, but also to estimate the extent of the lesion and to exclude other diagnosis.

**Treatment:**

**Drug treatment:**

I. Community acquired ambulatory patients (Mild Pneumonia):

   **First line**
   
   Amoxicillin, 500 mg P.O. TID for 5 to 7 days.
   (For S/Es, C/Is and dosage forms see page 18).

   **Alternative**
   
   Erythromycin, 500 mg P.O. QID for 5-7 days in cases of atypical pneumonia.
   (For S/Es, C/Is and dosage forms see page 214)

   OR
   
   Doxycycline, 100 mg P.O. BID for 7-10 days.
   (For S/Es, C/Is and dosage forms, see page 21).

   OR
   
   Procaine penicillin, 800,000 I:U I.M. QD daily for 5-7 days.
   (For S/Es and C/Is, see under Benzyl penicillin, page 38)
Dosage forms: injection (buffered), 4,000,000 IU in vial

II. Community acquired hospitalized patients (Severe Pneumonia)

Non-Drug treatment:
- Bed rest
- Frequent monitoring of temperature, blood pressure and pulse rate in order to detect complications early and to monitor response to therapy.
- Give attention to fluid and nutritional replacements.
- Administer Oxygen via nasal prongs or face mask
- Analgesia for chest pain

Drug treatment:
The Antibiotic choice should be aimed at the most likely causative agent.

A. Pneumonia due to common organisms:

First line

Benzyl penicillin, 2-3 million IU I.V. QID for 7-10 days.
(For S/Es, C/Is and Dosage forms, see page 38).

PLUS

Gentamicin, 3-5 mg/kg I.V. QD daily in single or divided doses for 7 days (For S/Es, C/Is and Dosage forms, see page 39).

Alternative

Ceftriaxone, 1 g I.V. OR I.M every 12-24 hours for 7 days.
(For S/Es and C/Is, see page 17)

OR

Erythromycin, 500 mg P.O. QID for 7-10 days
(For S/Es, C/Is and dosage forms, see pages 214)

OR

Doxycycline, 200 mg P.O. immediately, followed by 100 mg BID for 7-10 days. (For S/Es, C/Is and dosage forms see page 21).
B. Pneumonia due to Gram-negative bacteria, especially in the elderly

First Line

Ampicillin, 1 g I.V. QID for 7-10 days
(For S/Es, C/Is and dosage forms, see page 18, 314).

PLUS

Gentamicin, 3-5 mg/kg I.V. as a loading dose, followed by 3-5 mg/kg/day in single OR divided doses for a minimum of 7 days..
(For S/Es, C/Is and dosage forms, see page 39)

Alternative

Benzyl penicillin, 2-3 million IU I.V. QID for 7-10 days.
(For S/Es, C/Is and Dosage forms, see page 38).

PLUS

Gentamicin, 3-5 mg/kg I.V. QD in single or divided doses for 7 days
(For S/Es, C/Is and dosage forms, see page 39)

C. Pneumonia due to Staphylococcus Aureus: It should be treated as follows:

Cloxacillin, 1-2 g I.V. QID for 10-14 days.
(For S/Es and C/EIs, see page 39 - 40)

Dosage forms: Capsule, 250 mg, 500 mg; injection, 250 mg, 500mg in vial; syrup, 125 mg, 250mg in each ml.

III. Hospital acquired pneumonias (Nosocomial Pneumonias):
The antibiotic choice should depend on the epidemiology and susceptibility of local pathogens. Antimicrobials effective against gram-positives and gram-negatives should be given in combination. Suitable combinations includes, for example:

First line

Cloxacillin, 1-2 g I.V. QID for 7 days
(For S/Es, C/Is and dosage forms, see page 39 - 40)

PLUS

Gentamicin, 3-5 mg/kg I.V. QD daily in divided doses for 7 days.
(For S/Es, C/Is and dosage forms, see page 39)
Ceftazidime, 1 gm I.V. TID  
(For S/Es, C/Is and dosage forms, see page 17)

PLUS

Gentamicin, 3-5 mg/kg I.V. QD daily in divided doses for 7 days.  
(For S/Es, C/Is and dosage forms, see page 39)

OR

Ceftriaxone, 1-2 g I.V. OR I.M. BID for 7 days.  
(For S/Es and C/Is, see page 17).  
Dosage forms: Injection, 0.5 g, 1g, 2g, in vial.

PLUS

Gentamicin, 3-5 mg/kg I.V. QD daily in divided doses for 7 days.  
(For S/Es, C/Is and dosage forms, see page 39)

OR

Ciprofloxacin, 500 mg P.O./ I.V. BID every 12 hours for 7 days.  
(For S/Es, C/Is and dosage forms, see page 16).

Specific cause known:

1. *Staphylococcus aureus* -
   
   Cloxacillin, 0.5-1 gm QID I.V for 7 days  
   (For S/Es, C/Is and dosage forms, see page 39 - 40)

   If methicillin-resistant,
   
   Vancomycin, 1 g I.V. BID for 7 days  
   (For S/Es, C/Is and dosage forms, see page 40)

   PLUS

   Rifampicin, 600 mg/day P.O. QD for 7-10 days.  
   (For S/Es, C/Is and Dosage forms, see page 31)

2. *Pseudomonas aeruginosa* –
   
   First line
   
   Ceftazidime, 1-2 gm I.V. TID for 7-10 days  
   (For S/Es, C/Is and dosage forms, see page 17)

   Alternative
   
   Ceftriaxone, 1-2 g I.V. OR I.M. BID for 7-10 days.  
   (For S/Es, C/Is and Dosage forms, see page 17)
PLUS

**Gentamicin**, 3-5 mg/kg/day I.V. in 3 divided dose for 7-10 days  
(For **S/Es, C/Is** and dosage forms, see page 39)

3. **Enterobacteriaceae**

**Ceftriaxone**, 4 g/day I.V. OR I.M. divided BID.  
(For **S/Es, C/Is** and dosage forms, see page 17)

PLUS

**Gentamicin**, 3-5 mg/kg/day I.V. in 3 divided dose for 7-10 days  
(For **S/Es, C/Is** and dosage forms, see page 39)

**ASPIRATION PNEUMONIA AND LUNG ABSCESS**

Aspiration pneumonia is a pulmonary reaction resulting from the abnormal entry of fluid, particulate exogenous substances, or endogenous secretions into the lower airways. Most pneumonias arise following the "aspiration" of microorganisms from the oral cavity or nasopharynx. If untreated, pneumonia may complicate to lung abscess, necrotizing pneumonia, or empyema secondary to a bronchopleural fistula. Lung abscess refers to a localized area of destruction of lung parenchyma, which results in tissue necrosis and suppuration. Anaerobic bacteria such as *Peptostreptococci*, *M. tuberculosis* as well as the pathogens that commonly produce pneumonia, such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, gram-negative bacilli, and *Staphylococcus aureus* may cause lung abscess. Predisposing factors include impaired consciousness of various causes including anesthesia, bronchial obstruction, alcohol dependence, and cerebro-vascular accidents. The predominant symptoms are cough, fever and chest pain. The sputum often is copious, purulent and offensive.

**Diagnosis:**

Chest x-ray confirms the diagnosis. Gram stain and culture help to identify the specific causative agent. AFB and KOH examination of sputum should be done if TB or fungal causes are strongly considered.

**Treatment:**

*First line*

**Benzyl penicillin**, 1-2 million IU I.V. OR I.M. every 4-6 hours for about 4 weeks.  
(For **S/Es, C/Is and Dosage forms**, see page 38)
PLUS

**Metronidazole**, 500 mg I.V. every 8-12 hours for 10-14 days.
(For **S/Es, C/Is** and **dosage forms**, see page 14)

**Alternative**

**Amoxicillin + clavulanic acid**, 500 mg + 125 mg, P.O. TID for 10-14 days

**S/Es**: Hepatitis, cholestatic jaundice; rash, including Stevens-Johnson syndrome,

**C/Is**: penicillin hypersensitivity, history of co-amoxiclov- or penicillin-associated jaundice or hepatic dysfunction.

**Dosage forms**: chewable tablet, 125/31.25mg, 250/62.5mg; tablet (film coated), 250/62.5 mg, 500/125; oral suspension, 125/31.25mg in each 5 ml, 250/62.5 mg in each 5 ml.

PLUS

**Clindamycin**, 600mg I.V. TID for 14 days (when clinical improvement occurs, 300-450 mg, p.o. every 6-8 hours may be substituted).
(For **S/Es, C/Is** and **dosage forms**, see pages 44-45)

**PYOGENIC OSTEOMYELITIS**

Pyogenic Osteomyelitis is an acute infection of the bone and its structures caused by pyogenic bacteria. It may be acquired either by hematogenous, contiguous, or direct inoculation following trauma or surgery. It is commonly caused by *Staphylococcus aureus*. Clinically it presents with gradual onset varying from few days to weeks. The symptoms could be local bone pain, swelling, low grade fever, malaise and weight loss.

**Diagnosis**: Clinical, CBC, ESR, C-reactive protein, X-ray of the affected bone.

**Treatment**

**Non-drug treatment**

- Rest/immobilization
- Surgical drainage
N.B. Drainage by surgeon/orthopedic surgeon. If the temperature and local tenderness persist after 24 hours of adequate antibiotics, subperiosteal abscess must be looked for and drained. The pus should be sent for culture. (If the diagnosis is made early and antibiotics are started early, drainage may not be necessary.)

**Drug treatment**

Cloxacillin, 2 g I.V. QID for 7-10 days, followed by Cloxacillin, 500 mg P.O. QID for 2-4 weeks

(For S/Es, C/Is and dosage forms, see page 39 - 40)

N.B.

- Alternative treatment is guided by sensitivity tests, or if patient is allergic to penicillin.
- For pain and fever – Analgesic/antipyretic e.g. Paracetamol, 500 - 1,000 mg P.O. as needed (4-6 times daily) can be given.

**S/Es:** hypersensitivity skin reactions rare; rash, blood disorder

**C/Is:** hepatic and renal disease

**Dosage forms:** Tablets, 100 mg, 500 mg; syrup, 120 mg/5 ml; suppository, 125 mg, 250 mg; drops, 100 mg/ml

**RELAPSING FEVER**

Relapsing fever is a louse-borne disease that is caused by the spirochaete, *Borrelia recurrentis*. The disease is common among the homeless and in those living in overcrowded living conditions. It is endemic in our country but outbreaks do also occur from time to time especially during the rainy season. It is characterized by recurrent acute episodes of spirochetemia with short febrile periods alternating with spirochetal clearance and pyrexia. Other febrile diseases like typhus, typhoid fever, malaria and meningitis should be considered in the differential diagnosis of relapsing fever.

**Diagnosis:** is made by demonstrating spirochetes in the peripheral blood film by microscopic examination.
Treatment

Non Drug treatment:

Delousing

Drug treatment

First line

Procaïne penicillin, 400,000 unit I.M. single dose. For children: 25,000-50,000 units.

(For S/Es, C/ls, and dosage forms, see under Benzyl penicillin page 38)

Check blood film after 12 hours of treatment. If negative, give tetracycline 250 mgTID for three consecutive days. If the blood film remains positive, repeat the same dose of procaine penicillin and continue with tetracycline later as described above.

Alternative

Tetracycline hydrochloride, 500mg P.O. single dose. The same dose could be repeated the following day

(For S/Es, C/Is and dosage forms, see page 19)

N.B.

1. Some patients may develop reaction following treatment with antibiotics. It is known as the Jarisch-Herxheimer reaction and is believed to be due to a rapid clearance of the spirochetes. In severe cases, significant arterial hypotension with heart failure and pulmonary edema may supervene. Such complications require prompt and appropriate cardio-vascular support.

2. In patients who remain febrile after treatment, consider other concomitant infections like typhus.

SCHISTOSOMIASIS

Schistosomiasis is a disease caused by three major trematodes, which include Schistosoma Mansoni, Schistosoma Japonicum and, Schistosoma Haematobium. The first two species inhabit venules of the intestines whereas the latter are found mostly in the venules of the urinary tract. Human infection occurs as a result of penetration
of the unbroken skin by the free-swimming cercariae. This often occurs in individuals who have frequent contact with water bodies heavily infested with appropriate snails. Acute symptoms are swimmer’s itch and/or Katayama fever. Chronic complications related to schistosomiasis are more common in endemic areas where individuals are at increased risk of a high burden of infection.

**Diagnosis**

Diagnosis is made by identification of the ova in the feces in cases of *S. mansoni* and *S. japonicum* and urine in case of *S. haematobium* or tissues in all cases.

**Treatment**

*First line*

Praziquantel, 40 mg/kg in 2 divided doses 4-6 hours apart on one day OR 1200 mg P.O. as a single dose OR 2 divided doses for both *S. haematobium* and *S. mansoni*

S/Es: minor Gastro-intestinal upset.

C/Is: ocular cysticercoids.

Dosage forms: Tablet, 600 mg.

*Alternatives*

Metrifonate, 600 mg P.O. TID at 14 days interval for *S. haematobium*.

S/Es: nausea, colic, lassitude

C/Is: recent exposure to insecticides

D/Is: Respiratory paralysis when given with depolarizing neuromuscular blockers

Dosage forms: Tablet, 100mg.

OR

Oxamnique, 1250 mg (30 mg/kg) P.O. single dose for *S. mansoni*.

S/Es: headache, dizziness, drowsiness and minor GI disturbances.

C/Is: should not be used in pregnancy.

Dosage forms: capsule, 250 mg; suspension, 250-mg/5 ml
SEPTIC ARTHRITIS

This is an invasion of the joints by microorganisms. It may occur secondary to haematogenous spread (80-90%), contiguous spread (10-15%), and direct penetration of microorganisms secondary to trauma, surgery or injection. It is commonly caused by *S. aureus*, *S. pyogenes*, *N. gonorrhoeae*, and other Gram negatives. Septic arthritis presents acutely and mostly with a single swollen and painful joint.

**Diagnosis:** Clinical: synovial fluid analysis including Gram stain and culture; X-ray of the affected joint

**Treatment:**

**Non-drug treatment**
- Aspiration/drainage when indicated
- Splintage, but early immobilization if joints are mobile.
- The joint must be splinted with a POP slab or skin traction to relieve pain and prevent contractures

**Drug Treatment**

*Cloxacillin*, IV, 2 g every 6 hr QID for 4-6 weeks

(For *S/Es, C/Is* and dosage forms, see page 39 - 40)

SUBACUTE BACTERIAL ENDOCARDITIS

It is an infection of the endocardium of the heart. Fever is present in almost all patients, and features of Anemia, arthralgia and myalgia may also be seen. Petechial rash and splenomegaly are important physical findings. *Streptococcus viridans* causes the majority of cases of subacute bacterial endocarditis; the rest are due to organisms like *Entetrococi*, *Staphylococci* and others. A number of factors predispose to the development of SBE. These include intravenous drug use (IDU), prosthetic heart valves, and structural heart disease. Some procedures like dental or pelvic manipulations, and catheterization may result in transient bacteremia and predisposes to SBE.
**Diagnosis**

It is usually made on clinical grounds. Confirmation can be made through blood culture as well as echocardiography.

**Treatment**

**For Streptococci Viridans infection**

*First line*

**Penicillin G**, 12-18 million IU I.V. QD in divided doses four hourly for 4 weeks.

*S/Es:* hypersensitivity reactions including urticaria, fever, joint pains, rashes, angio-edema, anaphylaxis, paraesthesia, with prolonged use, diarrhea and antibiotic associated colitis.

*C/Is:* Penicillin hypersensitivity.

**Dosage forms:** Injection, penicillin G, sodium crystalline, 1,000,000 IU in vial, 5,000,000 IU in vial, 10,000,000 IU in vial, 20,000,000 IU in vial.

PLUS

**Gentamicin**, 1mg/kg I.V. TID, for the first 2 weeks.

(For S/Es, C/Is and dosage forms, see page 39)

*Alternative*

**Vancomycin**, 15 mg/kg IV BID for 4 weeks

(For S/Es, C/Is and dosage forms, see page 40)

PLUS

**Gentamicin**, 1mg/kg I.V. TID, for the first 2 weeks.

(For S/Es, C/Is and dosage forms, see page 39)

**For Enterococci infection**

**Penicillin G**, 18-30 million IU per day I.V. for 4-6 weeks.

(For S/Es, C/Is and dosage forms, see above)
PLUS

Gentamicin, 1 mg/kg I.V. TID for 4-6 weeks.
(For S/Es, C/Is and dosage forms, see page 39)

For Staphylococcal infection

Methicillin–susceptible:

Cloxacillin, 2 g I.V. every 4 hours for 4-6 weeks,
(For S/Es, C/Is and dosage forms, see page 39 - 40)

Methicillin – resistant:

Vancomycin, 15mg/kg I.V. BiD for 4 weeks.
(For S/Es, C/Is and dosage forms, see page 40)

TETANUS

Tetanus is a neurological syndrome caused by a neurotoxin elaborated by Clostridium tetani at the site of injury. It can largely be prevented by appropriate immunization. The most common and important clinical features include trismus (lockjaw) localized or generalized muscular rigidity and spasm. The presence of arrhythmia, extreme oscillation in blood pressure, diaphoresis, laryngeal spasm and urinary retention may suggest autonomic dysfunction.

Diagnosis: It is usually established on clinical grounds.

Treatment:

Non-drug treatment

- Admit patients to a quite place, and in severe cases, to an intensive care unit if possible for continuous cardio-pulmonary monitoring.
- Wound care which includes thorough cleaning and debridment.
- Intubation or tracheostomy, in severe cases.
Drug treatment:

A. Control of spasm

Diazepam, 10 mg I.V. should be given every 4 hourly, the dose being titrated depending on the response. Large doses as much as 250 mg a QD could be used.

S/Es: drowsiness, fatigue, hypotension, paradoxical excitement.

C/Is: acute pulmonary insufficiency.

Dosage forms: tablet, 2 mg, 5 mg, 10 mg; suppository, 5 mg, 10 mg; injection, 5mg/ml in 2ml ampoule.

PLUS

Chlorpromazine, 25-50 mg I.M. QID alternated with diazepam.

S/Es: bone marrow suppression, drowsiness, apathy, alteration in liver function, cutaneous reactions, occasionally tardive dyskinesia.

C/Is: bone marrow depression, coma caused by CNS depressants.

Dosage forms: tablet, 25mg, 50mg, 100mg; drop, 25mg/ml in 10ml bottle, 40mg/ml in 10ml and 30ml bottles; syrup, 25mg/5ml; injection, 25mg/ml in 1ml and 2ml ampoules, 50mg/ml in 2ml ampoule.

B. Antibiotic treatment

Metronidazole, 500 mg P.O. TID for 7-10 days

(For S/Es, C/Is and dosage forms, see page 14)

C. Neuromuscular blockade

Suxamethonium, 20-100 mg I.V. depending on the effect with mechanical ventilation may be employed inpatients with severe laryngeal spasm.

S/Es: tachycardia, hypertension or hypotension; bronchospasm, apnoea, prolonged respiratory depression.

C/Is: family history of malignant hypertension; severe liver disease.

Dosage forms: powder for injection, 100 mg, 500mg in vial

D. Neutralization of circulating toxin

Tetanus, Human immunoglobulin, 500 IU I.M. single dose OR

Tetanus Antitoxin (TAT) 10,000 IU IM. after a skin test.
E. Control of Autonomic dysfunction:

Like hypertension and supra-ventricular tachycardia can be treated with Beta-blockers.

*First line:*

**Propranolol**, 60 mg P.O. QD in three-divided dose

**S/Es:** bronchospasm, bradycardia, may mask insulin induced hypoglycemia, insomnia, fatigue and hypertriglyceridemia.

**C/Is:** in those who have a heart block and heart failure; asthma.

**Dosage forms:** Tablet, 10mg, 40mg; injection, 1mg/ml in 1ml ampoule

*Alternative*

**Labetolol**, 100-200mg, BID

(For **S/Es and C/Is**, see under propranolol)

**P/C:** may cause sudden death

**Dosage forms:** Tablet, 50mg, 100mg, 200mg, 400mg

**N.B.** Provide *active immunization* with appropriate booster doses in those who were never immunized in the past.

**TOXOPLASMOSIS (CNS)**

CNS Toxoplasmosis is an infection of the central nervous system by the protozoan *Toxoplasma gondii*. The disease develops in individuals with underlying immunodeficiency, usually occurring as a reactivation. Patients with cerebral toxoplasmosis typically present with headache confusion, fever. and/or signs of focal neurological deficit.

**Diagnosis:**

- Clinical and Neuro-imaging (CT scan or MRI of the brain).
- Serologic test for anti-toxo Ig-G antibody. If negative, it may help to exclude the diagnosis. On the other hand positive test or high titer for Ig-M would suggest a more recent infection.

**Treatment:**

*First line*

**Sulfadiazine**, 1-2g P.O.QID for six weeks
S/Es: crystaluria, rash
C/Is: severe liver, renal and hematological disorders, known hypersensitivity to Sulfonamides, children under 6 years old
Dosage forms: tablets, 500mg.

PLUS

Pyrimethamine, 25-100mg, P.O. QD
S/Es: Rash, fever, neutropenia
C/Is: folate deficiency
Dosage forms: Tablets, 25mg.

PLUS

Folinic acid, 10-20 mg P.O. QID for six weeks
S/Es: allergy
C/Is: pernicious anaemia
Dosage forms: Tablet, 500mg.

Followed by

Maintenance pyrimethamine, 25mg/day P.O. QD
(For S/Es, C/Is and dosage forms, see above)

Alternatives

Sulfadoxin pyrimethamine, 1000 mg/50 mg, P.O. BID for two days, then one tablet/day for 6 weeks.
(For S/Es, C/Is and dosage forms, see page 339)

PLUS

Folinic acid, 10-20mg, P.O. QID for 6 weeks

OR

Clindamycin, initially 200-400mg I.V. QID followed by 300-900 mg, P.O. TID

PLUS

Pyrimethamine, 25-100 mg/day P.O

PLUS

Folinic acid, 10-20 mg/day P.O.
(For S/Es, C/Is and dosage forms, see page 61)
PLUS

Azitromycin, 900-1200mg P.O. QD

(For S/Es, C/Is and dosage forms, see under Erythromycin page 241)

Followed by

Maintenance pyrimethamine, 25mg/day P.O.QD

(For S/Es, C/Is dosage forms, see page 61)

N.B. Administration of Dexamethasone is recommended in patients with altered sensorium and clinical evidence of marked increase in intra-cranial pressure.

(For Dosage schedule, S/Es, C/Is and dosage forms, see page 319)

Prophylaxis:

Sulphamethoxazole-Trimethoprim, (For Dosage schedule, S/Es, C/Is dosage schedule and dosage forms, see page 16)

TUBERCULOSIS

Tuberculosis is a chronic bacterial infection caused by a group of bacteria, Mycobacteriaeae, the most common of which is Mycobacterium tuberculosis. Less frequently, it can be caused by Mycobacterium bovis and Mycobacterium africanum. The clinical picture is quite variable and depends on the specific organ affected by the disease. Although the lung is the most commonly affected organ, almost all parts of the body can be infected with this bacterium. HIV infection has now become one of the most important risk factors for the development of active tuberculosis. Patients with TB usually present with the symptom complex of low grade fever with sweating, loss of appetite and weight loss.

Diagnosis

Microscopic examination of of sputum, other body fluids or tissue sample after Ziehl Nielsen(AFB) staining remains the most important diagnostic tool. Histo-pathology and radiography are also helpful, particularly in those patients who do not produce sputum. Culture for Mycobacteria should be done particularly for those suspected to have Multi Drug resistant (MDR) Tuberculosis.
Treatment

The treatment strategy is referred to as DOTS indicating that treatment (during the intensive phase) is given under the direct supervision of a health worker and that it is a short course of treatment.

The treatment has now been standardized by putting patients into different categories based on the smear status, seriousness of the illness and previous history of treatment for TB. Accordingly, the national TB control program office has adopted the following treatment guidelines, in which the different forms of tuberculosis are categorized and their respective regimens recommended.

Category I.

It includes those new patients who have smear-positive Pulmonary TB and those who seriously ill patients with smear-negative Pulmonary and Extra-pulmonary TB.

The treatment regimen for this category is 2 (RHZE) / 6 (EH) or OR 2 (RHZE) / 4RH.

Table IX. SCC regimen for new cases: 2(RHZE)/6(EH) or OR 2(ERHZ)/ 4RH

<table>
<thead>
<tr>
<th>Duration of Treatment</th>
<th>Drugs</th>
<th>Adolescents and adults</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>20-29 kg</td>
<td>30-37 kg</td>
<td>38-54 kg</td>
<td>&gt;55 kg</td>
</tr>
<tr>
<td>Intensive phase (8 weeks)</td>
<td>(RHZ) 150/75/400</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E 400 or 1 S</td>
<td>½ g im</td>
<td>¾ g im</td>
<td>¾ g im</td>
<td>1 g im</td>
<td></td>
</tr>
<tr>
<td>Continuation phase (6months)</td>
<td>(EH) 400/150</td>
<td>1½</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- or patients >50 years, the maximum dose of Streptomycin should not exceed 750 mg.
- During the intensive phase of DOTS, the drugs must be collected daily and must be swallowed under the direct observation of a health worker. During the continuation phase, the drugs must be collected every month and self-administered by the patient.
Table X. SCC regimen for children of 6 years or below and seriously ill children 7–14 years old: 2S(RHZ)/4(RH) or 2(RHZ)/4(RH)

<table>
<thead>
<tr>
<th>Duration of treatment</th>
<th>Drugs</th>
<th>Child pre-treatment weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive phase</td>
<td>RHZ 150/75/400</td>
<td>&lt; 7 kg</td>
</tr>
<tr>
<td>(8 weeks)</td>
<td>S²</td>
<td>-</td>
</tr>
<tr>
<td>Continuation phase</td>
<td>RH 150/75</td>
<td>-</td>
</tr>
<tr>
<td>(4 months)</td>
<td></td>
<td>¼ gm im</td>
</tr>
</tbody>
</table>

1 Streptomycin should not be given to pregnant women and must be replaced by Ethambutol.

- S is to be used as the fourth drug in the intensive phase if the child is smear-positive or seriously ill.
- During the intensive phase of DOTS, the drugs must be taken under the direct observation of a health worker or the mother. During the intensive phase, the mother can collect the drugs on a weekly basis. During the continuation phase, the drugs must be collected every month and taken under the direct observation of the mother.

Category II

This category is applied to a group of TB patients:

- Who relapsed after being treated and declared free from the disease, OR
- In those patients who are previously treated for more than one month with SCC or LCC, and found to be smear positive upon return, OR
- Who still remain smear positive while under treatment, at month five and beyond.
- The treatment regimen for this category is: 2 SE (RHZ) / 1E (RHZ) / 5 E³ (RH).
Table XI. Re-treatment regimen: 2 S (RHZE) / 1 (RHZE) / 5E₃(RH)₃<sup>3</sup>

<table>
<thead>
<tr>
<th>Duration of Treatment</th>
<th>Drugs</th>
<th>Adolescents &amp; adults pre-treatment weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20-29 kg</td>
</tr>
<tr>
<td>Intensive phase (8 weeks)</td>
<td>RHZ 150/75/400</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>½ gm im</td>
</tr>
<tr>
<td></td>
<td>E 400</td>
<td>1</td>
</tr>
<tr>
<td>Intensive phase (third month)</td>
<td>RHZ 150/75/400</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>E 400</td>
<td>1</td>
</tr>
<tr>
<td>Continuation phase (5 months, 3 x weekly)</td>
<td>RH 150/75</td>
<td>1½</td>
</tr>
<tr>
<td></td>
<td>H 100</td>
<td>½</td>
</tr>
<tr>
<td></td>
<td>E 400</td>
<td>1</td>
</tr>
</tbody>
</table>

- Streptomycin should not be included in the re-treatment for pregnant women.
- Throughout the duration of re-treatment, including the continuation phase, the drugs must be taken under the direct observation of a health worker.

<sup>3</sup> 5E₃(RH)₃ = 5 'months' (20 weeks) of treatment with a combination of E, R and H, three times a week on alternate days (e.g. Monday, Wednesday, Friday, etc.)

**Category III**

This refers to patients who have smear negative Pulmonary TB, Extra-pulmonary TB and TB in Children.

The regimen consists of 8 weeks of treatment with, Ethambutol, Rifampicin, Isoniazid and Pyrazinamide during the intensive phase followed by Ethambutol and Isoniazid six months [2(RHZE/)/6(EH)].
Table XII. Short course chemotherapy regimen for smear-negative PTB and EPTB: 2 (RHZE) / 6(EH). For children < than 20 kg see dosage in table IX.

<table>
<thead>
<tr>
<th>Duration of Treatment</th>
<th>Drugs</th>
<th>Children &amp; adults pre-treatment weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20-29 kg</td>
</tr>
<tr>
<td>Intensive phase (8 weeks)</td>
<td>RHZ 150 / 75 / 400</td>
<td>1½</td>
</tr>
<tr>
<td></td>
<td>S or E 400</td>
<td>½ g im</td>
</tr>
<tr>
<td>Continuation phase (6 months)</td>
<td>EH 400 / 150</td>
<td>1</td>
</tr>
</tbody>
</table>

Table XIII. Long course regimen for TB: 2 S (EH) / 10 (EH)

<table>
<thead>
<tr>
<th>Duration of treatment</th>
<th>Drugs</th>
<th>Child, adolescents &amp; adults pre-treatment weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 9</td>
</tr>
<tr>
<td>Intensive phase (8 weeks)</td>
<td>S (gm) EH 400/150</td>
<td>.125</td>
</tr>
<tr>
<td>Continuation phase (10 months)</td>
<td>EH 400/150</td>
<td>1</td>
</tr>
</tbody>
</table>

- For patients > 50 years, the dose of Streptomycin should not exceed 750 mg
- Streptomycin should not be given to pregnant women. These patients must be treated with EH for 12 months. Preferably all pregnant women should be treated with SCC (with Ethambutol instead of Streptomycin).
- Children in this group, who are 6 years or below, only receive H in the continuation phase. Children older than 6 years may receive E and H, but have to be regularly asked if they have complaints of visual problems.
- Long course chemotherapy may be preferred in case of jaundice or in patients with underlying serious liver disease.
Category IV

Treatment of chronic cases
Chronic cases can be described as those cases that continue to be smear-positive after completion of a fully supervised (initial phase and continuation phase) treatment with the treatment regimen. These patients are considered essentially incurable with currently available regimens in Ethiopia. As these patients cannot yet be effectively cured, family members should be advised as to how to prevent transmission.

Treatment of special cases
Treatment during pregnancy and breast-feeding
Note the following:
- Inquire about possibility of pregnancy before starting as well as during, TB treatment of women in the childbearing age
- Preferably all pregnant women should be treated with DOTS.
- Avoid Streptomycin because of the risk of toxic effects on the fetus. Replace Ethambutol in place of Streptomycin.
- Breast-feeding and chemotherapy should not be discontinued.
- When a breast-feeding mother has PTB, the infant should, regardless of prior vaccination with BCG, be given chemo-prophylaxis and then be vaccinated with BCG if not vaccinated before.

Treatment of patients also infected with HIV
Patients infected with HIV usually respond equally well to TB treatment as those without HIV infection, with a few exceptions:
- They should always be treated with short course chemotherapy.

Initiation of ART in the course of treatment for tuberculosis should follow the WHO guidelines (table XII).
Table XIV: Guide for management of patients presenting with TB before initiation of ART

<table>
<thead>
<tr>
<th>CD4 count</th>
<th>Recommendation</th>
<th>Preferred ARV regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200/mm³</td>
<td>• Start TB treatment.</td>
<td>EFV containing regimen is preferred. However, if drugs are unavailable or there are problems with EFV (adverse effects with intolerance and risk of pregnancy) use triple nucleoside regimen with caution. If patient develops ABC hypersensitivity continue NVP but monitor liver function every month.</td>
</tr>
<tr>
<td></td>
<td>• Start ART as soon as TB treatment is tolerated (usually between 2-8 weeks of TB treatment)</td>
<td></td>
</tr>
<tr>
<td>200-350/mm³</td>
<td>• Start TB treatment.</td>
<td>• Start NVP containing regimen if the continuation phase does not include rifampicin.</td>
</tr>
<tr>
<td></td>
<td>• Start ART after 8 weeks (after intensive phase) of TB treatment</td>
<td>• If a non-pregnant woman has CD4 of &gt;250 use EFV</td>
</tr>
<tr>
<td></td>
<td>• Start NVP containing regimen if the continuation phase does not include rifampicin.</td>
<td>• In pregnant women with CD4 &gt;250 use triple NRTI containing ABC/3TC/ZDV</td>
</tr>
<tr>
<td></td>
<td>• If a non-pregnant woman has CD4 of &gt;250 use EFV</td>
<td>Start EFV containing regimen if continuation phase includes rifampicin.</td>
</tr>
<tr>
<td>&gt;350/mm³</td>
<td>• Start TB treatment.</td>
<td>• Re-assess eligibility for ART at 24 weeks clinically and immunologically, in the course of TB-treatment, at completion of TB treatment, or as indicated.</td>
</tr>
<tr>
<td></td>
<td>• Defer ART</td>
<td></td>
</tr>
<tr>
<td>CD4 not available</td>
<td>• Start TB treatment.</td>
<td>• Start NVP containing regimen if the continuation phase does not include rifampicin.</td>
</tr>
<tr>
<td></td>
<td>• Start ART after 2-8 weeks TB treatment if patient has severe disease and/or other clinical indicators of advanced immune deficiency</td>
<td>• If a non-pregnant woman has CD4 of &gt;250 use EFV</td>
</tr>
<tr>
<td></td>
<td>• Start ART after completion of intensive phase when patient is not seriously ill or other signs of advanced immune deficiency are absent</td>
<td>• In pregnant women with CD4 &gt;250 use triple NRTI containing ABC/3TC/ZDV</td>
</tr>
<tr>
<td></td>
<td>• Start ART after completion of intensive phase when patient is not seriously ill or other signs of advanced immune deficiency are absent</td>
<td>Start EFV containing regimen if the continuation phase includes rifampicin.</td>
</tr>
</tbody>
</table>

1 Timing of ART initiation should be up to clinical judgment based on other signs of immunodeficiency indicating progression of HIV disease (Refer to Table 1). For TB patients in WHO clinical Stage IV, ART should be started as soon as TB treatment is tolerated irrespective of CD4 count.
2 EFV containing regimens include d4T/3TC/EFV or ZDV/3TC/EFV.
3 NVP (200 mg daily for 2 weeks followed by 200 mg twice daily) may be used in place of EFV in absence of other options. NVP containing regimens include: d4T/3TC/NVP or ZDV/3TC/NVP.
4 Start ART if non-TB Stage IV conditions are present.
Treatment of patients with renal failure

Avoid Streptomycin and Ethambutol; give 2 RHZ / 4 RH.

Treatment of patients with (previously known) liver disease (e.g. hepatitis, cirrhosis)

1. The dose of Rifampicin for these patients should not exceed 8mg per kg and for Isoniazid it should not exceed 4 mg per kg. In the case of jaundice, the treatment regimen should be changed to 2 SEH /10 EH.

2. All drugs should be taken together as a single daily dose, preferably on an empty stomach.

Treatment of patients with TB and leprosy

Patients having both TB and leprosy require appropriate ant-TB chemotherapy in addition to the standard MDT. Rifampicin will be common to both regimens and it must be given in the doses required for TB. Once the anti-TB course is completed, the patient should continue his anti-leprosy treatment.

Table XV: Relevant information about the first line antitubercular drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>S/Es</th>
<th>C/Is</th>
<th>D/is</th>
<th>Dosage forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid (H)</td>
<td>Peripheral neuritis, numbness, mental disturbance, rash,</td>
<td></td>
<td>Al(OH)₃ decreases absorption, Inhibits metabolism of phenytoin,</td>
<td>Tablet, 100 mg, 300 mg:</td>
</tr>
<tr>
<td></td>
<td>fever, arthralgia, hepatitis</td>
<td></td>
<td>diazepam, warfarin</td>
<td></td>
</tr>
<tr>
<td>Rifampicin (R)</td>
<td>Hepatitis, renal failure, hemolysis,pupurea, rash, nausea,</td>
<td></td>
<td>Increase metabolism of warfarin, corticosteroids, Protease Inhibitors,</td>
<td>Capsule, 150</td>
</tr>
<tr>
<td></td>
<td>vomiting, anorexia, orange/green urine</td>
<td></td>
<td>sulfonyl ureas, oral contraceptives</td>
<td>mg, 300mg, 600mg: Syrup,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20mg/5ml</td>
</tr>
<tr>
<td>Ethambotol (E)</td>
<td>Optic neuritis, nausea, rashes, fever, neurological changes,</td>
<td></td>
<td></td>
<td>Tablet, 100g, 400 mg</td>
</tr>
<tr>
<td></td>
<td>hyperurecemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyrazinamide (Z)</td>
<td>Hepatotoxicity, nausea, vomiting, hyperuricemia, arthralgia,</td>
<td></td>
<td>Liver disease</td>
<td>Tablet, 500 mg</td>
</tr>
<tr>
<td></td>
<td>flushing, rashes, fever</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table XVI. Symptom-based approach to management of anti TB drug side effects.

<table>
<thead>
<tr>
<th>Side-effects</th>
<th>Drugs</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Minor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anorexia, nausea, abdominal pain.</td>
<td>Rifampicin</td>
<td>Give tablets as last thing at night.</td>
</tr>
<tr>
<td>joint pains</td>
<td>Pyrazinamide</td>
<td>Aspirin</td>
</tr>
<tr>
<td>burning sensation in feet.</td>
<td>Isoniazid</td>
<td>Pyridoxine 100mg daily.</td>
</tr>
<tr>
<td>orange/red urine</td>
<td>Rifampicin</td>
<td>Reassurance</td>
</tr>
<tr>
<td>b. Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deafness</td>
<td>Streptomycin</td>
<td>Stop streptomycin, use ethambutol instead.</td>
</tr>
<tr>
<td>dizziness</td>
<td>Streptomycin</td>
<td>Stop streptomycin, use ethambutol instead.</td>
</tr>
<tr>
<td>jaundice</td>
<td>Most anti-TB</td>
<td>Stop all anti-TB drugs and jaundice clears.</td>
</tr>
<tr>
<td>vomiting and confusion.</td>
<td>Most anti-TB</td>
<td>Stop all anti-TB drugs until the situation</td>
</tr>
<tr>
<td>visual impairment</td>
<td>Ethambutol</td>
<td>Stop ethambutol and do proper ophthalmic</td>
</tr>
<tr>
<td>shock, purpura and acute renal failure.</td>
<td>Rifampicin</td>
<td>Stop Rifampicin and give appropriate supportive Rx.</td>
</tr>
</tbody>
</table>
Table XVII: Fixed dose combination antiTB drugs and their dosage forms

<table>
<thead>
<tr>
<th>Fixed Dose combination antiTB drugs</th>
<th>Dosage forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rifampicin, Isoniazid and Pyrazinamide (RHZ)</td>
<td>Tablet, 150/75/400 mg</td>
</tr>
<tr>
<td>Ethambutol and Isoniazid (EH)</td>
<td>Tablet, 400/150 mg</td>
</tr>
<tr>
<td>Rifampicin and Isoniazid (RH)</td>
<td>Capsule, 150/100 mg; tablet, 150/100mg, 300/150mg</td>
</tr>
<tr>
<td>Rifampicin and Isoniazide and Pyrazinamide and Ethambutol(RHZE)</td>
<td>Tablet, 150/75/400/275mg</td>
</tr>
</tbody>
</table>

**TYPHOID FEVER**

Typhoid fever is an acute febrile illness caused mainly by *Salmonella typhi*. The mode of transmission is via contaminated food or water. It is clinically characterized by a gradual increase in body temperature associated with headache, malaise and chills. Physical findings include fever, splenomegaly and hepatomegaly. Sometimes it may cause outbreaks.

**Diagnosis**

- Clinical
- Culture of blood, stool or urine
- Serological examination, such as the Widal test may be used as an adjunct to diagnosis in the proper clinical setup. The Widal test is, however, characterized by false positive results.

**Treatment:**

**Symptomatic treatment:** Use of antipyretics, e.g. paracetamol to control fever

**Drug treatment**

*First line:*

- **Chloramphenicol**, 500mg P.O. QID, for 14 days: For children: 25mg/kg. 
  (For S/Es, C/Is and dosage forms, see page 23)

*Alternative:*

- **Ciprofloxacin**, 500 mg P.O., BID for 7 days
  (For S/Es, C/Is and dosage forms, see page 16)
OR

**Amoxicillin**, 1g, P.O.QID., for children: 20 – 40 mg/kg/day P.O. in 3 divided doses for 14 days
(For S/Es, C/Is and dosage forms, see page 18)

OR

**Sulfamethoxazole+trimethoprim**, 800 mg/160 mg P.O. BID for 14 days. For children 6 weeks – 5 months, 100/20 mg; 6 months – 5 yrs, 200/40 mg; 6 – 12 yrs, 400/80 mg BID
(For S/Es, C/Is and dosage forms, see page 16)

OR

**Ceftriaxone**, 1g QD as a single dose or OR2 divided doses I.M. OR I.V. for 5-7 days.
For children: 20-50mg/kg/day as a single dose OR 2 divided doses I.M. OR slow I.V.
(For S/Es, C/Is and dosage forms, see page 17)

For severe cases:

**Chloramphenicol**, 1g, IV bolus QID until 48 hrs after fever has settled, followed by 500 mg P.O., QID for a total of 14 days. For children: 25mg/kg, IV bolus QID, until 48 hrs after fever has settled, followed by 525 mg/kg P.O., QID for a total of 14 days.
(For S/Es, C/Is and dosage forms, see page 23)

**TYPHUS**

Typhus is a *ricketisial* disease, which causes an acute febrile illness characterized by an abrupt onset of fever, severe headache and prostration. Important differential diagnosis include relapsing fever, bacterial meningitis, and typhoid fever. It is a disease commonly seen among destitute individuals with poor personal hygiene.

**Diagnosis:** Clinical and a high/rising titer in the Weil Felix serology test.

**Treatment**
First line

**Tetracycline**, 250mg, P.O.QID for 7 days

(For S/Es, C/Is and dosage forms, see page 19)

Alternatives

**Chloramphenicol**, 500mg P.O. QID, for 7 days: For children: 25mg/kg.

(For S/Es, C/Is and dosage forms, see page 23)

OR

**Doxycycline**, 200mg P.O. in a single or 2 divided doses for seven days

(For S/Es, C/Is and dosage forms, see page 21)

**URINARY TRACT INFECTION**

UTI refers to inflammation of the urinary tract, which includes the renal parenchyma (pyelonephritis), the bladder (cystitis), the prostate in males (prostatitis) and the urethra (urethritis). The range of possible symptoms caused by UTI is extremely broad, from no symptoms to symptoms referable to the lower urinary tract (e.g. dysuria and frequency), to symptoms indicative of an upper UTI (e.g. loin pain and costo-vertebral angle tenderness), to full-blown septic shock. The vast majority of acute symptomatic infections occur in young women. Acute symptomatic urinary infections are unusual in men under 50. It is also important to note that asymptomatic bacteriuria is very common in elderly men and women. *Escherichia coli* cause approximately 80% of acute infections in patients without catheters, stone or other urologic abnormalities. On the other hand, organisms like *klebsiella*, *enterobacteria*, *proteus*, *serratia* and *psuedomonas* assume greater importance in recurrent infections and infections associated with urologic manipulations as in catheter associated nosocomial infections.

**Diagnosis:**

- Urine analysis and Gram stain showing pyuria and bacteriuria
- Urine culture. Bacterial colony count of $10^5$ organisms per milliliter or greater in urine generally indicates urinary tract infection.
Treatment

A. Acute, Uncomplicated UTI in women:

First line:

Sulfamethoxazole+trimethoprim, 800mg/160 mg P.O. BID, for 3-5 days.

(For S/Es, C/Is and dosage forms, see page 16)

Alternatives:

Norfloxacin, 400mg P.O. BID, for 3-5 days.

S/Es: mild GI upset; rash and pruritus; hypersensitivity reactions including fever, joint pain, urticaria. Discontinue the drug if psychiatric, neurological or severe hypersensitivity reactions occur.

C/Is: renal impairment, pregnancy

Dosage forms: tablet, 400mg

OR

Amoxicillin, 250-500mg, P.O. TID for 3-5 days. For children: 20-40 mg/kg/day in 4 divided doses.

(For S/Es, C/Is and dosage forms, see page 18)

B. Acute, Uncomplicated Upper UTI (Pyelonephritis) in women:

The same antibiotics used for Lower UTI could be used, but the period of treatment should extend for 7-10 days.

N.B.

- In severe cases, antibiotics should be given parenterally for the first 48-72 hours.
- In severe cases addition of aminoglycosides like Gentamycin could be considered

C. UTI in Men:

First line:

Sulfamethoxazole+trimethoprim, 800 mg/160 mg P.O. BID, for 10-14 days.

(For S/Es, C/Is and dosage forms, see page 16)

Alternatives

Norfloxacin, 400 mg P.O. BID, for 10-14 days.
(For S/Es, C/I and dosage forms, see above)

OR

Amoxicillin, 250-500 mg P.O. TID for 10-14 days. For children: 20-40mg/kg/day in 4 divided doses.

(For S/Es, C/I and dosage forms, see page 18)

D. For recurrent and resistant cases of UTI:
An intensive urologic evaluation is needed and antibiotic choice should be guided by drug sensitivity test from urine culture.

VIRAL HEPATITIS

Viral hepatitis is a systemic infection affecting the liver predominantly and is caused by one of the five viruses: Hepatitis A virus (HAV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Hepatitis D virus (HDV) and Hepatitis E virus (HEV). All types of viral hepatitis produce clinically similar acute illness that ranges from asymptomatic infection to fulminant hepatic failure; whereas chronic illness ranging from subclinical persistent infection to rapidly progressive chronic liver disease and cirrhosis to hepatocellular carcinoma is more common with the blood borne infections (HBV, HCV, HDV).

Diagnosis: Clinical and laboratory

Clinical: in acute infection manifestations may include poor appetite, nausea, vomiting, right upper abdominal pain and jaundice. Chronic infections may be asymptomatic or may have manifestations of advanced cirrhosis in the form of ascites, splenomegaly and hepatic encephalopathy.

Laboratory: determination of liver enzymes and other tests of liver synthetic and excretory function as well as serologic viral markers help to make the diagnosis.

Prevention

Hepatitis B vaccination is now universally recommended and is available as part of childhood vaccination in the Expanded Program on Immunization (EPI). Vaccines for Hepatitis A and very recently for Hepatitis E are available but are not routinely administered.
Treatment

Nondrug treatment

Acute Viral Hepatitis: Some restriction of physical activity is useful although prolonged bed rest is not essential. A high calorie diet is desirable and drugs metabolized by the liver should be avoided.

Chronic Viral Hepatitis: Avoidance of alcohol consumption and drugs metabolized by the liver is recommended.

Drug Treatment

Specific drug treatment is not indicated in the treatment of acute viral hepatitis. Patients with chronic viral hepatitis due to HBV, HCV and HDV with evidence of active viral replication and ongoing injury to the liver require specific drug treatment with a combination of antiviral agents. Such patients should be referred to a specialized hospital with the appropriate expertise and resources to administer and monitor antiviral treatment.
CHAPTER II

NON-INFECTIOUS DISEASES

Acute cardiogenic pulmonary edema
Anemia
Anxiety disorder
Arrythmias
Atrioventricular block
Bronchial asthma
Chronic Lymphocytic Leukemia
Chronic Myelogenous Leukemia
Constipation
Diabetes mellitus
Dyspepsia
Epilepsy
Gout
Hemorrhoids
Hypertension
Immune thrombocytopenic purpura
Migraine
Mood disorders
Myocardial infarction
Osteoarthritis
Peptic ulcer
Portal hypertension
Rheumatic fever(Acute)
Rheumatic heart disease(Chronic)
Rheumatoid arthritis
Schizophrenia
Thyrotoxicosis
ACUTE CARDIOGENIC PULMONARY EDEMA

Acute pulmonary edema is characterized by rapid transudation of excess fluid into the interstitial space and alveoli secondary to increased pulmonary artery wedge pressure. It is a life threatening condition if not diagnosed and managed promptly.

Acute pulmonary edema could be cardiogenic or noncardiogenic in origin and these may be clinically indistinguishable. With full-blown pulmonary edema, the patient is dyspneic at rest, tachypenic, with cough productive of frothy and blood-tinged sputum. On physical examination the patient appears anxious and findings on the chest are bilateral rales and rhonchi. Chest radiography may show diffuse haziness of the lung fields with greater density in the hilar region. The cause of heart failure may be left atrial outflow impairment- e.g. mitral stenosis, left ventricular dysfunction- e.g. ischemic heart disease; left ventricular volume overload and left ventricular outflow tract obstruction.

Diagnosis: can be made clinically and by chest radiography

Treatment:

Supportive Treatment
- 100% oxygen via facemask
- If oxygenation remains inadequate use mechanical ventilation.
- Apply rotating cuff and keep the patient in semi-sitting position.

Drug treatment

**Morphine**, 2-4 mg, I.V. over 3 minutes, which can be repeated at 15 minutes interval.

S/Es: diaphoresis, nausea hypotension & bradycardia.
C/Is: head injury, elevated intra-cranial pressure

Dosage forms: Injection (hydrochloride), 10 mg/ml in 1 ml ampoule; tablet (sulphate), 5mg, 10mg, 15mg, 20mg, 30mg; granules for oral suspension, 20mg, 60mg; capsule (modified release), 20mg, 50mg, 100mg.
**PLUS**

**Furosemide**, 40 mg I.V. followed by 80 mg 1 hour later if required.  
**S/Es**: hypokalemia, dehydration, hyponatremia.  
**C/Is**: known sensitivity to furosemide.  
**Dosage forms**: Injection, 10mg/ml in 2ml ampoule; tablet, 40mg, 80mg; elixir, 10mg/ml

**PLUS**

**Nitroglycerin**, 0.4mg sublingual (repeat every 5 min as needed) is first-line therapy for acute cardiogenic pulmonary edema  
**S/Es**: hypotension;  
**C/Is**: systolic blood pressure less than 100mm Hg, clinical suspicion of right ventricular infarction.  
**Dosage forms**: tablet (sublingual), 0.5 mg.

**PLUS**

**Dopamine**, 5-10 µg/kg per min I.V.  
**S/Es**: tachyarrhythmia.  
**C/Is**: idiopathic hypertrophic subaortic stenosis  
**Dosage forms**: powder for injection, 250mg in vial.

**Digoxin** (For dosage schedule, S/Es, C/Is and dosage forms, see page 85) can sometimes be used for control of ventricular rate in patients with rapid atrial fibrillation or flutter and LV dysfunction.  
**N.B.**: Conditions that frequently complicate pulmonary edema, such as infection, acidemia, anemia, and renal failure, must be corrected.

**ANEMIA**

**1. Iron Deficiency Anemia (IDA)**

Iron deficiency denotes a deficit in total body iron resulting from iron requirements that exceed its supply. IDA is a manifestation of an underlying disease condition and is not in itself a complete diagnosis. Common causes of IDA include: increased iron requirements (growth-spurt, pregnancy and lactation), blood loss (chronic bleeding, blood donation, frequent phlebotomy,), worm infestation (hookworm), and inadequate iron supply (malnutrition, malabsorption). The symptoms of IDA include
fatigue, giddiness, headache, tinnitus, palpitations, sore tongue and dysphagia and are not specific to IDA.

**Diagnosis:**
1. Complete blood count and red blood cell indices
2. Peripheral blood smear examination and reticulocyte count
3. Serum ferritin level and bone marrow iron studies
4. Stool for ova and parasites and occult blood, digital per rectum examination, upper and lower GI radiologic and endoscopic studies, and genitourinary gynecologic and urologic examinations complete the workup of a patient with IDA.

**Treatment:**

**General:**
- The underlying cause of anemia should be identified and treated or corrected.
- Patients should be encouraged to take diet with optimal bioavailable iron such as meat.
- Patients with severe, symptomatic anemia and cardiovascular instability should be transfused packed red blood cells, cautiously.

**Drug Treatment**

*First Lline*

**Ferrous sulphate**, 325 mg tablets (65 mg elemental iron), or any other iron salt, taken TID between meals to maximize absorption is the treatment of choice. Treatment is continued for at least 3 months following correction of the anemia to replenish iron stores.

**S/Es:** Nausea, abdominal cramps and dyspeptic symptoms, constipation or diarrhea. For patients who do not tolerate ferrous sulfate tablets, they may be advised to take it with meals, or to start a smaller dose, or to change the brand to ferrous gluconate or fumarate tablets or elixir forms.

**D/Is:** Antacids, tetracyclines, chloramphenicol, and quinolone antibiotics interfere with the absorption and metabolism of iron.
Alternative

Iron dextran, 50 mg/ml in 2 ml ampoule; administered by deep I.M injection. The amount of iron required for i.v. administration can be calculated from the deficit and an additional of 500 to 1000mg iron is added to replenish the iron stores. Total dose of iron to be injected in mg = Body weight (kg) x 2.3x (15 - patient’s Hb) + 500-1000 mg.
S/Es: pain, swelling, and staining at site of injection; nausea, vomiting and taste disturbances; hypersensitivity reactions.
C/Is: history of allergic reactions (including asthma); severe hepatic or renal impairment; pregnancy.
Dosage forms: Injection, 50 mg/ml in 2 ml ampoule

N.B.
Iron parenteral therapy is rarely indicated; indications include oral iron intolerance despite modifications in dosage and regimen, malabsorption, presence of an inflammatory bowel and active peptic ulcer disease, inability or unwillingness by the patient to take oral iron. A dose of 25mg (0.5ml) IV is given first to test for hypersensitivity reactions and the patient is observed closely for possible complications.

2. Megaloblastic Anemia (MA)
Megaloblastic anemia (MA) is a descriptive morphologic term that refers to abnormal hematopoiesis characterized by dyssynchronous nuclear and cytoplasmic maturation. More than 95% of megaloblastic anemias are due to deficiency or deranged metabolism of either cobalamin (vitamin B₁₂) or folate. Folate deficiency MA is more common in Ethiopians. All the causes of megaloblastic anemia produce a common set of hematologic, laboratory and histologic abnormalities in the host. Folate deficient patients are usually malnourished. Neuropsychiatric manifestations are encountered in cobalamin deficiency, but not in folate deficiency states.

Diagnosis
1. Complete blood count and red blood cell indices
2. Peripheral blood smear examination and reticulocyte count
3. Serum cobalamin and folate levels and RBC folate content
4. Bone marrow aspiration and/or biopsy
Treatment:

General:

- Correctable or treatable causes must be identified and accordingly dealt with.
- Patients should be advised to take meat, dairy products (cobalamin) and green vegetables (folate).

Drug Treatment:

Specific therapy is directed toward replacing the deficient factor.

**Vitamin B$_{12}$ (Cyanocobalamine)** 1 mg I.M. twice during the first week, followed by 1 mg weekly for eight weeks then every 1-2 month for the rest of the patient's life if the cause cannot be corrected.

**S/Es:** Itching, fever chills, hot flushes, nausea and dizziness.

**Dosage forms:** Injection, 100 mcg/ml, 1000 mcg/ml in 1 ml ampoule.

**Folic acid** (Folate deficiency MA), 1 mg/day, P.O. but higher doses (up to 5 mg/d) may be required for folate deficiency due to malabsorption. for 4 months; child up to 1 year, 500 micrograms/kg daily QD; over 1 year, as adult dose. Higher doses may be required in malabsorption states.

**C/Is:** Folate-dependent malignancies

**Dosage forms:** Tablet, 200 mcg, 1 mg, 5 mg; injection, 5 mg/ml in 1 ml ampoule.

**P/C:** Folic acid should never be given without vitamin B$_{12}$ in undiagnosed megaloblastic anemia or other vitamin B$_{12}$ deficiency states.

**N.B.**
The hematologic picture normalizes in about 2 months in both cobalamin and folate replacement therapy. Large doses of folate may produce hematologic response in cobalamin deficiency states. This masks the cobalamin deficiency state and allows the neurologic damage to progress. Therefore, if both folate and cobalamin are deficient, cobalamin is administered first, followed by folate. Blood transfusion with packed RBCs could be needed in severe cases.
ANXIETY DISORDER

Anxiety Disorder is a pathological state characterized by a feeling of dread accompanied by somatic signs that indicate a hyperactive autonomic nervous system. It is differentiated from fear, which is a response to a known cause. Psychosocial stress may occur without any apparent cause.

**Diagnosis:** Clinical, ICD-10 criteria

**Treatment:**
**Non-drug treatment:**
Psychotherapy especially cognitive - behavior psychotherapy

**Drug treatment:**
*First line*
- **Diazepam**, 2.5 mg, P.O. TID for not more than 4 weeks, 2-10 mg IV for acute agitation
  (For S/Es, C/Is and dosage forms, see page 59)

*Alternative*
- **Oxazepam**, 15-30 mg P.O. 3-4 times daily
  S/Es: drowsiness, fatigue, hypotension
  C/Is: acute pulmonary insufficiency
  Dosage forms: tablet, 10 mg

OR
- **Bromazepam**, 1.5-3 mg tablet P.O. TID
  Dosage forms: Tablet, 1.5 mg, 3 mg, 6mg
  (For S/Es and C/Is, see under Oxazepam, above)

ARRHYTHMIAS

Arrhythmias are disorders of cardiac rhythm, which may be divided into disorders of impulse formation, disorders of impulse conduction or combination of both. At present, diagnostic tools do not permit unequivocal determination of the electrophysiological mechanisms responsible for a particular arrhythmia. Common rhythm disorders are conveniently classified as follows:
A. Tachyarrhythmias
   - Atrial fibrillation (AF)
   - Paroxysmal supra-ventricular tachycardia (PSVT)
   - Ventricular tachycardia

B. Bradyarrhythmias
   - Heart Blocks

1. Atrial Fibrillation

**Diagnosis:** Depends on electrocardiographic recognition of the following features:

- Absence of discrete P waves but undulating base line with irregular QRS complex

**Treatment**

- Aims at controlling the rate and/rhythm and prevention of embolization.
- Treat predisposing factor in cases of acute AF.

**Non Drug treatment**

- Immediate cardio-version may be necessary when it is associated with hemodynamic instability.

**Drug Treatment**

If there is no hemodynamic change, primary goal is slowing the ventricular rate as follows:

*First line:*

- **Propranolol**, 10-40mg P.O.. 3-4 times daily.

  (For **S/Es, C/Is** and **dosage forms**, see page 60)

*Alternatives*

- **Verapamil**, 40-80 mg P.O 2-3 times daily.
**S/Es:** Cardiogenic shock advanced heart block, uncompensated heart failure

**C/Is:** atrial fibrillation and rapid ventricular response through an accessory pathway.

**Dosage forms:** injection, 2.5mg/ml ampoule.

OR

**Digoxin,** 0.25 - 0.375 mg daily QD (first line drug if the arrhythmia is associated with left Ventricular dysfunction).

**S/Es:** anorexia, nausea, vomiting, visual disturbance, arrhythmia specially block and ventricular premature beats

**C/Is:** ventricular Arrhythmias in the absence of congestive cardiac failure, Wolf-Parkinson-White syndrome

**Dosage forms:** Tablet, 0.25mg; injection, 0.1mg/ml in 1ml ampoules, 0.25 mg/ml

**N.B.** Sub sequent measure is conversion to sinus rhythm.

**P/C:** If the arrhythmia had persisted for more than 48hr, conversion to sinus rhythm should be attempted after 3 weeks of anti-coagulation with warfarin to INR value of at least 1.8 and should be continued for 4 weeks after conversion.

- In-patients with underlying long standing chronic rheumatic heart disease, or long standing AF or if the left atrial dimension is greater than 5 cm on echocardiography, conversion is often unsuccessful.

**2. Paroxysmal supra-ventricular tachycardia (PSVT)**

Paroxysmal supraventricular tachycardia (PSVT) is an intermittent SVT other than AF, atrial flutter, and MAT (Multifocal Atrial Tachycardia). PSVTs are often caused by reentry.

**Diagnosis:**

- Electrocardiography: Regular narrow QRS complex tachycardia. P wave may be seen preceding or following the QRS complex or may not be seen at all.
Treatment:

**Non-drug treatment**

Acute termination should be undertaken with Valsalva maneuver or Carotid sinus massage.

N.B. Carotid massage should not be attempted in patients with a carotid bruit.

**Drug treatment**

*First line*

Verapamil, 5mg IV can be repeated once or twice 10 min apart

(For S/Es, C/Is and dosage forms, see page 84)

*Alternative*

Digoxin, 0.5 to 1 mg IV over a period of 10 to 15 min followed by 0.25 mg every 2-4 hours with a total dose less than 1.5mg with in 24-hour period. (For S/Es, C/Is and dosage forms, see page 85)

**Prevention of recurrence**

Propranolol, 10-40mg P.O. 3-4 times daily

(For S/Es, C/Is and dosage forms, see page 60)

**3. Ventricular tachycardias**

These group of tachycardias originate below the bifurcation of the bundle of His. Generally, they accompany some form of structural heart disease, most commonly, ischemic heart disease.

**Diagnosis:** is suggested by a wide-complex QRS tachycardia at a rate exceeding 100 beats per minute.

**Treatment:**

Symptomatic ventricular tachycardia generally need treatment.

1. **For Acute termination:**

   *First line:*

   Lidocaine, 1-1.5 mg/kg I.V. can be repeated with in 3 min to a maximum of 3mg/kg.
S/Es: respiratory depression and convulsion; hypotension, bradycardia; rarely hypersensitivity.
C/Is: hypovolumia, complete heart block.
Dosage forms: Tablet (sulphate), 200 mg

Alternative

Procainamide, 25-50 mg I.V. over one minute period then repeated every 5 min until the arrhythmia is controlled, hypotension results, or the QRS complex is prolonged more than 50%.
S/Es: QRS prolongation and torsades points.
Dosage forms: tablet, 250 mg; injection (hydrochloride), 100 mg/ml in 10 ml ampoule

2. Prevention of recurrence

First line

Propranolol, 20-160 mg P.O. in two divided doses
(For S/Es, C/Is and dosage forms, see page 60)

Alternatives

Amiodarone, initially 200 mg P.O. TID to be reduced gradually to 100-200 mg daily QD for maintenance.
S/Es: pulmonary fibrosis, photodermatitis, paresthesia, tremor, ataxia, constipation, hepatocellular necrosis;
D/Is: it reduces clearance of warfarin, quinidine, procainamide and flecanide.
Dosage form: Tablet, 200 mg.

OR

Verapamil, 40-80 mg P.O. three times daily.
(For S/Es, C/Is and dosage forms, see page 84)

Atrioventricular (AV) block

AV block is caused by acute processes such as myocardial infarction, digitals intoxication, beta and/or calcium channel blockers, and infections like myocarditis. It may also be caused by a variety of infiltrative and degenerative diseases.
**Diagnosis:** is based on Electrocardiographic findings.

**First degree AV block:** Characterized by prolonged PR interval more than 0.20 seconds

**Second degree AV block:** Some atrial impulses fail to be conducted to the ventricles.

- **Type 1:** progressive prolongation of the PR interval before block of an atrial impulse.
- **Type 2:** conduction fails suddenly without preceding change in PR interval

**3rd degree AV block:** No atrial impulse propagates to the ventricles

**Symptomatic AV block**

**A. For Acute termination**

- **Atropine, 0.5 –2mg IV.**
- **S/Es:** dry mouth, constipation, blurred vision, photophobia, and elevated intraocular pressure, and cardiac arrhythmias.
- **C/I:** closed angle glaucoma, atony of GI tract or bladder
- **S/Ps:** cardiac failure, tachyarrhythmias
- **Dosage forms:** injection, 1mg/ml in 1ml ampoule

**B. AV blocks requiring pacemaker permanently**

- 2nd degree type 2 block
- Wide complex 3rd degree AV block
- Chronically symptomatic AV blocks

**BRONCHIAL ASTHMA**

Asthma is a chronic inflammatory disease of the airways characterized by increased responsiveness of the tracheobronchial tree to allergens and physical stimuli. Clinically it is characterized by episodic shortness of breath, usually accompanied by wheezing and coughing. Common precipitating factors include exposure to cold weather, upper respiratory tract infections, bad smells, exercise, ingestion of drugs...
like aspirin and beta-blockers etc. The course of an acute asthmatic attack is often unpredictable. Therefore, one should never underestimate the severity of a given asthmatic attack and close monitoring and appropriate management should be employed until the patient clearly comes out of the attack. Concerning the chronic form of the disease, one should always try to classify the disease based on severity before initiating treatment. Chronic bronchial asthma is classified as intermittent or persistent asthma. The latter is again divided into mild, moderate and severe persistent asthma.

**Diagnosis**

- Suggestive clinical history
- Objective tests by using peak flow meters and spirometry are essential to make a definitive diagnosis as well as to grade severity of the disease.

**Treatment**

**Non-drug treatment:**

Prevention of exposure to known allergens and inhaled irritants.

**Drug treatment**

Drugs are required for the treatment of acute asthmatic exacerbations as well as for the treatment of chronic asthma.

**Treatment of acute asthma attacks in adults**

**General measures**

- Patient’s condition should be carefully monitored to assess severity, and to detect signs of improvement or deterioration. In the absence of blood gas monitoring facilities, clinical evaluation by using some important physical signs, such as the respiratory rate, pulse rate, use of accessory muscles, color, paradoxical movement of the diaphragm, speech, level of consciousness are essential.
- Humidified oxygen by mask at high concentration (6 liters/min) is important.
- Rehydrate the patient as needed.
• Antibiotics should not be routinely given unless there is convincing evidence for bacterial respiratory infection, such as fever, pleuritic chest pain and bronchial breath sound or chest x-ray evidence of consolidation.

**Drug Treatment**

**I. Initial management**

*First line*

**Salbutamol,** (metered dose inhaler MDI), 200 micrograms by aerosol inhalation. Could be repeated every 20 minutes for the first hour. OR 2.5-5 mg undiluted could be given via a nebulizer over 3 minutes, repeat every 20 minutes for the first one hour, or tablet, 2-4 mg 3-4 times a day

**S/Es:** headache, nervousness, dizziness, palpitation, tachycardia, fine tremor, muscle cramp, paradoxical broncho-spasm.

**C/Is:** cardiac Arrythmias

**Dosage forms:** Oral inhalation (aerosol) preparation, 100 mcg per dose; tablet, 2 mg, 4 mg; syrup, 2 mg/5 ml; nebulizer solution, 5 mg/5 ml 20 ml ampoule.

*Alternatives*

**Aminophylline,** 5 mg/kg by slow I.V. push over 5 minutes.

**S/Es:** GI disturbances, headache, irritability, nervousness, insomnia, and tremor

**C/Is:** hypertension, ischemic heart disease, epilepsy, hyperthyroidism, congestive cardiac failure

**Dosage forms:** Tablet, 100 mg, 225 mg, 350 mg; injection, 250 mg/10 ml in 10 and 20 ml ampoule

OR

**Adrenaline,** 1:1000, 0.5 ml sc. Repeat after ½ to 1 hour if patient doesn’t respond.

**S/Es:** headache, nervousness, dizziness, cardiac Arrythmias

**C/Is:** cardiac arrythmias

**Dosage forms:** injection, 0.1% in 1 ml ampoule
II. If response to initial therapy is poor, give the following:

First line

Establish intravenous line and start Aminophylline,

- If patient has taken oral Theophylline or Aminophylline in the preceding 8 hours, start I.V. infusion at 0.6 mg/kg/hr
- If patient has not been taking Theophylline preparations, give a loading dose of 3-5 mg/kg in dextrose in water over 20 minutes. Thereafter, the maintenance dose can be given with a continuous infusion in dextrose 5% at a dose of 0.6 mg/kg/hour until recovery.

(For S/Es, C/Is and dosage forms, see page 90)

PLUS

Hydrocortisone, 200 mg IV as a single dose. Further IV doses are needed only if oral dosing is not possible.

S/Es: GI disturbances, hyperglycemia, headache, and psychiatric reactions

P/C: hypertension, infection, diabètes, osteoporosis

Dosage forms: Tablet (acetate), 5mg, 10mg; powder for injection; 25mg/ampoule, 500mg vial; injection (sodium succinate), 50mg/ml in 2ml ampoule, 125mg/ml

OR

Prednisolone, 40-60 mg P.O., should be started immediately, preferably after the first bolus of hydrocortisone, and given at least for a minimum of 5-7 days.

S/Es: GI disturbances, such as dyspepsia and peptic and oesophageal ulcers; candidiasis; musculoskeletal effects, such as osteoporosis, bone fractures and proximal myopathy; endocrine effects, such as adrenal suppression, Cushing’s syndrome, menstrual irregularities, weight gain, hirsutism; increased susceptibility to infection and impaired healing; euphoria, depression, isomnia, aggravation of epilepsy and schizophrenia; glaucoma; hypersensitivity reaction including anaphylaxis.
**C/Is:** systemic infection; use of live vaccines in those receiving immunosuppressive therapy.

**P/C:** Use the lowest effective dose for the shortest period possible; withdraw gradually after systemic use.

**Dosage forms:** Tablet, 1 mg, 3.5 mg, 5 mg, 10 mg; injection, 10 mg/ml, 25 mg/ml in 2 ml ampoule.

**Alternatives**

Nebulized **Salbutamol** as above but the dose may be increased to 10 mg if side effect permits

(For **S/Es**, **C/Is** and **dosage forms**, see page 90)

**PLUS**

**Hydrocortisone,** 200 mg IV as a single dose. Further IV doses are needed only if oral dosing is not possible.

(For **S/Es**, **C/Is** and **dosage forms**, see page 91)

**OR**

**Prednisolone,** 40-60 mg P.O. should be started immediately, preferably after the first bolus of hydrocortisone, and given at least for a minimum of 5-7 days.

(For **S/Es**, **C/Is** and **dosage forms**, see page 91)

### III. Maintenance therapy for chronic asthma in adults:
Requires prolonged use of anti-inflammatory drugs mainly in the form of steroid inhalers.

1. **Intermittent asthma:**

   **First line**

   **Salbutamol,** inhaler 200 microgram/puff, 1-2 puffs to be taken as needed but not more than 3-4 times a day, or **tablet,** 2-4 mg 3-4 times a day

   (For **S/Es**, **C/Is** and **dosage forms**, see page 90)
Alternative

**Ephedrine + Theophylline (11mg + 120mg)** P.O. BID OR TID

**S/Es:** GI disturbances, headache, irritability, nervousness, insomnia, tremor

**C/Is:** hypertension, ischemic heart disease, epilepsy, hyperthyroidism, congestive cardiac failure

**Dosage forms:** Tablet, 120 mg theophylline + 11 mg ephedrine; syrup, 0.30% theophylline + 0.24% ephedrine; elixir, 30 mg theophylline + 6 mg ephedrine per 5 ml

2. Persistent mild asthma:

*First line*

**Salbutamol,** inhaler, 200 micro gram/puff 1-2 puffs to be taken, as needed but not more than 3-4 times/day, or tablet, 2-4mg 3-4 times a day (For **S/Es, C/Is** and **dosage forms**, see page 90)

**PLUS**

**Beclomethasone,** oral inhalation 1000mcg QD for two weeks

**S/Es:** GI disturbances, hyperglycemia, headache, and psychiatric reactions

**C/Is:** hypertension, infection, diabetes, and osteoporosis

**Dosage forms:** oral inhalation (aerosol), 50 mcg/dose, and 100 mcg/dose

*Plus if required*

**Prednisolone,** 5-10 mg P.O. QOD. Doses of 20-40 mg QD for seven days may be needed for short-term exacerbations in patients not responding to the above.

(For **S/Es, C/Is** and **dosage forms**, see page 91)

*Alternative*

**Ephedrine + Theophylline (11mg + 120mg),** P.O. two to three times a day

**PLUS**

**Beclomethasone** oral inhalation 1000mcg QD for two weeks.

(For **S/Es, C/Is** and **dosage forms**, see page 93)
PLUS (if required)

Prednisolone, 5-10 mg P.O. QOD. Doses of 20-40 mg QD for seven
days may be needed for short-term exacerbations in patients not
responding to the above.
(For S/Es, C/Is and dosage forms, see page 91)

3. Persistent moderate asthma:

First line

Salbutamol, inhalation 200 microgram/puff 1-2 puffs as needed PRN
not more than 3-4 times a day.
(For S/Es, C/Is and dosage forms, see page 90)

PLUS

Beclomethasone, 2000 mcg, oral inhalation QD for two weeks and
reduce to 1000 mcg if symptoms improve.
(For S/Es, C/Is and dosage forms, see page 93)

PLUS (if required)

Prednisolone, 5-10 mg P.O. QOD. Doses of 20-40 mg daily for seven
days may be needed for short-term exacerbations in patients not
responding to the above.
(For S/Es, C/Is and dosage forms, see page 91)

4. Severe persistent asthma:

First line

Salbutamol, inhalation, 200 micro gram/puff 1-2 puffs not more than
3-4 times a day
(For S/Es, C/Is and dosage forms, see page 90)

PLUS

Beclomethasone, 2000 mcg, oral inhalation daily and
(For S/Es, C/Is and dosage forms, see page 93)

PLUS (if required)
Prednisolone, 5-10 mg P.O. QOD. Doses of 20-40 mg daily for seven days may be needed for short-term exacerbations in patients not responding to the above.
(For S/Es, C/Is and dosage forms, see page 91)

N.B. Increasing intensity: When asthma is not brought under control with current treatment even though treatment has been taken correctly; medication dose is doubled with each step.

Decreasing intensity: When the objective of treatment have been reached and maintained over some weeks; medication dose is halved at each step; the minimum treatment needed must be determined.

Chronic Lymphocytic Leukemia (CLL)

CLL is the most common type of lymphoid leukemia in western populations, accounting for almost 30% of all leukemias. It is the second most common leukemia in Ethiopians. The clinical course of CLL is highly variable and survival is closely correlated with the stage of disease at diagnosis.

The symptoms and signs of CLL relate to tissue infiltration (lymphadenopathy, organomegaly), peripheral blood cytopenias (anemia, bleeding, infections), or immune suppression (infections and malignancies).

Diagnosis
1. Complete blood count and differential
2. Peripheral blood smear and bone marrow examination
3. Chest x-ray and abdominal ultrasound studies
4. Biochemical studies and uric acid level
5. An absolute lymphocyte count of 10,000/µL in the peripheral blood and 30% lymphocytes in the bone marrow establish the diagnosis of CLL.
Treatment
General

- Patients with early stage and asymptomatic disease should be observed without treatment.
- Infections, if present, should be treated aggressively
- Patients with symptomatic anemia should be transfused packed red blood cells.

To prevent hyperuricemia:

**Allopurinol,** 100mg P.O.TID is given before the initiation of specific treatment

**S/Es:** nausea, vomiting, skin rash, headache, peripheral neuropathy, acute gout.

**C/Is:** pregnancy, lactation, severe renal disorder, acute gout.

**Dosage forms:** Tablets, 100mg.

Drug Treatment

The following are indications for the initiation of specific therapy:

1. Persistent or progressive systemic symptoms
2. Bulky lymphadenopathy that causes mechanical obstruction or bothersome cosmetic deformities
3. Evidence of bone marrow failure (anemia and/or thrombocytopenia), immune hemolysis or immune thrombocytopenia.

*First line*

**Chlorambucil,** 0.1 to 0.2mg/kg P.O. QD for 3 to 6 weeks. It is then discontinued after the desired effect is achieved. Alternatively, 15 to 30mg/m² P.O. may be given over 3 to 4 days every 14 to 21 days.

**S/Es:** Myelosuppression, GI disturbances, leukemogenic,

**C/Is:** Lactation, pregnancy.

**Dosage forms:** Tablet 2mg, 5mg

PLUS
**Prednisolone**, 0.5-1mg/kg may be added, particularly in the presence of hemolytic anemia (For **S/Es**, **C/Is** and **dosage forms**, see page 91)

**Alternative**

**Cyclophosphamide**, 2 to 4 mg/kg P.O. daily until the desired effect is achieved (systemic symptoms improve and the size of enlarged lymph nodes and organomegaly are decreased).

**S/Es**: Myelosuppression, GI disturbances, hemorrhagic cystitis, etc.

**C/Is**: Pregnancy, lactation.

**Dosage forms**: Tablet 50mg; powder for injection, 200 mg, 500 mg in vial.

**PLUS**

**Prednisolone**, 0.5-1mg/kg may be added, particularly in the presence of hemolytic anemia (For **S/Es**, **C/Is** and **dosage forms**, see page 91)

**CHRONIC MYELOGENOUS LEUKEMIA**

Chronic myelogenous leukemia (CML) is a myeloproliferative disease characterized by a proliferation of myeloid cells without loss of their capacity to differentiate initially.

CML runs a generally mild course until it transforms to a frankly leukemic (blastic) phase. Although CML constitutes only 14% of all leukemias in Western populations, it is the most common leukemia in Ethiopians. Ionizing radiation in high doses is the only known risk factor for CML.

**Diagnosis:**

1. Complete blood count and differential
2. Peripheral blood smear examination
3. Bone marrow aspiration and/or biopsy
4. Leukocyte alkaline phosphatase score
5. Biochemical studies and uric acid
6. The diagnosis is correctly confirmed by the demonstration of the Philadelphia chromosome that results from a balanced translocation of genetic material between the long arms of chromosomes 9 and 22
Treatment:

General:
- Patients with symptomatic anemia should be transfused packed red blood cells.
- Dehydration and electrolyte imbalance, if present, should be corrected.

To prevent hyperuricemia:
- **Allopurinol**, 100 mg P.O. TID should be started before the initiation of specific treatment.

(For **S/Es**, **C/Is** and **dosage forms**, see page 96)

Drug Treatment:

Palliative chemotherapy:

*first Line*

**Hydroxyurea** is the agent of choice for palliative chemotherapy and is given 2 to 4 g/day P.O. initially depending on the cell count. The dose is then adjusted to the blood counts. It should be stopped or withheld if the WBC count drops to < 10,000/µL.

**S/Es:** Nausea, vomiting, myelosuppression, etc.

**C/Is:** Lactation, pregnancy.

**Dosage forms:** Capsule, 500mg

*Alternative*

**Busulphan**, 4 to 8mg/day and is adjusted to the blood counts. It is then stopped when the WBC count drops to below 20,000/µL.

**S/Es:** Myelosuppression, hyperpigmentation, pulmonary fibrosis

**C/Is:** Lactation, pregnancy.

**Dosage Forms:** Tablet, 2mg, 0.5 mg

**N.B.** These chemotherapeutic agents may achieve hematologic remission in almost all patients and also significantly improve the quality of life. They do not, however, lead to cytogenetic remission and therefore, do not change the natural history of the disease to a significant degree.
CONSTIPATION

Constipation is difficult to define. In general it may be defined as infrequent passage of stool. It may be caused by either organic or functional disorders. A diligent search for the underlying cause should be performed before resorting to symptomatic treatment.

**Diagnosis:** Clinical

**Treatment**

**Non-drug treatment**

- Removal of the underlying cause
- More fiber diet intake
- High residue diet intake,
- Increased fluid intake

**Drug treatment:**

Only for severe cases (Not recommended for children less than 4 years old.)

I. **Short term relief of severe constipation**

- **Magnesium Sulphate**, 10-20 mg P.O. in a glass of water, preferably before breakfast.

  **S/Es:** colic
  **C/Is:** acute gastrointestinal conditions

  **Dosage forms:** Magnesium Sulphate crystals in sachets

II. **For chronic constipation**

  **First line**

  - **Bisacodyl**, 5 – 10mg, P.O. at night OR 10mg rectally in the morning.
  - For children (above 4 years): 5mg rectally in the morning.

  **S/Es:** mild
  **C/Is:** insignificant

  **Dosage forms:** Tablet, 5mg; suppository, 5mg, 10mg

  **Alternatives:**

  - **Cascara**, 40mg, P.O. at night.

  **S/Es:** mild
  **C/Is:** insignificant
Dosage forms: tablet, 125mg

OR

Glycerin, 1 gm, rectally at night after moistening with water
S/Es: loose stool
C/Is: insignificant
Dosage forms: suppository, 1g, 1.36g, 2g, 2.76g

OR

Liquid paraffin, 10ml, P.O. every 8-12 hrs as required.
S/E: loose stool
C/I: insignificant

DIABETES MELLITUS

Diabetes Mellitus is a metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels.

DM is classified on the basis of the pathogenic process that leads to hyperglycemia. The two broad categories of DM are type 1 and type 2 diabetes.

Type 1 diabetes is caused by an absolute deficiency of insulin secretion. Individuals, at increased risk of developing this type of diabetes can often be identified by serological evidence of an autoimmune pathologic process occurring in the pancreatic islets and by genetic markers.

Type 2 diabetes is caused by a combination of resistance to insulin action and an inadequate compensatory insulin secretory response. In this category, a degree of hyperglycemia sufficient to cause pathologic and functional changes in various target tissues, but without clinical symptoms, may be present for a long period of time before diabetes is detected.
**Diagnosis**

- Poly-symptoms (polydypsia, polyphagia, and polyuria) **PLUS** casual plasma glucose greater than or equal to 200 mg/dl.
- Fasting blood sugar glucose greater than or equal to 126 mg/dl.
- 2 hours plasma glucose greater than or equal to 200 mg/dl during an oral glucose tolerance test (OGTT).

**N.B** In the absence of unequivocal hyperglycemia with acute metabolic decompensation, these criteria should be confirmed by repeating the blood sugar tests on a different day.

Patients with diabetes require periodic monitoring for the early detection of microvascular complications (e.g., exam of urine for protein, exam of the optic fundus). Other cardiovascular risk factors like hypertension, hyperlipidemia and smoking must also be looked for and appropriately managed.

**Treatment**

**Non drug treatment**

- Regular physical exercise
- Diet control (avoid simple sugars, low saturated fat and cholesterol).

**Drug treatment**

**Type 1 diabetes mellitus**

*Insulin*, Adults of normal weight may be started with 20-25 units of intermediate acting insulin a day and increased to maintain a fasting blood sugar level of 80-120 mg/dl. Fast acting insulin may also be considered in situations where control of post-prandial hyperglycemia is essential. Insulin administration should ideally be several times a day (e.g., 3 pre-meal short acting insulin injections and 1 intermediate acting insulin at bedtime) but should be given at least twice daily.

*S/Es*: hypoglycemia, lipohypertrophy

*C/Is*: hypoglycemia

**Dosage forms**: Injection, regular insulin (crystalline zinc insulin suspension / 100 unit/ml in 10 ml vial.)
**Type 2 diabetes mellitus**: drug treatment should be started if trial with non drug treatment fails.

- **Glibencamide**: 2.5 to 20 mg, P.O. daily or divided into two doses
  - **S/Es**: hypoglycemia;
  - **C/Is**: hepatic impairment, renal insufficiency;
  - **D/Is**: with alcohol, flushing.
  - **Dosage forms**: Tablet, 5 mg

AND/OR

- **Metformin** (often used for obese patients), 500-2000 mg PO daily QD in divided doses.
  - **S/Es**: anorexia, nausea, vomiting, abdominal discomfort and diarrhea;
  - **C/Is**: renal diseases, hepatic disease, alcoholism.
  - **Dosage forms**: Tablet, 500 mg.

**N.B.** Many patients with Type 2 Diabetes may require insulin(with or without additional oral agents) for good glycemic control.

**Complications**

1. **Diabetic ketoacidosis**

Diabetic ketoacidosis is a clinical condition characterized by a triad of hyperglycemia, acidosis and ketosis. It occurs as an acute complication of diabetes mellitus mostly Type 1 DM. Common precipitating factors are infection and omission of insulin dose. Patients may also come with diabetic ketoacidosis on initial presentation.

**Diagnosis**: is based on clinical findings, and determination of blood sugar and urine ketone.

**Treatment**

Correction and treatment of precipitating factors must be done simultaneously with the treatment of ketoacidosis.

**Drug treatment**
**Insulin**, 20 units of regular insulin (10 units IM, 10 units IV), followed by 5 units IM every hour in adults, (0.1 IU/kg/h. in children). Blood glucose should be checked every 1-2 hours. If after the 1st two hours the blood glucose level has not fallen significantly, dose of IM insulin can be doubled. When the patient is completely out of ketoacidosis, regular insulin is given 4 hourly subcutaneously according to the random blood sugar (RBG) level as follows:

<table>
<thead>
<tr>
<th>RBG Range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 250mg/dl</td>
<td>12</td>
</tr>
<tr>
<td>180-250mg/dl</td>
<td>8</td>
</tr>
<tr>
<td>120-180mg/dl</td>
<td>4</td>
</tr>
<tr>
<td>&lt; 120 mg/dl</td>
<td>0</td>
</tr>
</tbody>
</table>

(For S/Es, C/Is and Dosage forms, see page 101)

**PLUS**

**Fluid replacement:**

**Normal saline (0.9% NaCl)** IV should be given rapidly as soon as the patient arrives. 5% dextrose can be given when the blood sugar reaches 250-300 mg/dl. Total fluid given may be as high as 10 liters depending on the patient’s response and urine output.

**Dosage forms:** Injection, 0.9% NaCl (Normal saline), 10 ml, 20 ml, 500ml, 1000ml

**PLUS**

**Potassium replacement** should be according to serum potassium values. K+: 10 meq/h when plasma K+ < 5.5 meq/L, ECG normal, urine flow and normal creatinine documented; administer 40–80 meq/h when plasma K+ < 3.5 meq/L

**C/Is:** renal failure.

**Dosage forms:** Injection, 20mEq/10m/ ampoule of KCL.
II. Diabetic foot ulcer

Abnormal pressure distribution due to diabetic neuropathy is the underlying mechanism contributing to the initiation of a diabetic foot ulcer. Callus formation is usually the initial abnormality. Vascular disease with diminished blood supply contributes to development of ulcers, and infection is common, often caused by multiple organisms. Patients should be advised to inspect their feet daily and to keep them clean and to wear properly fitting shoes. Moreover, diabetic patients should be advised not to walk barefooted.

**Diagnosis:** Clinical,
Gram stain and culture from the discharge.
X-ray of the affected foot

**Treatment**

**Non Drug Treatment:** Proper wound care, including debridement

**Drug Treatment**

*First line*

- **Ampicillin**, 1 g IV QID for 2-3 weeks
  (For S/E, C/I and dosage forms, see page 18)

PLUS

- **Gentamicin**, 3-5 mg/kg IV QD in divided doses for 10-14 days
  (For S/E, C/I and dosage forms, see page 39)

PLUS

- **Metronidazole**, 750 mg, P.O. TID or OR 500mg IV QID, for 10-14 days.
  (For S/E, C/I and dosage forms, see page 14)

*Alternatives*

- **Ceftazidime**, 1 gm IV TID
  (For S/E and C/I see under cefuroxime).
Dosage forms: Injection, 0.5 g, 1g, and 2g, in Vial.

OR

Ceftriaxone 1-2 g IV. or IM BID for 7-10 days.
(For S/Es and C/Is see under cefuroxime).

Dosage forms: Injection, 0.25, 0.5g, 1g, 2g in vial

PLUS

Gentamicin, 3-5 mg/kg I.V. daily QD in divided doses for 10-14 days.
(For S/Es, C/Is and dosage forms, see page 39)

PLUS

Metronidazole, 750 mg, P.O. TID OR 500mg IV QID, for 10-14 days.
(For S/Es, C/Is and dosage forms, see page 14)

DYSPEPSIA

Dyspepsia is a chronic, recurrent, often meal-related epigastric discomfort, pain or fullness. The location of the pain and the relationship to meals resembles the classic description of peptic ulcer disease (PUD) except that no evidence for ulcer will be found by either endoscopy or barium studies.

Diagnosis

Diagnosis is often made on clinical grounds but endoscopy or barium meal studies might be required to exclude ulcer.

Treatment

First line

Aluminium hydroxide + Magnesium trisilicate, 10 - 30 ml OR
125+250mg to 250mg + 500mg, P.O. taken between meals PRN.

S/E: rare and mild

C/I: insignificant

Dosage forms: Suspension, 310 mg + 620 mg in 5 ml; tablet
(chewable), 125 mg + 250 mg; 250 mg + 500 mg.

Alternatives

Magnesium Hydroxide + Almuninium Hydroxide, 10 - 30 ml OR
250 + 500mg to 500+1000mg, P.O. between meals PRN.
Dosage forms: Tablet (chewable) tablet, 400mg + 400 mg, 195mg + 220mg in 5 ml.

OR

Magnesium trisilicate 100-200mg, P.O. between meals PRN.

Dosage forms: Tablet (chewable) 500 mg.

OR

Magnesium hydroxide, 10 - 30 ml OR 600+622mg to 1200+1244mg, P.O between meals PRN.

Dosage forms: Tablet (chewable), 300mg + 311mg; Mixture, 375mg/5ml, 7.75%.

OR

Cimetidine, 400 mg BID, with breakfast and at night, OR 800 mg at Night for 2 weeks. For children, P.O. 20-40 mg/kg/day, neonates 10-20mg/kg, in 4 divided doses.

S/Es: galactorrhea, Gynacomastia, impotence.

C/Is: insignificant

D/Is: may enhance the effect of drugs like warfarin, phenytoin, and lidocaine.

Dosage forms: Tablet, 200 mg, 400 mg, 800 mg; chewable tablet, 200mg; syrup, 200 mg/5 ml; injection, 200 mg/ml in 2 ml ampoule

**EPILEPSY**

Epilepsy is a paroxysmal neurologic disorder characterized by a sudden onset of sensory perception or motor activity with or without loss of consciousness due to abnormal, excessive, hypersynchronous electrical discharges from the cortex. Its etiology is often unknown. Secondary causes include congenital, perinatal injuries, intracranial tumors, vascular, metabolic and others.

Diagnosis: Clinical and EEG. Additional investigations like CT scan are required if there is suspicion of secondary causes.
Treatment

Non-drug treatment

- Advice on a healthy lifestyle with good sleep habits and the avoidance of excessive alcohol and caffeine.
- The patient should know the name and the dose of his medication and should be warned of the consequences of poor compliance.

N.B.

- Epileptics are not allowed to drive a vehicle unless the patient has had a two-year attack-free period.
- They should not swim.
- Refer all adult onset epilepsy, complicated or atypical epilepsy, and if there is a progressive increase in uncontrollable attacks.
- Pregnancy is better avoided in patients with difficult to control epilepsy.

Drug Treatment

I. Tonic-clonic, partial focal, or partial Complex seizure with and without Secondary Generalization:

First line

Phenobarbitone, 60-180 mg/day P.O. in divided doses
S/Es: sedation, skin rash, decreased libido, confusion, ataxia
C/Is: acute intermittent porphyria
P/Caution: impaired renal or hepatic function, during pregnancy and lactation, in the elderly.
Dosage forms: Tablet, 15mg, 30mg, 100mg; elixir, 20mg/5ml; Injection (sodium), 25mg/ml, 100mg/ml,

Alternatives

Phenytoin (Diphenylhydantion) 5 mg/kg/day, P.O. in single or divided doses. Maximum dose is 400 mg/day; the usual maintenance dosage is 200-300 mg/day
S/Es: gum hyperplasia, hirsutism, lymphadenopathy, facial coarsening, ataxia, incoordination, and confusion

P/Caution: pregnancy, liver dysfunction, and lactation.

Dosage forms: Tablet, 50mg, 100mg; capsule, 50mg, 100mg; suspension, 30 mg/5ml; powder for injection (sodium) 250 mg in vial.

OR

**Carbamazepine**, 600-1,800 mg/day P.O.. in 2 divided doses

S/Es: GI irritation, aplastic anaemia, hepatotoxicity, ataxia, dizziness, diplopia, vertigo

C/Is: hypersensitivity to tri-cyclic compounds, AV block

P/C: pregnancy, hepatic or renal impairment, lactation, severe CV disease

Dosage forms: Tablet, 100mg, 200mg; syrup, 100mg/5ml.

N.B.

- The aim is to use monotherapy i.e. a single anticonvulsant, until the seizures are controlled or intolerable side effects occur.
- Therapy should not be initiated after 1 attack only and only if evidence of epilepsy has been established.
- Anti-convulsants may make oral contraceptives ineffective.
- Monitor plasma levels for efficacy and toxicity, if possible
- Increase gradually to maintenance dose

**When to discontinue therapy**

About 60% of adults who have their seizures completely controlled with antiepileptic drugs can eventually discontinue therapy. The following patient profile yields the greatest chance of remaining seizure-free after drug withdrawal:

1. complete medical control of seizures for 1 to 5 years;
2. single seizure type, either partial or generalized;
3. normal neurologic examination, including intelligence; and
4. normal EEG.

In most cases it is preferable to reduce the dose of the drug gradually over 2 to 3 months.
II. Absence

Treatment

Drug treatment:

First line

**Ethosuximide**, average dose 250-500 mg P.O. TID

*S/Es*: GI irritation, bone marrow suppression, skin rash, ataxia, lethargy, headache

*P/C*: pregnancy, hepatic or renal impairment, lactation.

**Dosage forms**: Capsule, 250mg; syrup, 250mg/5ml.

Comments:

- Not indicated for other seizures.
- To be prescribed by a specialist only.

Alternative

**Sodium valproate**, average dose 500 mg P.O. BID, maximum 2,500 mg/day

*S/Es*: GI irritation, hepatotoxicity, thrombocytopenia, weight gain, transient alopecia, tremor, sedation, ataxia.

*C/Is*: hepatic dysfunction

**Dosage forms**: Tablet, 200mg, 500mg; syrup, 200mg/5ml.

N.B.

- Dosages should be increased gradually over 6 weeks.
- To be prescribed by a specialist only

III. Myoclonic

**Clonazepam**, 0.5-2 mg P.O. TID

*S/Es*: anorexia, ataxia, sedation, and lethargy.

*C/Is*: acute pulmonary insufficiency

**Dosage forms**: Tablet, 0.5mg, 1mg, 2mg; injection, 1mg/ml in 1mlampoule.
GOUT

Gout is the term used to describe a group of disorders in which clinical problems result from tissue deposition of crystals of monosodium urate monohydrate from hyperuricemic body fluids. Major clinical manifestations include acute inflammatory arthritis, chronic erosive arthritis, nephrolithiasis and chronic renal failure.

**Diagnosis:** Clinical and demonstration of urate crystals in the synovial fluid. Hyperuricemia may be present, but is not diagnostic.

**Treatment:**

**Non-drug treatment:**

- **Acute attack:** rest and immobilization.
- **Chronic gout:** lifestyle modification, including continued high fluid intake, avoidance of purine-rich food.

**Drug Treatment:**

I. **Acute Gout**

*First line*

- **Indomethacin**, 50 mg P.O. 4-6 hourly for 24-48 hours; thereafter 25-50 mg TID for symptomatic relief for the duration of the attack. OR , 100 mg rectally, BIQ for 24-48 hours; thereafter 100 mg daily QD for symptomatic relief for the duration of the attack.

**S/Es:** GI disturbances, headache, dizziness; GI ulceration and bleeding; CNS disturbances; thrombocytopenia; hyperglycemia; blurred vision.

**C/Is:** epilepsy, parkinsonism, psychiatric disturbances

**P/C:** Suppositories may cause rectal irritation and bleeding; do not use in proctitis and haemorrhoids.

**Dosage forms:** Capsule, 25 mg, 50 mg, 75 mg; suppository, 100 mg; syrup, 25 mg/5ml.

**P/C:** Suppositories may cause rectal irritation and bleeding; do not use in proctitis and haemorrhoids.

*Alternatives*
Colchicine, 0.5-1 mg P.O. initially, followed by 0.5 mg every 30 minutes to 1 hour for a total dose of 6 mg or until relief has been obtained, or until severe nausea/vomiting/diarrhea occur.

S/Es: nausea, vomiting, diarrhea, abdominal pain, bone marrow depression,

C/ls: serious GI, renal, hepatic, or cardiac disorders, blood dyscrasias.

Dosage forms: Tablet, 0.5mg; injection, 0.5mg/ml in 2ml ampoule.

OR

Prednisolone, 30-40 mg/day P.O. may be needed in some cases. Specialists may use intra-articular corticosteroids in exceptional cases (For S/Es, C/ls and dosage forms, see page 91)

II. Chronic Gout

First line

Allopurinol, 100 mg P.O. QD, increasing weekly by 100 mg to 400 mg QD, the mean dose is 300 mg/day

(For S/Es, C/ls and dosage forms, see page 96)

Alternative

Probenecid, 500 mg P.O. BID.

S/Es: pruritis, headache, dizziness, hypersensitivity reactions, anemia

C/ls: blood dyscrasias, uric acid kidney stones

Dosage forms: Tablet, 500mg.

N.B.

• Allopurinol should not be initiated within one month after an acute attack.

• Administer prophylactic NSAID or colchicine when initiating therapy.

• Take more fluid with probenicid treatment

HEART FAILURE

Heart failure is a syndrome of inability of the heart to pump blood at an output sufficient to meet the requirements of the metabolizing tissues and/or to do so only at an abnormally elevated diastolic volume or pressure. Presenting symptoms are weakness, dyspnea, orthopnea and body swelling. Patients may have elevated JVP, gallop rhythm, hepatomegaly and leg edema. The causes of heart failure can be
valvular diseases, myocardial diseases, intra-cardiac shunts and others. In stable patients with heart disease, heart failure may be precipitated by causes such as infection, arrhythmias, myocardial infarction, myocarditis, anemia, pulmonary embolism, change in physical activity or dietary salt, severe elevations in blood pressure, pregnancy, thyrotoxicosis, and infective endocarditis.

**Diagnosis**

Diagnosis can be made clinically supported with radiography and echocardiography examinations. Diagnostic criteria like the Framingham Criteria shown below are useful to make a diagnosis of heart failure.

**Table I: Framingham Criteria for Diagnosis of Congestive Heart Failure**

<table>
<thead>
<tr>
<th>MAJOR CRITERIA</th>
<th>MINOR CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroxysmal nocturnal dyspnea</td>
<td>Extremity edema</td>
</tr>
<tr>
<td>Neck vein distention</td>
<td>Night cough</td>
</tr>
<tr>
<td>Rales</td>
<td>Dyspnea on exertion</td>
</tr>
<tr>
<td>Cardiomegaly</td>
<td>Hepatomegaly</td>
</tr>
<tr>
<td>Acute pulmonary edema</td>
<td>Pleural effusion</td>
</tr>
<tr>
<td>S3 gallop</td>
<td>Vital capacity reduced by 1/3 from normal</td>
</tr>
<tr>
<td>Increased venous pressure (&gt;16 cm H2O)</td>
<td>Tachycardia (≥ 120 bpm)</td>
</tr>
<tr>
<td>Positive hepatojugular reflux</td>
<td>Weight loss ≥ 4.5 kg over 5 days' treatment</td>
</tr>
</tbody>
</table>

To establish a clinical diagnosis of congestive heart failure by these criteria, at least one major and two minor criteria are required.

**Treatment**

In addition to the management of heart failure, we have to treat the underlying and precipitating causes in addition to the management of heart failure.
Non-drug treatment:
Reduce sodium intake and physical activity.

Drug treatment

First line

**Digoxin**, 0.125 – 0.375 mg, P.O. QD
(For S/E, C/I and Dosage forms, see page 85)

PLUS

**Furosemide**, 40-240mg, P.O. divided in to 2-3 doses QD
(For S/Es, C/Is and dosage forms, see page 79)

PLUS

**Potassium chloride**, 600 mg P.O. once QD OR BID
S/Es: hypo-excitability
C/Is: renal impairment
Dosage forms: Tablet, 500 mg, 600 mg, 750 mg, 1g.

AND/OR
(Additional treatment that may be of use to a large proportion of patients with Heart Failure)

**Enalapril**, 5-40mg P.O. once or divided into two doses QD
S/Es: cough, angioedema, hyperkalemia, rash, loss of taste, leukopenia.
C/Is: life threatening side effects during earlier exposure (angioedema, anuria renal failure) and pregnancy,
P/C: Should be used with caution in systolic blood pressure < 80 mmHg, serum creatinine level > 3mg/l, bilateral renal artery stenosis and serum potassium > 5.5 mmol.
Dosage forms: Tablet, 2.5mg, 5mg, 10mg, 20mg, 40mg.

AND/OR

**Spironolactine**, 25 mg P.O.QD
S/Es: gynecomastia. C/Is: hyperkalemia, acute renal failure
Dosage forms: Tablet, 25mg, 100 mg
**HEMORRHOIDS**

Hemorrhoids occur due to enlargement and venous swelling of the hemorrhoidal plexus of veins in the submucosal space of the anal canal. Hemorrhoids can be external or internal depending on whether it is the internal or external plexus that is enlarged. Both types of hemorrhoids are very common and are associated with increased hydostatic pressure in the portal venous system, such as during pregnancy, straining at stool and cirrhosis of the liver. Internal Hemorrhoids are painless and often manifest with bright red rectal bleeding (usually with or following bowel movements). Prolapse with defecation or other straining activities can also occur. External hemorrhoids are quite often painful and manifest with a tender swelling at the anal verge.

**Diagnosis:** Clinical

**Treatment**

**Non-drug treatment**
- Personal hygiene,
- Avoid constipation.

**Drug treatment**

*First line*

**Bismuth subgallate**, insert one suppository in the rectum BID, OR use topical application, BID for five days.

*S/Es:* rare

**Dosage forms:** Suppository, bismuth subgallate (59mg) + bismuth oxide (24mg) + Peru Balsam (49mg) + zinc oxide (296mg); ointment, Bismuth subgallate (2,25%) + bismuth oxide (0.875%) + Peru Balsam (1.875%) + zinc oxide (10.75%)

**Alternatives**

**Bismuth subgallate with hydrocortisone**, one suppository in the rectum BID OR use topical application, BID for five days.
Dosage forms: Suppository, bismuth subgallate (59mg) + bismuth oxide (24mg) + Peru Balsam (49mg) + zinc oxide (296mg) + hydrocortisone acetate (10mg) + benzyl benzoate (33mg); ointment: Bismuth subgallate (2.25%) + bismuth oxide (0.875%) + Peru Balsam (1.875%) + zinc oxide (10.75%) + hydrocortisone acetate (0.25%) + benzyl benzoate (1.25%)

OR

Lidocaine + aluminium acetate + zinc oxide + hydrocortisone acetate, one suppository OR topical application BID for five days.

Hypertension

Hypertension is a state of elevated systemic blood pressure that is commonly asymptomatic. It is a major cardiovascular risk factor that is closely associated with lethal complications like coronary artery disease, cerebro-vascular accidents, heart and renal failure. In 90-95% of cases, the cause is unknown while the rest are secondary to renal, endocrine, neurogenic and other abnormalities.

Diagnosis

Diagnosis is based on the finding of elevated blood pressure on three separate occasions. Accordingly, a systolic blood pressure of 140 mm Hg or greater and/or a diastolic blood pressure of 90 mm Hg or greater, taken on two separate occasions after the initial screening in an individual who is not acutely ill, establishes the diagnosis of hypertension.
Table II. Category of blood pressure

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Hypertension</td>
<td>≥140</td>
<td>≥90</td>
</tr>
</tbody>
</table>

Table III. Stages of Hypertension

<table>
<thead>
<tr>
<th>Stage</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>≥160</td>
<td>≥100</td>
</tr>
</tbody>
</table>

These definitions apply to adults on no antihypertensive treatment and who are not acutely ill. If there is a disparity in the category between the systolic and diastolic pressures, the higher value determines the severity of hypertension.

The evaluation of a person with hypertension must include assessment for other cardiovascular risk factors such as smoking, dyslipidemia, diabetes mellitus, old age family history of cardio-vascular disease as well as examination to look for target organ damage (TOD) or clinical cardiovascular disease (CCD).

**Hypertensive Crisis:** There are two major forms:

1. **Hypertensive Emergencies**
   These are situations that require immediate blood pressure reduction to prevent or limit target organ damage. The conditions include malignant hypertension, hypertensive encephalopathy, intracranial hemorrhage, unstable angina, acute myocardial infarction, pulmonary edema and dissecting aortic aneurysm, and eclampsia.

2. **Hypertensive Urgencies**
   These are situations in which there is asymptomatic severe hypertension with no target organ damage. The rapidity with which BP must be reduced is controversial but the goal of management should be to reduce BP to ≤160/100 over several hours to days.
Treatment Objectives

The goal of antihypertensive treatment in patients with uncomplicated hypertension is to bring the BP below 140/90 mmHg. In patients with diabetes and chronic kidney disease the goal is to bring the BP to 130/80 mmHg.

Table III. Management of blood pressure for adults aged 18 years or older

<table>
<thead>
<tr>
<th>BP Classification</th>
<th>Systolic BP mmHg</th>
<th>Diastolic BP mmHg</th>
<th>Management*</th>
<th>Management*</th>
<th>Management *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Initial drug therapy</td>
<td>Without compelling indications</td>
<td>With compelling indications</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt;120 and &lt; 80</td>
<td></td>
<td>Encourage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>120-139 or 80-89</td>
<td></td>
<td>Yes</td>
<td>No antihypertensive indicated</td>
<td>Drug(s) for compelling indications,∆</td>
</tr>
<tr>
<td>Stage 1 hypertension</td>
<td>140-159 or 90-99</td>
<td></td>
<td>Yes</td>
<td>Thiazide type diuretic for most, ACEI, ARB, beta blocker or CCB or combination</td>
<td>Drugs for compelling indications; other antihypertensive drugs (diuretics, ACEI, ARB, CCB, beta blocker) as needed</td>
</tr>
<tr>
<td>Stage 2 hypertension</td>
<td>≥160 or ≥100</td>
<td></td>
<td>Yes</td>
<td>2-drug combination for most (usually thiazide diuretic &amp; ACEI or ARB or CCB)♦</td>
<td>Drugs for compelling indications; other antihypertensive drugs (diuretics, ACEI, ARB, CCB, beta blocker) as needed</td>
</tr>
</tbody>
</table>

ACEI: Angiotensin Converting Enzyme Inhibitor, ARB: Angiotensin Receptor Blocker, CCB: Calcium Channel Blocker

* Treatment determined by highest BP category.

∆ Treat patients with chronic kidney disease or diabetes to BP goal of less than 130/80 mmHg. Other compelling indications include heart failure, post-myocardial infarction, and atrial fibrillation in which particular antihypertensives are warranted independent of BP.

♦ Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension
Non Drug treatment

Life Style Modifications: Reduce salt intake, reduce weight if overweight, regular exercise, reduce alcohol intake and quit smoking

Drug treatment

Any one of the following classes of drugs could be used as first step agents:
Diuretics, Beta blockers, Calcium antagonists and Angiotensin converting enzyme inhibitors.

I. Non -Emergency conditions

First line

**Hydrochlorothiazide**, 12.5- 25 mg/day, P.O. QD
S/E: hypokalemia, hyponatremia, glucose intolerance, hyperuricemia
C/I: gouty arthritis, diabetis mellitus, hypokalemia, dyslipidemia, severe renal impairment
Dosage forms: Tablet, 25mg

Alternatives

**Nifedipine**, 10 – 40 mg, P.O., .BID
S/E: flushing, edema of ankle, headache, gingival hypertrophy
C/I: unstable angina, hypotension
D/I: Cimetidine may enhance it’s anti-hypertensive effect
Dosage forms: Tablet (modified release), 10 mg, 20 mg, 30mg, 40mg, 60mg, 90mg; capsule (modified release), 5 mg, 10 mg, 20 mg, 30mg

OR
Atenolol, 25-100mg P.O.QD
(For S/Es, C/Is and dosage forms, see page 120)

OR

Enalapril, 2.5-40mg P.O., once OR divided into two doses QD
(For S/Es, C/Is and dosage forms, see page 113)

P/C: Should be used with caution in patients with serum creatinine level > 3mg/dl, bilateral renal artery stenosis and serum potassium > 5.5 mmol/dl

N.B. When there is suboptimal response to initial therapy a second drug should be added. If 2 drugs are required use of a thiazide diuretic increases the response to other agents. Common combinations include a thiazide with a beta blocker or an ACEI or an ACEI with a Calcium Channel Blocker.

Considerations for individualizing antihypertensive therapy: Examples of compelling indications (in which major improvement in outcome independent of BP has been demonstrated) include: ACEI or ARB in proteinuric chronic kidney disease, ACEI, beta blocker, aldosterone antagonist in post-myocardial infarction.

II. Treatment of Hypertensive Emergencies:
Optimal therapy varies with the type of hypertensive emergency.

Hydralazine, 5-10 mg initial dose, repeated every 20 to 30 minutes (with maximum dose of 20 mg) should be given until the mean arterial blood pressure is reduced by 25% (within minutes to 2 hours), then towards 160/100 mm Hg within 2-6 hours.

S/E: nausea, headache, weakness, palpitation, flushing, aggravation of angina.

C/I: porphyria, aortic stenosis, lupus erythematosus renal failure

Dosage forms: Injection, 20m/ml in 1ml ampoule

N.B. Additional Furosemide, 40 mg I.V. can be used according to blood pressure response.

S/Es: hypovolamia, dehydration, ototoxicity, hypersensitivity reactions
**C/Is:** renal failure, congestive cardiac failure, hypersensitivity to sulfonamides

**Dosage forms:** Tablet, 40mg, 80mg; injection, 10mg/ml in 2 ml ampoule; elixir, 10mg/ml

### III. Hypertensive Urgency

**First line**

**Captopril,** 6.25-12.5 mg P.O. single dose

**S/Es:** Tachycardia, weight loss, stomatitis, photosensitivity

**C/I:** Porphyria

**Dosage forms:** Tablet, 12.5 mg, 25 mg, 50 mg, 100 mg.

**Alternative**

**Furosemide,** 40mg IV single dose

To be followed by longer acting agents such as CCBs (e.g. nifedipine) or a beta blocker or ACEI.

(For **S/Es, C/Is** and **dosage forms**, see page 79)

**N.B.** Choice of the type of drug should be dependent on the underlying clinical situation. If there is acute coronary syndrome, dihydropyridine type of calcium channel blockers (e.g. nifidipine) are contraindicated.

### Table IV. List of common Anti-hypertensive drugs and their dosage

<table>
<thead>
<tr>
<th>Name</th>
<th>Dose (in mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics, e.g. Hydrochlorothiazide</td>
<td>12.5-25 mg per day</td>
</tr>
<tr>
<td>Beta- Blockers, e.g. Atenolol</td>
<td>25-50 mg QD</td>
</tr>
<tr>
<td>Calcium channel blockers, e.g. Nifedipine</td>
<td>10-40 mg BID</td>
</tr>
<tr>
<td>Anti-adrenergic agents, e.g. Methyl-dopa</td>
<td>250-500 mg BID</td>
</tr>
<tr>
<td>ACE Inhibitors, e.g. Enalapril</td>
<td>2.5-40 mg QD</td>
</tr>
</tbody>
</table>
Table V. Drugs used in the treatment of hypertensive crisis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Initial dose</th>
<th>Dose Range</th>
<th>Onset  peak Effects</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitroprusside</td>
<td>I.V</td>
<td>0.5 µg/kg per min</td>
<td>0.5 to 10 µg/kg per min</td>
<td>1 to 2 min</td>
<td>2 to 3 min</td>
</tr>
<tr>
<td>Hydralazine</td>
<td>I.V</td>
<td>5-10 mg</td>
<td>5 to 20 mg every 20-30 min</td>
<td>5 to 15 min</td>
<td>2 to 6 hr</td>
</tr>
<tr>
<td>Captopril</td>
<td>P.O</td>
<td>6.25 to 12.5 mg</td>
<td>12.5 - 50 mg every 8 hr</td>
<td>30 to 90 min</td>
<td>4 to 6 hr</td>
</tr>
<tr>
<td>Propranolol</td>
<td>I.V</td>
<td>0.5 to 1 mg</td>
<td>0.5 mg every 5 min (maximum 6 mg)</td>
<td>1 to 2 min</td>
<td>4 to 12 hr</td>
</tr>
</tbody>
</table>

IMMUNE THROMBOCYTOPENIC PURPURA (ITP)

ITP is an autoimmune disorder characterized by a low platelet count that manifests with mucocutaneous bleeding. It is caused by the production of antiplatelet antibodies (usually IgG) directed against platelet membrane antigens, which accelerate the clearance and destruction of platelets by the reticuloendothelial system. The acute form of ITP is mostly seen in children and about 70-80% of them recover with or without treatment. The chronic form is seen in adults and the disease is indolent.

Diagnosis:
1. Complete blood count, including platelet count
2. Peripheral blood smear examination
3. Bone marrow aspiration and/or biopsy
4. The diagnosis of ITP is suggested by an isolated thrombocytopenia in the absence of other causes, such as HIV infection.
Treatment

General

- Patients with a platelet count of >30,000/µL, who are asymptomatic should be observed without treatment.
- Females in the childbearing ages should be offered oral contraceptive pills to avoid excessive menstrual bleeding.
- Patients with wet purpura and retinal hemorrhages (impending CNS bleeding) should be admitted to hospital for observation and expectant treatment.

Drug Treatment:

For patients with abnormal hemostasis and a platelet count of < 30,000/µL,

**Prednisolone**, 1-2 mg/kg (max dose 60mg) P.O. OR its equivalent is given daily QD for 4-6 weeks, tapering it slowly when the platelet count rises to >100,000/µL.

(For **S/Es, C/Is** and **dosage forms**, see page 91)

**N.B**: Splenectomy is indicated for refractory chronic ITP in patients who fail to achieve satisfactory hemostatic response to acceptable doses of corticosteroids (<15 mg/day of prednisolone).

MIGRAINE

Migraine is a paroxysmal recurrent headache unilateral or bilateral lasting 4-72 hours, often preceded by aura and accompanied by nausea and/or vomiting. Migraine is thought to have a polygenetic and multifactorial etiology. Migraine is about three times more common in women than men.

**Diagnosis: Clinical**

The International Headache Society (IHS) diagnostic criteria for migraine are as follows:

- Headache attacks last 4 to 72 hours
• Headache has at least two of the following characteristics: unilateral location; pulsating quality; moderate or severe intensity; aggravation by routine physical activity
• During headache at least one of the following occurs: nausea and/or vomiting; photophobia and phonophobia
• At least five attacks occur fulfilling the above criteria. History, physical examination, and neurologic examination do not suggest any underlying organic disease

Treatment

Non-drug treatment:
• Patients should be reassured that this is a benign condition.
• They should attempt to identify foods or drinks and other situations, which precipitate the attack and try to diminish patterns of tension.

Drug Treatment:
1. Acute treatment, mild attacks:

   First line

   **Acetylsalicylic acid**, soluble, 600-900 mg P.O. once, followed by 300 mg half hourly up to a maximum dose of 1800 mg
   **S/Es**: Dyspepsia, fatigue, nausea, and diarrhea
   **C/Is**: Hypersensitivity, active peptic ulcer disease

   **Dosage forms**: Tablet, 100mg (soluble), 300mg, 500mg (enteric coated)

   Alternative

   **Paracetamol**, 500-1000 mg P.O. 4-6 hourly, PRN
   (For **S/Es**, **C/Is** and **dosage forms**, see page 53)

N.B.
Initiate therapy during the attack or at the very onset of the headache. If nausea and vomiting is troublesome an anti-emetic, e.g. **Metoclopramide**, 10 mg , P.O. 10 mg 3 times TID can be used.

   **S/Es**: drowsiness, fatigue, dizziness, weakness
   **C/Is**: epilepsy, pheochromocytoma, and mechanical bowel obstruction, concomitant administration of atropine like drugs.
S/Ps: concomitant administration of phenothiazines.

**Dosage forms:** tablet, 10mg; syrup, 5mg/5ml; injection, 5mg/ml in 2ml ampoule; drop, 0.2mg/drop.

2. More severe attacks, especially with a defined aura:

   *First line*

   [Ibuprofen](#), 600-1,200 mg/day P.O. in 2-3 divided doses

   **S/Es:** Gastritis, gastrointestinal bleeding

   **C/Is:** Active peptic ulcer disease

   **Dosage forms:** Tablet, 200mg, 400mg; capsule, 300mg; syrup, 100mg/5ml.

   **AND/OR**

   [Ergotamine tartrate and Caffeine](#), 1mg +100 mg P.O. 1-2 tablets immediately, followed by 1/2-1 tablet every 30 minutes to a maximum of 4 tablets per attack or 10 tablets per week, or until vomiting occurs.

   **S/Es:** nausea, vomiting, abdominal pain, muscle cramps, occasionally precordial pain, myocardial ischaemia and rarely infarction; repeated high dose may cause ergotism with gangrene and confusion

   **C/I:** peripheral vascular disease, coronary heart disease, hepatic or renal impairment, inadequately controlled hypertension, pregnancy, and breast feeding

   **Dosage forms:** Tablet, 1mg +100mg; suppository, 2mg +100mg.

**Prophylaxis:**

Prophylactic headache treatment is indicated if the headaches are frequent (>2-3/month), long lasting, or account for a significant amount of total disability. The success rate is about 60-70%.
First line

**Propranolol**, 80 mg/day in divided doses; increase by 20-40 mg/dose every 3-4 weeks to a maximum of 160-240 mg/day

(For **S/Es, C/Is** and **dosage forms**, see page 60)

Alternative

**Amitriptyline**, 10-25 mg P.O. at bed time, titrate dose up to adequate response. It seldom requires more than 75-150 mg as a single bedtime dose

**S/Es**: dry mouth, sedation, blurred vision, constipation, nausea, difficulty with micturition, postural hypotension, Arrhythmias

**C/Is**: recent myocardial infarction, arrhythmias, severe liver disease

**Dosage forms**: Tablet, 10 mg, 25 mg, 50 mg.

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**MOOD DISORDERS**

Mood disorders are characterized by abnormal feelings of depression or euphoria with associated psychotic features in some severe cases. Mood disorders are divided into depressive and bipolar disorders. The etiology is unknown.

**Diagnosis:** Clinical; ICD-10 Criteria

**Treatment:**

**A. Depressive disorders**

**Non-drug treatment**

- Psychotherapy - usually cognitive/ behavioral
- Interpersonal therapy (IPT)
- Group therapy and Family therapy.

**Drug treatment**

*First line*

**Amitriptyline**, 75-150 mg/day, P.O. titrate up to 300 mg/day QD

(For **S/Es, C/Is** and **dosage forms**, see page 125)
Alternative

Imipramine, 25-100 mg/day P.O.

S/Es: similar to Amitriptyline

C/Is: similar to Amitriptyline

Dosage forms: Tablet, 10 mg, and 25 mg.

OR

Fluoxetine, 20-40 mg QD P.O.

S/Es: GI irritation, dry mouth, nervousness, anxiety, headache, hypotension, hypersensitivity reactions

C/Is: Should be avoided in manic phase.

Dosage forms: Capsule, 20 mg.

N.B.

Start with lower than therapeutic doses and titrate up to therapeutic doses within about 7 days. Treat for at least 6 months; suicide risk should always be evaluated.

B. Bipolar disorders

Non-drug treatment

• Psychotherapy - usually cognitive/behavioral

• Supportive psychotherapy

• Group therapy and Family therapy

Drug Treatment

First line

Haloperidol, 5 - 40 mg/day P.O. in divided doses OR 5 - 10 mg IM QD

S/Es: extrapyramidal effects such as dystonic reactions and akathisia

C/Is: Parkinsons disease

Dosage forms: Tablet, 1mg, 2 mg, 5 mg; oral liquid, 2 mg/ml; injection, 5 mg/ml in 1 ampoule
Alternatives

**Chlorpromazine, Chlorpromazine, Chlorpromazine, Chlorpromazine, Chlorpromazine**, 100 – 1000 mg/day P.O. in divided doses
(For S/Es, C/Is and dosage forms, see page 59)

OR

**Carbamazepine, Carbamazepine, Carbamazepine, Carbamazepine, Carbamazepine**, 200-600 mg P.O. 2-3 times daily. QD
(For S/Es, C/Is and dosage forms, see page 108)

**N.B.** Treatment with carbamazepine is effective, but usually after the manic episode has been controlled by an antipsychotic (haloperidol).

**MYOCARDIAL INFARCTION (ACUTE)**

Acute Myocardial infarction (MI) occurs when there is an abrupt decrease in coronary blood flow following a thrombotic occlusion of a coronary artery previously narrowed by atherosclerosis. Pain is the most frequent presenting complaint in patients with myocardial infarction. Typically, the pain involves the central portion of the chest anteriorly and/or the epigastrium. However, myocardial infarction may be painless as in patients with diabetes. The incidence of infarction is greater in patients with multiple risk factors for Atherosclerosis such as hypertension, diabetes mellitus, cigarette smoking, dyslipidemia, obesity, and it also increases with age (men > 45 yrs; women > 55 yrs).

**Diagnosis**

The diagnosis of acute MI is made using a combination of clinical, electrocardiographic and biochemical parameters. The revised WHO criteria are shown below and the presence of two criteria is required to make a diagnosis of acute ST segment Elevation MI (STEMI).

- Chest discomfort characteristic of ischemia
- Typical ECG pattern including the development of Q waves
- Typical elevations in serum markers of myocardial injury, usually creatine kinase (CK)-MB

**Treatment**

Non-drug treatment (General measures)
**Bed Rest**
- Strict in the 1st 12hrs
- If no complications, sit in 24hrs, and Ambulate in 48-72hrs

**Diet**
- Nothing P.O. OR liquid in the first 4-12hrs
- Low fat, low Sodium, high fiber diet.

**Bowel**
- Bed rest + Narcotics → Constipation
- Stool softener & Laxatives

**Sedation**
- ↓Anxiety & ensures adequate sleep
- Enforced inactivity
- Diazepam 5mg 3-4x/day, Additional dose at bed time

**Drug treatment:**

**Oxygen**, 2-4 l/min, via facemask, if patient is hypoxic (low O₂ saturation)

PLUS

**Nitroglycerin**, 0.5mg, sublingual, every 5 min up to 3 doses.  
(For S/Es, C/Is and dosage forms, see page 79)

PLUS

**Acetylsalicylic acid**, 160-325 mg., chew and continue P.O. QD
S/Es: Dyspepsia, fatigue, nausea, and diarrhea
C/Is: Hypersensitivity, active peptic ulcer disease
Dosage forms: Tablet, 100mg (soluble), 300mg, 500mg (enteric coated)

PLUS

**Diazepam**, 5mg P.O. 3-4 times daily.
(For S/Es, C/Is and dosage forms, see page 59)

PLUS

**Morphine**, (for control of pain), 2-4 mg IV. every 5 min until the desired level of analgesia is achieved or until unacceptable side effects occur.
(For S/Es, C/Is and dosage forms, see page 78)
Heparin:
For all patients with myocardial infarction (MI), 7500 units subcutaneously every 12 hours BID until the patient is ambulatory. For patients at increased risk of systemic or pulmonary thromboembolism, (anterior MI, severe left ventricular dysfunction, congestive heart failure, history of embolism, echocardiographic evidence of mural thrombus, or atrial fibrillation), heparin 5000 IV bolus followed by infusion of 1000 units per hour. The activated partial thromboplastin time should be maintained between 1.5 to 2 times the control value.

S/Es: bleeding, allergy, reversible alopecia, osteoporosis, thrombocytopenia, paradoxical thromboembolism.

C/Is: hypersensitivity to the drug, active bleeding, hemophilia, thrombocytopenia, purpura, severe hypertension, intracranial hemorrhage, infective endocarditis, & during or after neuro surgical procedures.

Dosage forms: Injection, 1000 IU/ml, 5000 U/ml in 5 ml ampoules; 5000 IU/ml, 12,500 IU/ml in 1ml ampoules; 24000 USP IU/5 ml

Followed by

Warfarin, for at least 3 months (Dose determined on the basis of serial INR determinations)

S/Es: hemorrhage in the fetus during pregnancy, fetal malformation, cutaneous necrosis.

C/Is: bleeding, breast feeding, pregnancy

Dosage forms: Tablet, 2mg, 5mg, 10mg.

PLUS

Enalapril, 5 - 40 mg P.O. once or divided into two to three doses daily.
(For S/Es, C/Is and dosage forms, see page 113)

PLUS

Metoprolol, 5 mg I.V. every 2 to 5 min for a total of 3 doses

Dosage forms: injection, 1mg/ml; tablet, 50 mg, 100 mg, 200 mg (s/r)
(For S/Es, C/Is and dosage forms, see under propranolol)
OSTEOARTHRITIS

Osteoarthritis is a progressive loss of joint cartilage with reactive changes at joint margins and subchondral bone. Osteoarthritis is caused by a complex interplay of genetic, metabolic, biochemical, and biomechanical factors with secondary components of inflammation. The process involves interactive degradation and repair processes of cartilage, bone, and synovium.

**Diagnosis:** Clinical and X-ray studies of affected joints

**Treatment:**
The goals of management of patients with osteoarthritis (OA) are to control pain and swelling, minimize disability, improve the quality of life, and educate the patient about his or her role.

**Non-drug treatment:**
- Patient and family education
- Attend to predisposing factors such as weight reduction, exercise
- Rest during acute painful episodes
- Support and alleviate weight bearing in affected joints.
- Physiotherapy
- Surgery
Drug Treatment

First line

Paracetamol, 500-1000 mg P.O. PRN (4-6 times daily) is the treatment of choice when only pain relief is needed
(For S/Es, C/Is and dosage forms, see page 53)

Alternatives

Ibuprofen, 600-1,200 mg/day P.O. in divided doses as needed
(For S/Es, C/Is and Dosage forms, see page 124)

OR

Combination of Paracetamol and ibuprofen can also be given.
Intra-articular steroids such as Methylprednisolone acetate may be given when there is evidence of persistent inflammation with joint swelling.
(For dosage schedule, S/Es, C/Is and dosage forms, see pages 53, 124)

N.B. Referral criteria includes: Pathological fracture/dislocation, intractable pain, infection, doubtful diagnosis and when joint replacement is considered.

PEPTIC ULCER DISEASE (PUD)

PUD is a mucosal ulcerative lesion of the stomach or duodenum. It is believed to occur when gastro-duodenal mucosal defenses are unable to protect the epithelium from the corrosive effects of acid and pepsin. H. Pylori infection is an important risk factor.

Epigastric pain, which comes 90 minutes to 3 hours after eating is the most frequent symptom. Other suggestive symptoms include right upper quadrant pain, abdominal fullness, nausea and vomiting.

Diagnosis: Clinical plus Endoscopic examination. Tests for H.pylori (serology, urease test, histology and culture) also important.

Treatment:
I. PUD only

**First Line**

Ranitidine, 150 mg P.O. BID OR 300 mg at bedtime for 4 – 6 weeks.

Maintenance therapy: 150 mg at bedtime.

**S/E:** GI disturbances

**C/I:** insignificant

**Dosage forms:** Tablet, 150 mg; injection, 10 mg/ml in 5 ml ampoule, 25 mg/ml in 10 ml ampoule.

**Alternatives**

Cimetidine, 400 mg P.O. BID, with breakfast and at night, OR 800 mg at night for 4 - 6 weeks. GU may require 6 weeks of 400 mg bid treatment. For children, 20-40 mg/kg/day IV OR P.O., 20-40 mg/kg/day., neonates 10-20mg/kg, in 4 divided doses.

(For **S/Es, C/Is and dosage forms**, see page 106)

OR

Famotidine, 40 mg, P.O. at night for 4 – 6 weeks.

**S/Es:** GI disturbances

**C/Is:** insignificant

**Dosage forms:** Tablet, 20 mg, and 40 mg.

OR

Omeprazole, 20 mg P.O. QD for 4 weeks (DU) or 8 weeks (GU).

**S/E:** GI disturbances.

**C/I:** pregnancy, lactation

**D/Is:** may enhance the effect of drugs like warfarin and phenytoin

**Dosage forms:** Capsule, 20 mg

II. PUD associated with H. pylori

**First Line**

Amoxicillin, 1g, P.O. BID

(For **S/Es, C/Is and dosage forms**, see page 18)
**PLUS**

**Clarithromycin**, 500mg P.O. BID

*S/E*: minor diarrhea

*C/I*: insignificant

**Dosage forms**: Tablet, 250 mg, 500 mg

**PLUS**

**Omeprazole**, 20mg P.O. BID (OR 40mg QD), all for 7 - 14 days.

(For *S/Es*, *C/Is* and **dosage forms**, see page 132)

**Alternative**

**Amoxicillin**, 1g, P.O. BID

(For *S/Es*, *C/Is* and **dosage forms**, see page 18)

**PLUS**

**Metronidazole**, 500mg, P.O. BID

(For *S/Es*, *C/Is* and **dosage forms**, see page 14)

**PLUS**

**Omeprazole**, 20mg P.O. BID OR 40mg QD for 7 - 14 days

(For *S/Es*, *C/Is* and **dosage forms**, see page 132)

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**PORTAL HYPERTENSION**

Portal hypertension is an abnormal elevation of the portal pressure exceeding 30 cm water (>12 mmHg). It occurs due to increased resistance to the portal blood flow. Common causes include cirrhosis of the liver, portal vein thrombosis, schistosomiasis and Budd-Chiari syndrome. It may clinically manifest itself in one or more of the following: upper GI bleeding, ascites, splenomegally; and if cirrhosis is the cause, with acute and chronic hepatic encephalopathy.

**Diagnosis**

- Clinical
- Ultrasound examination may reveal portal vein thrombosis or hepatic fibrosis.

**Principles of management of Portal hypertension**

**Non-drug treatment**

- Take adequate bed rest
• Control ascites by dietary salt restriction, and cautious mechanical fluid removal
• Reduce protein intake
• Remove cause and aggravating factors if possible.

Other treatments may include:
• Blood transfusion may be needed in cases of variceal bleeding
• Sclerotherapy for variceal bleeding
• Surgery, if recommended, e.g., portal venous shunt

Drug treatment

1. For ascites and edema:
   First line
   **Spironolactone**, 25-50 mg P.O.TID
   (For **S/Es**, **C/Is** and dosage forms, see page 113)

   AND / OR
   **Furosemide**, initially low dose, 20-40 mg /day P.O. QD, Titrate the
dose carefully until the desired effect is achieved.
   (For **S/Es**, **C/Is** and dosage forms, see page 79, 119)

2. For hepatic encephalopathy:
   First line
   **Magnesium sulfate**, 5-15g, P.O. BID
   (For **S/Es**, **C/Is** and dosage forms, see page 99)

   PLUS
   **Ampicillin**, 500 mg P.O. 6 hourly QID
   (For **S/Es**, **C/Is** and dosage forms, see page 18)

   OR
   **Neomycin**, 1-2 g P.O.QID and may be used intermittently one week at a
time, for long-term use.

   **S/Es**: ototoxic, nephrotoxic, neurotoxic, allergic reactions, membranous- enterocolitis
   **C/Is**: hypersensitivity to this drug, renal impairment
   **Dosage forms**: Tablet, 500mg
**Alternative**

**Lactulose**, 10-30 ml P.O. TID  
**S/E**: rare and mild  
**C/I**: galactosaemia  
**Dosage forms**: Powder, 10g sachet; syrup, 3.3g/5ml  

PLUS  

**Ampicillin**, 500 mg P.O. QID  
(For S/Es, C/Is and dosage forms, see page 18)  

OR  

**Neomycin**, 1-2 g P.O. QID and may be used intermittently one week at a time, for long-term use.  
(For S/Es, C/Is and dosage forms, see page 134)

**RHEUMATIC FEVER (ACUTE)**

Acute rheumatic fever (ARF) is a delayed, nonsuppurative sequel of a pharyngeal infection with the group *A streptococcus*. Rheumatic fever primarily affects the heart and joints. It is characterized by five major manifestations like carditis, migratory polyarthritis, Sydenham’s chorea, subcutaneous nodules and erythema marginatum, and minor manifestations like fever, arthralgia, elevated acute phase reactants, and prolonged PR interval on electrocardiography. Its cause is believed to be an immunologic reaction to group *A streptococcal* infection of the respiratory tract.

**Diagnosis**

Diagnosis is based on the modified Jones criteria: either two major criteria, or one major criterion and two minor criteria,  

PLUS  

Evidence of an antecedent streptococcal infection (e.g., positive throat culture or rapid antigen test),

AND/OR
Elevated or increasing streptococcal antibody test. The modified Jones criteria need not be fulfilled in patients presenting with Sydenham’s chorea, indolent carditis, and recurrence of acute rheumatic fever.

**Treatment**

**Drug treatment:**

*First line*

- **Benzathine Penicillin G**, 1.2 million units stat. IM
  (For S/Es, C/Is, and D/Is see under benzyl penicillin page 38)

*Alternative*

- **Erythromycin**, 250mg four times P.O. daily for 10 days.
  (For S/Es, C/Is and dosage forms, see page 214, 315)

*PLUS*

- **Aspirin**, up to 2g P.O. four times daily for 4-6 weeks and gradually tapered over 2 weeks, (For S/Es, C/Is and dosage forms, see page 32)

*AND/OR*

- **Prednisolone**, up to 30 mg P.O. QID. During the tapering of steroid over 4-6 weeks aspirin should to be added to prevent a rebound.
  (For S/Es, C/Is and dosage forms, see page 91)

**RHEUMATIC HEART DISEASE (CHRONIC)**

This is a delayed consequence of rheumatic fever, which mostly affects the mitral and aortic values.

**Diagnosis:** See note under rheumatic fever

**Treatment**

The definitive treatment in patients with significant symptoms not responding to conservative treatment is surgical valve replacement.
The most important management to prevent worsening/progression of RHD is administration of secondary prophylaxis as follows:

**Drug treatment**

*First line*

**Benzathine penicillin G**, 1.2 million units IM every 3-4 weeks should be given as a secondary prophylaxis for a minimum of 10 years or until the age of 40 years which ever is longer.

(For S/Es, C/Is and dosage forms, see under benzyl penicillin, see page 38)

*Alternative*

**Penicillin V**, 250 mg. P.O. QD

*Dosage forms*: Tablet, 125 mg, 250 mg, 500,000 IU; oral suspension, 125 mg/5 ml, 50,000 IU/ml

(For S/Es C/Is and dosage forms, see under Penicillin G, page 57)

OR

**Sulfadiazine**, 1gm, P.O. QD

(For S/Es, C/Is and dosage forms, see page 60)

**N.B.** In case of penicillin and sulfadiazine allergy, **Erythromycin** 250 P.O mg twice BID can be used. (For S/Es, C/Is and dosage forms, see page 214)

**RHEUMATOID ARTHRITIS**

Rheumatoid Arthritis (RA) is a chronic systemic inflammatory disease of unknown etiology with predilection for joint involvement. Its etiology is not known, but is presumed to involve autoimmune reactions. It is clinically, it is characterized by symmetrical peripheral polyarthritis and morning stiffness.

**Diagnosis**: is clinical, with radiologic and laboratory findings used to support the diagnosis. 4 of the 7 criteria from the American College of Rheumatology criteria for the diagnosis of Rheumatoid Arthritis must be present.
Treatment:

Non-Drug treatment:

- Should be managed by coordinated multidisciplinary care (including Physiotherapy and Occupational therapy).
- Acute flare-ups: Rest affected joints, use of day and/or night splints

Drug Treatment:

*First line*

**Aspirin**, 600-1200mg P.O. TID,
(For S/Es, C/Is and dosage forms, see page 32)

*Alternatives*

**Ibuprofen**, 400-800 mg P.O. TID
(For S/Es, C/Is and dosage forms, see page 124)

OR

**Indomethacin**, 25-50 mg P.O. TID
(For S/Es, C/Is and dosage forms, see page 110)

OR

**Indomethacin**, 100 mg rectal at night, as part of the total daily dose of NSAID, may be needed in some patients for severe nocturnal pain.
(For S/Es, C/Is and dosage forms, see page 110)

N.B.

Reduced NSAID doses have to be used in the elderly and inpatients with impaired renal function. Concomitant use of more than one NSAID only increases toxicity, and has no additional benefit.

**Cimetidine**, 200 mg P.O. twice BID may be considered for those at risk for gastrointestinal side effects.
(For S/Es, C/Is and dosage forms, see page 106)
For non-responders

A. Disease-modifying Anti-rheumatic Drugs (DMARD):

Chloroquine phosphate, 150-300 mg P.O. as base QD
(For S/Es, C/Is and dosage forms, see page 33)

Alternatives

Methotrexate, 7.5 mg P.O. weekly,
N.B. Patients on methotrexate should be placed on supplementary folic acid, P.O. 5 mg QD
S/Es: Dizziness, fatigue, headache, bone marrow suppression, hepatotoxicity, rashes, photosensitivity, interstitial pneumonitis
C/Is: Pregnancy, lactation, chronic liver disease, alcoholism, preexisting blood dyscrasia

Dosage forms: Tablet, 2.5mg, 10mg.

OR

Azathioprine, 50-100 mg P.O QD
S/Es: Nausea, vomiting, leukopenia, thrombocytopenia, rash.
C/Is: Pregnancy
Dosage forms: Tablet, 50mg.

N.B.

- Patients not responding to NSAIDs and non-pharmacological therapy within 4-6 weeks, should seek specialist advice for consideration of therapy with disease-modifying anti-rheumatic medication drug (DMARD)
- DMARDs must be used only if adequate monitoring for toxicity is regularly performed. This applies particularly to retinal toxicity caused by chloroquine and bone marrow depression and liver damage caused by methotrexate.
- Doses of most of these are gradually titrated to a maintenance dose.

OR

B. Oral Corticosteroids

Prednisone, 30-40 mg/day P.O. for 1-2 weeks with rapid tapering to minimize side effects. Use for longer duration at doses of 5-7.5mg/day.
(For S/Es, C/Is and dosage forms, see page 33)
OR

C. Intra-articular Corticosteroids

Methylprednisolone acetate, 20-80 mg intra-articular depending on the joint.

S/Es: tendon rupture, osteonecrosis.

C/Is: infection in or around the joints.

Dosage form: Injection (aqueous suspension), 40mg/ml in 1ml and 2ml ampoules.

N.B.

- Should be given by specialist.
- Should be used only in patients with isolated persistent monoarticular synovitis.
- Should not be given more than 2 – 3 times a year.

SCHIZOPHRENIA

Schizophrenia is a psychiatric disorder characterized by psychotic symptoms that significantly impair functioning and that involve disturbances in feeling, thinking, and behavior. The etiology is unknown.

Diagnosis: Clinical; ICD-10 Criteria

Treatment

Non-drug treatment:

- Supportive psychotherapy and psycho-educational group therapy for patients and family members.

Drug Treatment:

A. Emergency phase

First line

Haloperidol, 5-10 mg I.M./I.V. over 30-60 minutes. Daily dose may go as high as 40 mg.

(For S/Es, C/Is and dosage forms, see page 126)
Alternative

Chlorpromazine hydrochloride, 25 mg, I.M. and raise to 200 mg QD for acute attacks
(For S/Es, C/Is and dosage forms, see page 59)

B. Stabilization phase

First line

Haloperidol, 1-15 mg/day P.O.
(For S/Es, C/Is and dosage forms, see page 126)

Alternative

Chlorpromazine, 75-300 mg/day P.O. QD in divided doses.
(For S/Es, C/Is and dosage forms, see page 59)

C. Maintenance (chronic therapy)

First line

Haloperidol. 1-15 mg/day P.O.
(For S/Es, C/Is and dosage forms, see page 126)

Alternatives

Chlorpromazine, 75-300 mg/day P.O. QD in divided doses.
(For S/Es, C/Is and dosage forms, see page 59)

OR

Fluphenazine decanoate, 12.5-100 mg IM every 3-4 weeks

S/Es: similar to chlorpromazine, extrapyramidal features are more frequent

C/Is: similar to chlorpromazine

Dosage forms: Injection, (Depot, Oily), 25mg/ml in 1ml and 2ml ampoules and in 10ml vial

N.B.

• After 6 months in remission the drug can be withdrawn for a trial period to see if relapse occurs, at which point therapy is instituted.
THYROTOXICOSIS

Thyrotoxicosis is a clinical state resulting from excess thyroid hormone in the body. The major etiologies of thyrotoxicosis are hyperthyroidism caused by Graves' disease (60-80%), toxic multinodular goiter, and toxic adenomas. It is clinically characterized by symptoms like, irritability, dysphoria, heat intolerance and sweating, palpitations, and weight loss with increased appetite and diarrhea, and signs such as, tachycardia; atrial fibrillation in the elderly and tremors.

Diagnosis

Clinical

Laboratory: Determination of serum thyroid hormones confirms the diagnosis (TSH level is suppressed and total and unbound thyroid hormone levels are increased.) and Radioactive iodine uptake is increased on Nuclear Medicine studies.

Treatment

First Line

**Propylthiouracil**, 100-450 mg P.O. QD divided into three to four doses.

S/Es: Leukopenia, allergy, agranulocytosis, hepatitis, drug fever, arthralgia;

C/Is: impaired liver function

Dosage forms: Tablet, 25mg, 100mg

N.B. Duration of treatment depends on the specific cause of the hyperthyroidism. In Grave’s disease, PTU can be stopped after 1-2 years of treatment. In case of Toxic nodular goiter, treatment with PTU should be continued almost indefinitely.

Alternative

**Carbimazole**, 20-60 mg P.O. QD in two to three divided doses.

S/Es: allergy, arthralgia, hepatitis, drug fever and agranulocytosis.

C/Is: impaired liver function
**Dosage forms:** Tablet, 5 mg

PLUS

**Propranolol,** 10-120 mg P.O. daily divided into 2-3 doses.

(For S/Es, C/Is and dosage forms, see page 60)

**N. B.** Propranolol is given until anti-adrenergic signs and symptoms subside.

**Radioactive iodine (131 I),** 150-370 MBq (4-10 millicuries) may be given in selected patients.
CHAPTER III

PEDIATRIC DISEASES

Bronchial Asthma
Croup (Acute laryngotracheobronchitis)
Diarrheal disease (Acute)
Foreign body aspiration
Heart failure
HIV/ AIDS in Children
Jaundice in neonates
Malnutrition (severe)
Measles
Meningitis
Oral thrush
Osteomyelitis
Pertusis
Pneumocystis carinii pneumonia
Pneumonia in children
Rickets
Seizures (Neonatal)
Sepsis (Neonatal)
Septic arthritis
Tetanus (Neonatal)
Tinea capitis
Tuberculosis
BRONCHIAL ASTHMA

Asthma is a disease characterized by reversible airway obstruction, airway inflammation and increased airway responsiveness to a variety of stimuli (hyper-reactive airway). Diagnosis of childhood asthma is entirely clinical symptoms such as intermittent dry coughing and expiratory wheezes, which are severe at night. Shortness of breath or chest tightness may be reported by older children. These symptoms are usually triggered or aggravated by viral infection of the respiratory tract or inhaled allergens. Findings on examination may include: hyperinflation of the chest, chest indrawing, suprasternal retractions, prolonged expiration with audible wheezes, reduced air entry, and good response to treatment with bronchodilator.

Treatment

Asthma therapy includes basic concepts of avoiding allergens, improving vasodilatation, and reducing mediator–induced inflammation.

Drug treatment

Eliminate or reduce problematic environmental exposures to allergens including, but not limited to furred or feathered animals, occult indoor allergens such as dust mites, molds, and cockroaches.

Treat comorbid conditions like rhinitis, sinusitis, etc as appropriate.

First line

For Acute asthma

**Epinephrine**, 0.01-0.02ml/kg sc, and repeat the dose every 20 minutes for three doses.

**S/Es:** transient headache, palpitation, anxiety, and dysrythmia.

**Dosage forms:** Injection, 0.1% in 1ml ampoule
AND/OR

Salbutamol: 0.1-0.2mg/kg (1-2 puffs) 3-4 times a day or 0.075-0.1mg/kg p.o. 3 times a day. (For S/Es, C/Is, D/Is and Dosage forms, see page 90)

N.B. Good response implies resolution of symptoms in an hour and no further symptoms over the next four hours.

If inadequate response to emergency treatment, add prednisolone 1 – 2mg/kg/24hrs for 4 days in addition to the inhaled beta agonist. (For S/Es, C/Is and Dosage forms see page 91)

If a child does not improve after 3 doses of rapid acting bronchodilator given at short intervals plus oral prednisolone, give aminophylline – initial dose of 5 – 6mg/kg (up to maximum of 300mg), followed by a maintenance dose of 5mg/kg every 6 hours. Weigh the child carefully and give the intravenous dose over at least 20 minutes and preferably 1 hour.

Stop giving aminophylline immediately if the child starts to vomit or has a pulse rate of >180/min, develops headache, or starts to convulse. (For S/Es, C/Is and Dosage forms, see page 90)

Alternatives

Beclomethasone, 336 - 672µg (8 – 16puffs of 42µg/puff or >8puffs of 84µg/puff) daily in two divided doses. (For S/Es, C/Is and Dosage forms, see page 93, 290)

1. Status Asthmaticus

Status Asthmaticus is a clinical diagnosis defined by increasingly severe asthma that is not responsive to drugs that are usually effective.

Admit the child and give:

1. Supplemental oxygen via hoods, nasal catheters or nasal prongs.
2. Administer inhaled beta – agonists (e.g. salbutamol) very frequently, as frequent as one hourly. Dose of salbutamol: 0.1-0.2mg/kg (1-2 puffs) (For S/Es, C/Is and Dosage forms see page 90)
3. Start systemic glucocorticoids (e.g. methyl prednisolone at 1mg/kg/dose every 6 hrs for 48 hrs, with a taper to 1 – 2mg/kg/24 hr (maximum 60mg/24 hr) until the patients peak expiratory flow (PEF) reach 70%).

(For S/Es, C/Is and Dosage forms see page 140)
CROUP (Acute laryngotracheobronchitis)

Infectious croup is a syndrome caused by upper airway obstruction due to infection of the larynx and trachea. The spectrum of the syndrome ranges from laryngotracheobronchitis epiglottitis to diphtheria and other bacterial tracheitis. The clinical picture is characterized by dyspnea, hoarseness, a brassy cough and stridor. Infants and young children develop more severe disease because of their narrow upper airway. Many of these infectious processes also involve the lower airways.

Spasmodic croup occurs in young children between the ages of 3 months and 3 years. Onset is always at night and the characteristic presentation a child who previously was thought to be well or to have had a mild cold or coryza as the only symptom. The child wakes up in a sudden dyspnea, croupy cough and inspiratory stridor. Fever is not present.

Diagnosis: Clinical

Table I: Croup scoring

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<td>Mild</td>
<td>moderate at rest</td>
<td>severe on inspiration and expiration</td>
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<td>severe and marked use of accessory muscles</td>
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Score

1. 5 mild
2. 5-6 mild to moderate
3. 7-8 moderate most cases admitted
4. 8 severe or if the child has any one of severe category needs admission for tracheostomy.

**Treatment**

**Non-Drug Treatment**

Humidified air given by vaporizer or inhalation of steam at home or by croup tent in the hospital is the mainstay of therapy. A few patients may need intubation or tracheotomy.

**Drug Treatment**

*First line*

- **Dexamethasone**, 0.6mg/kg IM. single dose (for severe cases)
  
  *(For S/Es and C/ls, see under Prednisolone, page 91, 319)*

  **Dosage forms:** Tablet 0.5 mg, 1mg, 2mg; Injection 4mg/ml, 25mg/ml, 50mg/ml

*Alternative*

- Epinephrine (nebulized), 0.5ml/kg of 1:1000 (1mg/ml) in 3ml NS (maximum dose is 2.5 ml for ≤4 years old, 5ml for >4 years old). Hospitalize the child if more than one nebulization is required

**DIARRHEAL DISEASE (Acute)**

Acute diarrheal disease is a common problem in infants and children and its complications - dehydration and malnutrition - are major causes of morbidity and mortality in developing countries. Clinically it is useful to distinguish two syndromes produced by gastrointestinal infection: watery diarrhea and bloody diarrhea. The leading cause of diarrhea in infants is the rotavirus followed by enteric adenoviruses. Shigella is most frequently a pathogen in children between 1 to 5 years with bloody diarrhea. Other bacterial pathogens include *campylobacter*, *salmonella* and *Escherichia Coli*.

**Classification of degree of dehydration**

1. **Severe dehydration:** If two or more of the following signs,
   
   - Lethargic or unconscious
   - Sunken eyes
   - Not able to drink or drinking poorly
Skin pinch goes back very slowly

2. **Some dehydration: if two or more of the following signs,**
   - Restless irritable
   - Sunken eyes
   - Drinks eagerly, thirsty
   - Skin pinch goes back slowly

3. **No dehydration: if there are no enough signs to classify as “some” or “severe” dehydration.**

Diarrhea can also be classified as:
1) Severe persistent diarrhea: if diarrhea lasts for 14 days or more and dehydration is present.
2) Persistent diarrhea: diarrhea lasting for 14 days or more and there is no dehydration.

**Dysentery:** if there is blood in the stool. Dysentery can be an acute or persistent diarrhea and it can also be associated with dehydration.

**Diagnosis:** Clinical.
Stool examination or stool culture may be indicated in children with dysentery or persistent diarrhea but is not commonly needed for acute watery diarrhea.

**Treatment**

**Non-Drug Treatment**
Since the major morbidity relates to dehydration and malnutrition, emphasis in management should focus on rehydration and nutrition.

Treatment of acute watery diarrhea depends on the degree of dehydration

1. **Treatment Plan A: If no dehydration, treat diarrhea at home.**
Counsel the mother on the three rules of home treatment:
Give extra fluid, Continue feeding and Advise the mother when to return.

   a. **Give extra fluid (as much as the child will take)**
   - Tell the mother:
     - Breastfeed frequently and for longer period at each feed
     - If the child is exclusively breastfed give ORS or clean water in addition to breast milk.
- If the child is not exclusively breastfed, give one or more of the following: ORS solution, food based fluids (such as soup, rice water, and yoghurt drinks or clean water).

- It is especially important to give ORS at home when the child has been treated with plan B or plan C during this visit.

- The child cannot return to a clinic if the diarrhea gets worse.

- Teach the mother how to mix and give ORS; give the mother two packets of ORS to use at home.

- Show the mother how much fluid to give in addition to the usual fluid intake:
  - Up to two years - 50 to 100 ml after each loose stool
  - Two years or more - 100 to 200 ml after each loose stool

Tell the mother to:

- Give frequent small sips from a cup
- If the child vomits, wait 10 minutes, then continue but more slowly
- Continue giving extra fluid until the diarrhea stops

b. **Continue feeding**

c. **Council the mother on when to return.**

2. **Treatment plan B. Treat some dehydration with ORS in Clinic**

- Give the recommended amount of ORS over 4-hour period

**Table II: Amount of ORS to be given during the first 4 hours depending on the age of the child**

<table>
<thead>
<tr>
<th>Age</th>
<th>Up to 4 Months</th>
<th>4 Months up to 12 months</th>
<th>12 months up to 2 years</th>
<th>2 years up to 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>6 kg</td>
<td>6-10 kg</td>
<td>10-12 kg</td>
<td>12-19 kg</td>
</tr>
<tr>
<td>ORS in ml</td>
<td>200-400</td>
<td>400-700</td>
<td>700-900</td>
<td>900-1400</td>
</tr>
</tbody>
</table>

- Use the child's age only when you do not know the weight. The approximate mount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75.
- If the child wants more ORS than shown, give more.
• For infants less than 6 months who are not breastfed, also give 100-200 ml clean water during this period.

Show the mother how to give ORS solution
• Give frequent small sips from a cup.
• If the child vomits, wait 10 minutes. Then continue, but more slowly.
• Continue breastfeeding whenever the child wants.

After 4 hours:
• Reassess the child and classify the child for dehydration.
• Select the appropriate plan to continue treatment.
• Begin feeding the child in clinic.

If the mother has to leave before completing treatment
• Show her how to prepare ORS solution at home.
• Show her how much ORS to give to finish 4-hour treatment at home
• Give her enough ORS packets to complete rehydration. Also give her 2 packets as recommended in Plan A.
• Explain the 3 Rules of Home Treatment:
3. Treatment plan C: treat severe dehydration quickly.

Follow the arrows. If Answer is "Yes", go across. If "No", Go Down

START HERE

Can you give intravenous (IV) fluid immediately

Yes

No

is IV treatment available nearby (within 30min)

Yes

No

Are you trained to use a naso-gastric (NG) tube for rehydration?

Yes

No

Can the child drink?

Yes

No

Refer URGENTLY TO hospital for IV or NG treatment

- Start IV fluid immediately. If the child can drink, give ORS by mouth while the drip is set up. Give 100 ml/kg Ringer's Lactate Solution (or, if not available, normal saline), divided as follows:

<table>
<thead>
<tr>
<th>AGE</th>
<th>First give 30 ml/kg in:</th>
<th>Then give 70 ml/kg in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants (Under 12 months)</td>
<td>1 hour*</td>
<td>5 hours</td>
</tr>
<tr>
<td>Children (12 months up to 5 years)</td>
<td>30 minutes*</td>
<td>2 ½ hours</td>
</tr>
</tbody>
</table>

- Repeat once if radial pulse is still very weak or not detectable.
- Reassess the child every 1-2 hours. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children).
- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

- Refer URGENTLY to hospital for IV treatment
- If the child can drink, provide the mother with ORS solution and show her how go give frequent sips during the trip

- Start rehydration by tube (or mouth) with ORS solution give 20 ml/kg/ hour for 6 hours (total of 120 ml/kg).
- Reassess the child every 1-2 hours:
  - If there is repeated vomiting or increasing abdominal distension, give the fluid more slowly.
  - If hydration status is not improving after hours, send the child for IV therapy
- After 6 hours, reassess the child. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

NOTE:
- If possible, observe the child at least 6 hours after rehydration to be sure the mother can maintain hydration giving the child ORS solution by mouth.
1. Severe persistent diarrhoea

**Non drug treatment**
Treat dehydration before referral

**Drug treatment**

- **Vitamin A**, 50,000 IU for children less than 6 months of age, 100,000 IU for 6 – 12 months and 200,000 IU for those older than 12 months.
- **S/Es:** diarrhea, vomiting, irritability, drowsiness
- **C/Is:** renal impairment
- **D/Is:** cholestyramine or colestipol reduces its absorption

**Dosage forms:** capsule, 25,000 IU, 50,000 IU, 100,000 IU; oral suspension, 150,000 IU/ml (concentrate), 50,000 IU/ml: tablet, 50,000 IU, 100,000 IU, 200,000 IU; injection, under 200,000 IU/ml

2. Persistent diarrhoea

**Non drug treatment**
Advice the mother on feeding the child with persistent diarrhoea

**Drug treatment**

- **Vitamin A**, 50,000 IU for children less than 6 months of age, 100,000 IU for 6 – 12 months, 200,000 IU for greater than 12 months, P.O. single dose

(for **S/Es, C/Is, D/Is and Dosage forms**, see above)

3. Dysentery

**Drug treatment**

Give antibiotic recommended for Shigella in your area for five days.

*First line*

- **Cotrimoxazole**, 4 mg/kg trimethoprim 20mg/kg sulphamethaxozole twice a day for five days.

- **S/Es:** headache, mental depression, nausea, vomiting, diarrhea, hypersensitivity, Stevens Johnson’s syndrome.

- **C/Is:** infants under 6 weeks (risk of kernicterus), jaundice, hepatic failure, blood disorder, porphyria

**Dosage forms:** Pediatric tablet- trimethoprim 20mg and sulphamethoxazole
100mg; Tablet trimethoprim 80 and sulphamethoxazole 400mg: Suspension - trimethoprim 40 and sulphamethoxazole 200mg; Ampoule 5ml (trimethoprim 80mg and sulphamethoxazole 400mg).

Alternative

**Nalidixic acid**, 2 months to 4 months 62.5 mg P.O. months up to 12 months 125 mg p.o.; 12 months to 5 years 250 mg P.O. QID for 5 days.

**S/Es**, Gastrointestinal disturbances

**C/Is**, Children under 12 years old

**Dosage** forms: Tablets, 500 mg; oral suspension, 300mg/vial

---

**FOREIGN BODY ASPIRATION**

Peak age: 6 months to 4 years.

Commonly aspirated materials include: nuts, seeds, or other small objects. The foreign body commonly lodges in the bronchus, usually the right one. The obstruction can lead to collapse or consolidation of portion of the lung distal to the site of obstruction. Choking is a frequent initial symptom. This may be followed more commonly by a symptom free interval of days or weeks before the child presents with persistent wheeze, chronic cough or pneumonia which fails to respond to treatment. When a large foreign body is aspirated, it may lodge in the trachea and may lead to asphyxia and sudden death.

**Diagnosis**

Foreign body aspiration should be considered in a child who presents with:

- Sudden onset of choking, coughing or wheezing; or
- Segmental or lobar pneumonia which fails to respond to antibiotic treatment; or
- Unilateral wheeze; or
- An area of decreased air entry which is either dull or hyper resonant on percussion; or
- Deviation of trachea or apex beat.

**Treatment**

**Emergency first aid for the choking child**

Attempt to dislodge and expel the foreign body. The management depends on the age of the child.
For infants:
- Lay the infant on one arm or on the thigh in a head down position.
- Strike the infant’s back five times with the heel of the hand.
- If the obstruction persists, turn the infant over and give five chest thrusts with two fingers, one finger’s breadth below the nipple level in the midline.
- If the obstruction persists, check the infant’s mouth for any obstruction which can be removed.
- If necessary, repeat this sequence with back slaps again.

For older children:
- While the child is sitting, kneeling or lying, strike the child’s back five times with the heel of the hand.
- If the obstruction persists, go behind the child and pass your arms around the child’s body; form a fist with one hand immediately below the sternum; place the other hand over the fist and thrust sharply upwards into the abdomen. Repeat this up to five times.
- If the obstruction persists, check the child’s mouth for any obstruction which can be removed.
- If necessary, repeat the sequence with backslaps again.

Once this has been done, it is important to check the patency of the airway by:
- Looking for chest movements.
- Listening for air entry, and
- Feeling for breath.

Later treatment of suspected foreign body aspiration.
- If there is evidence for pneumonia start antibiotics (see section on treatment of pneumonia
- Refer the child to a center that can make correct diagnosis and remove the foreign body through bronchoscopy.

HEART FAILURE IN CHILDREN

Heart failure in infants and young children is usually manifested by respiratory distress making it usually difficult to differentiate it from pneumonia. However,
presence of marked Hepatomegaly and absence of fever may help in making the diagnosis. Older children with heart failure usually present with clinical features that are more or less similar to the adult with heart failure.

Underlying causes of heart failure in children include: congenital heart diseases (usually in the first year of life), acute rheumatic fever with carditis, infective endocarditis, Myocarditis, cardiomyopathies, pericarditis, glomerulonephritis, severe anemia etc.

**Diagnosis**

The most common signs of heart failure, on examination, are:

- Tachycardia (heart rate>160/min in a child under 12 months of age; >120/min in a child aged 12 months to 5 years).
- Gallop rhythm
- Basal rales
- Enlarged, tender liver.
- In infants – fast breathing (or sweating), especially when feeding).
- Edema of the feet, hands or face, or distended neck veins – in older children.
- Severe palmar, buccal mucosa or conjunctival pallor, if severe anemia is the cause of heart failure.
- Chest x – ray shows cardiomegaly.
- Highblood pressure in a child with heart failure may suggest glomerulonephritis or coarctation of the aorta as a cause.

**Treatment**

**Treatment Objectives:**

- Remove excess retained fluid
- Increase contractility

**Non-drug Treatment**

**Supportive measures.**

- Give oxygen if the infant or child is showing signs of respiratory distress.
- Avoid the use of intravenous fluids whenever possible.
- Support the child in a semi – sitting position with hand and shoulders elevated and lower limbs dependent.
- Relieve fever with paracetamol to reduce the cardiac work load.
• Avoid added salt diets.

**Drug-treatment**

1. **Diuretics**

   *First line*

   **Furosemide**, 1mg/kg, intravenously and wait for marked diuresis with in 2 hours. If not effective, give 2mg/kg and repeat in 12 hours, if necessary. Then a single dose of 1 – 2 mg/kg P.O. is usually sufficient. If furosemide is given for more than 5 days, or if it is given with digoxin, potassium supplementation is necessary.

   (For **S/Es, C/Is and Dosage forms** see page 79, 119).

   *Alternative*

   **Spironolactone**, 2 – 3mg/kg/24 hr in two to three divided doses

   PLUS

   **Hydrochlorothiazide** 2mg/kg/24hr, (maximum dose 100mg/24hr) in two divided doses. (For **S/Es, C/Is and dosage forms**, see page 118)

2. **Positive inotropic drugs**

   These are used when the cause of heart failure is due to decreased contractility

   **Digoxin**, 15micrograms/kg P.O. loading dose followed by 5micrograms/kg p.o. every 12 hrs starting 6hrs after the loading dose.

   **P/C: Myocarditis**

   (For **S/Is, C/Is and Dosage forms** see page 85)

   **N.B.** Digoxin is not necessary when the cause of heart failure is severe anemia, pericardial effusion or glomerulonephritis.

**HIV/ AIDS IN CHILDREN**

The vast majority of HIV infected children acquired the virus from their mothers. The rate of mother to child transmission (MTCT) of HIV is estimated to range from 25-45% (see section on HIV in pregnancy). Evidence from developed countries shows that such transmission can be greatly reduced to less than 5% by using anti-retroviral therapy during pregnancy. An efficient ANC is mandatory before implementing MTCT reduction program.
Antiretroviral therapy in children

HIV Testing in HIV-exposed Infants < 18 months Where Virologic Testing is Available

**HIV – exposed infant**
(Infant born to HIV – infected mother or HIV antibody positive infant < 18 months of age)

DNA PCR at 6 weeks or at earliest opportunity after age 6 weeks*. Start cotrimoxazole prophylaxis.

**POSITIVE**
Presumed HIV-infected

Refer infant for HIV care & treatment

If infant or child gets SICK
Repeat DNA PCR
Continue cotrimoxazole

**POSITIVE**
HIV-infected

Refer infant for HIV care and treatment

**NEGATIVE**
HIV infection unlikely
Look for other causes
Rapid test ≥ 18 months of age or > 6 weeks after complete cessation of breastfeeding

Infant or child remains WELL
Continue follow-up
Continue cotrimoxazole
Rapid test at ≥ 12 months of age or at least 6 weeks after complete cessation of breastfeeding

**POSITIVE**
If child is ≥ 18 months HIV-infected refer for care and treatment. If child is < 18 months repeat rapid antibody at 18 months of age

**NEGATIVE**
Not HIV-infected

Follow-up in routine child health service
Diagnostic Algorithm for Infants < 18 Months of Age Where Virologic Tests are Unavailable

**HIV-exposed infant**
Infant born to HIV-infected mother or HIV antibody positive infant < 18 months of age

- Start Cotrimoxazole prophylaxis at 6 weeks of age or at earliest opportunity if older than six weeks
- Assess for presumptive diagnosis of severe HIV disease in infants and children < 18 months as per the WHO criteria*

Infant/child eligible for ART

- Start or refer for HIV/ART care

Infant/child not eligible for ART or asymptomatic

- Continue Cotrimoxazole prophylaxis
- Provide follow up care (clinical and immunological monitoring) for disease progression as per guidelines
- Assess for ART eligibility criteria met

Do repeat rapid HIV antibody test, at ≥ 18 months of age or at least 6 weeks after cessation of breastfeeding. Consider doing virologic test earlier if possible.

- **Negative**
  - Stop HIV/ART care

- **Positive**
  - Continue HIV/ART care and treatment
Selecting children for ART

Clinical criteria:

Infants and children with established HIV infection should be started on ART if they have:

- WHO pediatric clinical stage 4 disease (irrespective of CD4 count)
- WHO pediatric clinical stage 3 disease (irrespective of CD4 count). In children ≥12 months with TB, LIP, or thrombocytopenia initiation of ART can be delayed if the immune suppression is just mild.
- WHO Pediatric clinical stage 2 disease and CD4 or TLC value at or below threshold
- WHO Pediatric clinical stage 1 disease and CD4 value at or below threshold
- HIV antibody positive infants < 18months of age where virologic testing is not available to confirm HIV infection should be considered for ART if they have clinically diagnosed presumed severe HIV disease.

Clinical criteria for presumptive diagnosis of severe HIV disease in infants and children <18months of age:

- The infant is confirmed HIV positive; and
- Diagnosis of any AIDS indicator condition(s) can be made; or
- The infant is symptomatic with two or more of the following:
  - Oral thrush
  - Severe pneumonia
  - Severe sepsis

Other factors that may support the diagnosis of severe HIV disease in an HIV seropositive infant include:

- Recent HIV related maternal death; or advanced HIV disease in the mother;
- CD4 count < 20% in the infant.

Process for initiating ART

1. **First screening visit 2 – 4 weeks before starting ART**
   - Complete clinical assessment including weight, height, and head circumference.
• Ensure medical criteria are met, TB has been excluded, and there is no medical contraindication to initiation of ART.
• Treat and stabilize opportunistic infections
• Review baseline laboratory investigations (Hgb, platelet count, WBC with differential, BUN/creatinine, AST, CD4% and/or count etc...)
• Assess patient’s and caregivers readiness for therapy
• Disclosure counseling depending on the developmental maturity of the child
• Explain the drug schedule and possible side effects of ARVs

2. Second visit
• Complete clinical assessment before starting ART
• ARV prescription
  ✓ Calculate dose of medication, total volume required, and prescribe enough for 2 weeks
  ✓ Provide detailed description of drugs,
  ✓ Demonstrate use of syringe and cups to measure medications as appropriate.
• Arrange follow up in 2 weeks.

3. Follow up visit 1 (2 weeks after initiation of ART)
• Review clinical history enquiring about skin rash, fatigue etc.
• Assess nutrition, growth and development – measure weight and height, update growth chart, and check surface area.
• Clinical exam (look for evidence of toxicity – e.g. pallor, rash and upper quadrant tenderness).
• Check adherence
• ARV prescription
  ✓ Verify drug dose and schedule,
  ✓ Dispense two weeks supply of medication
• Arrange follow up in two weeks.

4. Follow up visits 2 and 3 (4 and 8 weeks after initiation of ART)
• Review clinical history
• Assess nutrition, growth and development
• Clinical exam – look for evidence of toxicity
• Laboratory test – check Hgb at 4 weeks for patients on AZT containing regimen.
• ARV prescription
  ✓ Adjust drug dose appropriately based on weight and body surface area
  ✓ Dispense four weeks supply of medication
• Arrange follow up in 1 month

5. Subsequent follow up visits
• HIV infected children on ART should be followed up monthly to collect medication and assess adherence, and 3 – monthly for clinical examination and toxicity assessment.

At each visit:
• Clinical history
• Nutrition and growth assessment
• Developmental assessment
• Physical exam – looking for evidence of response to therapy or development of disease progression, evidence of toxicity
• Clinical staging using WHO staging system
• Immunological staging every 6 months
• Laboratory tests – clinical response and symptom directed
• Immunization and nutrition counseling as appropriate for age.
• Check adherence
• Disclosure
• ARV prescription
  ✓ Adjust drug dose appropriately based on weight and body surface area
  ✓ Dispense four weeks supply of medication
• Arrange follow up in 1 month to collect medications and every 3 months for clinical evaluation.

First-line

Zidovudine  - Less than 90 days age 2 mg/kg four times a day
  - More than 90 days age 160 mg/m² three times a day
Lamuvidine
- Less than 30 days age 2 mg/kg two times a day
- More than 30 days age 4 mg/kg four times a day

Nevirapine
- Less than 60 days age 120 mg/m² two times a day for 14 days, then 200 mg/m² two times a day
- More than 60 days age 120 mg/m² two times a day for 14 days, then 120 mg/m² one time a day for 14 days, then 120 mg/m² two times a day for 14 days

(For S/Es, C/Is and dosage forms, see page 10)

N.B. In children on concomitant anti-tuberculosis treatment and older than 30 days, abacavir 8 mg/kg/dose twice daily replaces nevirapine

Alternatives
Stavudine
- More than 30 days age: 1 mg/kg every 12 hours

Didanosine
- Less than 30 days age: 50 mg/m² every 12 hours
- More than 30 days age: 90 mg/m² every 12 hours

Ritonavir
- More than 30 days age: 400 mg/m² every 12 hours
  (started with 250 mg/m² every 12 hours and increased stepwise over five days)

(For S/Es, C/Is and dosage forms, see page 6)

N.B. Nelfinavir or lopinavir/ritonavir may be used in place of ritonavir.

Treatment failure
Failure of a first-line regimen should be determined by evidence of disease progression using clinical staging, and immunological criteria where available. Note the following when determining treatment failure in children:

- Check adherence, make sure child has been on therapy at least 24 weeks, nd adherence has been assessed and found adequate
- Exclude immune reconstitution syndrome
- CD4% should not be measured during an intercurrent infection – but preferably a month after resolution.
- Do not use TLC to determine treatment failure.
Table III: Clinical definition of treatment failure in children

**Clinical criteria for treatment failure**

- Lack of or decline in growth rate in children who show an initial response to treatment (WHO clinical stages 3 or 4; moderate or severe unexplained malnutrition; not adequately responding to standard therapy despite adequate nutritional support and with out explanation)
- Loss of neuro-developmental milestones or development of HIV encephalopathy
- Occurrence of new opportunistic infections or malignancies; recurrence of infections such as oral candidiasis that is refractory to treatment or esophageal candidiasis

Table IV: Immunological definition of treatment failure in children

**Immunological criteria for treatment failure**

- Development of age – related severe immunodeficiency after initial immune recovery
- Development new age – related immune deficiency, confirmed with at least one subsequent CD4 measurement
- Rapid decline to at or below threshold of age – related severe immunodeficiency

Recommendations on Infant Feeding

- All HIV infected mothers should receive infant feeding counseling which includes provision of general information about the risk and benefits of infant feeding options.
- Decision needs to be made by the mother, with guidance and support from a health care provider to select the most suitable option for her.
• If an HIV infected mother decides to breast feed then exclusive breast-feeding should be encouraged, followed by early weaning at 4-6 months.

• If she decides not to breast feed, she should be provided with the means for formula feeding and educated on sterility procedures and hygiene.

Mixed feeding (breast milk and formula) should be discouraged, as it is associated with higher rate of transmission.

**JAUNDICE IN NEONATES**

• The color usually results from the accumulation of unconjugated Bilirubin in the skin.

• About 60% of full-term and 80% of preterm infants may normally develop jaundice in the first week of life.

• Unconjugated bilirubin is neurotoxic, while the conjugated is not.

• The most important pathologic causes of unconjugated hyperbilirubinemia include: Rh incompatibility, ABO incompatibility, concealed hemorrhage etc.

• “Physiologic” jaundice is a diagnosis made by exclusion when the following criteria are strictly met:
  
  • Jaundice first appears between the 2\textsuperscript{nd} and 3\textsuperscript{rd} day, peaking between the 2\textsuperscript{nd} and 4\textsuperscript{th} day and generally decreasing within the 1\textsuperscript{st} week of life;

  • Peak Bilirubin level ≤ 12mg/dl in full term infants and ≤15mg/dl in preterm infants;

  • Rate of rise of Bilirubin < 5mg/dl/24 hours;

  • Jaundice not persisting beyond the first two weeks of life;

  • Direct reacting bilirubin <1mg/dl at any time;
PLUS

- Absence of known cases of jaundice on the basis of history, physical examination and laboratory examination.

- “Pathologic” jaundice: jaundice that does not fulfill the above criteria strictly is considered pathological and needs serious attention.

- The most important danger of pathological jaundice in the new born is Kernicterus (neurotoxicity resulting from unconjugated bilirubin).

Laboratory Diagnosis

- Serum bilirubin (total and direct fraction);
- Blood group and Rh type;
- Evidence of hemolysis including Coomb’s test, reticulocyte count, hematocrit, peripheral morphology;
- VDRL;
- Septic work up whenever infection is suspected.

Treatment

- **Phototherapy** using either day light (white light) or blue light.
- **Exchange transfusions** with 2 volume of cross-matched blood.

Table V: Size of exchange transfusion and replacement of infant’s blood;

<table>
<thead>
<tr>
<th>Infants blood volume exchange</th>
<th>Removed and replaced by</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>40%</td>
</tr>
<tr>
<td>1</td>
<td>63%</td>
</tr>
<tr>
<td>2</td>
<td>87%</td>
</tr>
<tr>
<td>3</td>
<td>95%</td>
</tr>
</tbody>
</table>
### MALNUTRITION (SEVERE)

#### Table VI: Definition for Severe acute Malnutrition (6 months old to adulthood)

<table>
<thead>
<tr>
<th>Age</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months to 18 yrs</td>
<td>- Weight for height or length &lt;70% OR</td>
</tr>
<tr>
<td></td>
<td>- Mid upper arm circumference (MUAC)&gt;110mm with a length &gt;65cm OR</td>
</tr>
<tr>
<td></td>
<td>- Presence of bilateral pitting edema of the feet</td>
</tr>
<tr>
<td>Adults</td>
<td>- MUAC&lt;170mm OR</td>
</tr>
<tr>
<td></td>
<td>- MUAC&lt;180mm with recent weight loss or underlying chronic illness OR</td>
</tr>
<tr>
<td></td>
<td>- Body mass index (BMI)* &lt;16 with/OR Presence of bilateral pitting edema of the feet (unless there is another clear – cut cause)</td>
</tr>
</tbody>
</table>

#### Principles of management

Whatever the program may be, the principle is based on 3 phases:

**Phase I (Inpatient facility)**
- Poor appetite and/or major medical complications.
- Formula used during this phase is F75.
- Weight gain at this stage is dangerous.

**Transition phase**
- To avoid a sudden change to large amount of diet before physiological function is restored.
- Patients start to gain weight as F100 is introduced.
- The quantity of F100 given is equal to the quantity of F75 given in phase I.

**Phase II**
- Good appetite
- No major medical complications
- Can occur at inpatient or outpatient setting
- F100 (inpatient only) or ready to use therapeutic feeding (RUTF).
### Table VII: Criteria for admission in in-patient or out patient care

<table>
<thead>
<tr>
<th>Factor</th>
<th>Inpatient care</th>
<th>Outpatient care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anthropometry</strong></td>
<td>6 months to 18 yrs:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- W/H or W/L &lt;70% OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MUAC &lt;110mm with length &gt;65cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MUAC &lt;180mm with recent weight loss or underlying chronic illness OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MUAC&lt;170mm OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- BMI &lt;16</td>
<td></td>
</tr>
<tr>
<td><strong>Bilateral pitting edema</strong></td>
<td>Bilateral pitting edema grade 3(+++)</td>
<td>Bilateral pitting edema grade 1 to 2 (+ and++)</td>
</tr>
<tr>
<td></td>
<td>Marasmic – kwashiorkor</td>
<td></td>
</tr>
<tr>
<td><strong>Appetite</strong></td>
<td>Poor appetite</td>
<td>Good appetite</td>
</tr>
<tr>
<td><strong>Choice of caregiver</strong></td>
<td>Chooses to start, continue or transfer to inpatient treatment</td>
<td>Chooses to start, continue transfer to outpatient treatment</td>
</tr>
<tr>
<td></td>
<td>- No suitable or willing caregiver</td>
<td>- reasonable home circumstance and a willing caregiver</td>
</tr>
<tr>
<td><strong>Skin</strong></td>
<td>Open skin lesions</td>
<td>No open skin lesions</td>
</tr>
<tr>
<td><strong>Medical complications</strong></td>
<td>- severe/intractable vomiting</td>
<td>Alert with no medical complications</td>
</tr>
<tr>
<td></td>
<td>- hypothermia: axillary T° &lt;35 °C OR rectal &lt;35.5 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- fever &gt;39 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- fast breathing based on age</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- extensive skin lesions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- very weak, lethargic, unconscious</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- fitting/convulsions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- severe dehydration based on history &amp; physical examination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Any condition that requires an infusion or NG – tube feeding.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Very pale (severe anemia), jaundice, bleeding tendencies</td>
<td></td>
</tr>
</tbody>
</table>
PHASE I

Treatment of complications

1. Dehydration

- “Therapeutic window” is narrow in a patient with severe acute malnutrition.
- Quickly go from having depleted circulation to overhydration with fluid overload and cardiac failure.
- IV infusions should be avoided whenever possible.
- The standard protocol for the well nourished dehydrated child should not be used.
- A supply of modified ORS or ReSoMal should never be freely available for the caretakers to give to the child whenever there is a loose stool.
- Ongoing loss replacement should not be given when there is no dehydration.

a. Marasmic patient

I. Diagnosis of dehydration

- The usual signs of dehydration are not reliable.
- History is more important than physical examination.
  - A definite history of significant recent fluid loss – usually diarrhea which is clearly like water (not just soft or mucus) and frequent with sudden onset within the past few hours or days.
  - History of a recent change in the child’s appearance.
  - If the eyes are sunken then the mother must say that the eyes have changed to become sunken since the diarrhea has started.
  - The child must not have any edema.
  - Shock may be diagnosed when there is definite dehydration plus a weak or absent radial or femoral pulse, and cold hands and feet, and decrease in level of consciousness.

II. Treatment of dehydration in the Marasmic patient

- Rehydration should be oral whenever possible.
- IV infusions should be avoided except when there is 1) severe shock, 2) loss of consciousness from confirmed dehydration.
- Weight is the best measurement of fluid balance.
- Before starting any rehydration treatment, weigh the child, mark the edge of the liver and ton the skin with indelible pen and record respiratory rate.
- Start with 5ml/kg of Rehydration salt for malnurished (ReSoMal), not in National Drug List every 30 minutes for the first 2 hours orally or by NG – tube and then adjust according to the weight change observed. If continued weight loss, increase the rate of administration of ReSoMal by 10ml/kg/hr.
- Weigh the child every hour and assess liver size, respiration rate, and pulse rate and pulse volume.

**Treatment of dehydration in the Marasmic patient**

Only rehydrate until the weight deficit (measured or Estimated) is corrected and then stop

Do not give extra fluid To prevent dehydration.

Conscious

unconscious

ReSoMal

5ml/kg/30min first hour
5 to 10ml/kg/hour

Darrow’s solution OR
½ N/S in 5% glucose, OR
R/L in 5% dextrose
At 15ml/kg for the first hour and reassess

- if improving, 15ml/kg 2nd hr
- if conscious NGT: ReSoMal
- if not improving septic shock

IV fluid
b. Kwash patient

I. Diagnosis of dehydration in the kwashiorkor patient

- All children with edema have an increased total body water and sodium – they are over - hydrated.
- Edematous patients cannot be dehydrated although they are frequently Hypovolemic.
- If a child with kwashiorkor has definite watery diarrhea and the child is deteriorating clinically (excessive weight loss, more than 2% of the body weight per day), then the fluid lost can be replaced on the basis of 30ml of ReSoMal per day.

II. Diagnosis and Treatment of septic shock

- A fast weak pulse with cold extremities
- Disturbed consciousness
- Give broad – spectrum antibiotics
- Keep warm to prevent or treat hypothermia
- Give sugar – water by mouth or nasogastric tube as soon as the diagnosis is made.
- Full blown septic shock – treat as in the Marasmic patient.
Treat hypothermia, severe anemia, severe pneumonia and any major medical complications.

**Diet**
- F75 (130ml=100kcal) should be used at this phase (see table for amounts).
- Use NG – tube for feeding if the child is taking <75% of prescribed diet per 24hrs or has pneumonia with a rapid respiratory rate or consciousness is disturbed.

**Table VIII: Amounts of F75 to give during Phase 1**

<table>
<thead>
<tr>
<th>Class of Weight (Kg)</th>
<th>8 feeds per day ml for each feed</th>
<th>6 feeds per day Ml for each feed</th>
<th>5 feeds per day Ml for each feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 to 2.1 Kg</td>
<td>40 ml per feed</td>
<td>50 ml per feed</td>
<td>65 ml per feed</td>
</tr>
<tr>
<td>2.2 - 2.4</td>
<td>45</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>2.5 - 2.7</td>
<td>50</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>2.8 - 2.9</td>
<td>55</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>3.0 - 3.4</td>
<td>60</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td>3.5 - 3.9</td>
<td>65</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>4.0 - 4.4</td>
<td>70</td>
<td>85</td>
<td>110</td>
</tr>
<tr>
<td>4.5 - 4.9</td>
<td>80</td>
<td>95</td>
<td>120</td>
</tr>
<tr>
<td>5.0 - 5.4</td>
<td>90</td>
<td>110</td>
<td>130</td>
</tr>
<tr>
<td>5.5 - 5.9</td>
<td>100</td>
<td>120</td>
<td>150</td>
</tr>
<tr>
<td>6 - 6.9</td>
<td>110</td>
<td>140</td>
<td>175</td>
</tr>
<tr>
<td>7 - 7.9</td>
<td>125</td>
<td>160</td>
<td>200</td>
</tr>
<tr>
<td>8 - 8.9</td>
<td>140</td>
<td>180</td>
<td>225</td>
</tr>
<tr>
<td>9 - 9.9</td>
<td>155</td>
<td>190</td>
<td>250</td>
</tr>
<tr>
<td>10 - 10.9</td>
<td>170</td>
<td>200</td>
<td>275</td>
</tr>
<tr>
<td>11 - 11.9</td>
<td>190</td>
<td>230</td>
<td>275</td>
</tr>
<tr>
<td>12 - 12.9</td>
<td>205</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>13 - 13.9</td>
<td>230</td>
<td>275</td>
<td>350</td>
</tr>
<tr>
<td>14 - 14.9</td>
<td>250</td>
<td>290</td>
<td>375</td>
</tr>
<tr>
<td>15 - 19.9</td>
<td>260</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>20 - 24.9</td>
<td>290</td>
<td>320</td>
<td>450</td>
</tr>
<tr>
<td>25 - 29.9</td>
<td>300</td>
<td>350</td>
<td>450</td>
</tr>
<tr>
<td>30 - 39.9</td>
<td>320</td>
<td>370</td>
<td>500</td>
</tr>
<tr>
<td>40 - 60</td>
<td>350</td>
<td>400</td>
<td>500</td>
</tr>
</tbody>
</table>
Table IX: Routine medications

<table>
<thead>
<tr>
<th></th>
<th>Direct admission to in-patient (phase I)</th>
<th>Direct admission to out patient (phase II)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>- One dose at admission</td>
<td>- One dose on the 4th week</td>
</tr>
<tr>
<td></td>
<td>- One dose on discharge</td>
<td></td>
</tr>
<tr>
<td>Folic acid</td>
<td>One dose at admission if signs of anemia</td>
<td>One dose at admission if signs of anemia</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Everyday in phase I + 4 more days in transition</td>
<td>One dose at admission + give Treatment for 7 days at home</td>
</tr>
<tr>
<td>Malaria</td>
<td>According to the national protocol</td>
<td>According to national protocol</td>
</tr>
<tr>
<td>Measles (in Those above 9 months Old)</td>
<td>- One vaccine at admission if no card</td>
<td>One vaccine on the 4th week</td>
</tr>
<tr>
<td></td>
<td>- One vaccine at discharge</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>Add to F100 in phase 2</td>
<td>No. iron is already in all RUTF</td>
</tr>
<tr>
<td>Deworming</td>
<td>One dose at the start of phase 2</td>
<td>One dose on the 2nd week</td>
</tr>
</tbody>
</table>

(For S/Es, C/Is and Dosage forms of amoxicillin and iron see pages 18 and 81, respectively)

Transition phase

Progress to from phase I to transitions phase when

- Appetite has improved
- Begins to loose edema and weight
- No IV – line or NGT.
- The only change made to the treatment in phase I is a change in the diet that is given from F75 to F100 or RUTF.
- The number of feeds, their timing and the volume of the diet given remains exactly the same as in phase I.
<table>
<thead>
<tr>
<th>Class of Weight</th>
<th>Plumpy Nut</th>
<th>BP 100</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>gram/day</td>
<td>Sachets/day</td>
<td>Bars/day</td>
<td>Kcal</td>
</tr>
<tr>
<td>3 - 3.4</td>
<td>90</td>
<td>1.00</td>
<td>1.5</td>
</tr>
<tr>
<td>3.5 - 3.9</td>
<td>100</td>
<td>1.00</td>
<td>1.5</td>
</tr>
<tr>
<td>4 - 4.9</td>
<td>110</td>
<td>1.25</td>
<td>2.0</td>
</tr>
<tr>
<td>5 - 5.9</td>
<td>130</td>
<td>1.50</td>
<td>2.5</td>
</tr>
<tr>
<td>6 - 6.9</td>
<td>150</td>
<td>1.75</td>
<td>3.0</td>
</tr>
<tr>
<td>7 - 7.9</td>
<td>180</td>
<td>2.00</td>
<td>3.5</td>
</tr>
<tr>
<td>8 - 8.9</td>
<td>200</td>
<td>2.00</td>
<td>3.5</td>
</tr>
<tr>
<td>9 - 9.9</td>
<td>220</td>
<td>2.50</td>
<td>4.0</td>
</tr>
<tr>
<td>10 - 11.9</td>
<td>250</td>
<td>3.00</td>
<td>4.5</td>
</tr>
<tr>
<td>12 - 14.9</td>
<td>300</td>
<td>3.50</td>
<td>6.0</td>
</tr>
<tr>
<td>15 - 19.9</td>
<td>370</td>
<td>4.00</td>
<td>7.0</td>
</tr>
<tr>
<td>25 - 39</td>
<td>450</td>
<td>5.00</td>
<td>8.0</td>
</tr>
<tr>
<td>40 - 60</td>
<td>500</td>
<td>6.00</td>
<td>10.0</td>
</tr>
</tbody>
</table>

The amounts given in the table are for the full 24h period. The amounts represent an average increase in energy intake of about one third over the amount given during Phase I. However, this varies between an increment of 10% and 50% depending upon the actual weight and the product used.

Each of the RUTF products is nutritionally equivalent to F 100, with the exception that they have an appropriate amount of iron added during manufacture for children in Phase 2 (i.e. children who pass the appetite test).

If both F100 and RUTF are being given they can be substituted on the basis that about 100 ml of F100 = 20g of RUTF.
Table XI: Transition Phase: amounts of F100 to give

<table>
<thead>
<tr>
<th>Class of Weight (Kg)</th>
<th>8 feeds per day</th>
<th>6 feeds per day</th>
<th>5 feeds per day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Less than 3Kg</strong></td>
<td>F100 full strength should not be given – Only F100 diluted should be given</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 to 3.4 Kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 – 3.9</td>
<td>65</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>4.0 – 4.4</td>
<td>70</td>
<td>85</td>
<td>110</td>
</tr>
<tr>
<td>4.5 – 4.9</td>
<td>80</td>
<td>95</td>
<td>120</td>
</tr>
<tr>
<td>5.0 – 5.4</td>
<td>90</td>
<td>110</td>
<td>130</td>
</tr>
<tr>
<td>5.5 – 5.9</td>
<td>100</td>
<td>120</td>
<td>150</td>
</tr>
<tr>
<td>6 – 6.9</td>
<td>110</td>
<td>140</td>
<td>175</td>
</tr>
<tr>
<td>7 – 7.9</td>
<td>125</td>
<td>160</td>
<td>200</td>
</tr>
<tr>
<td>8 – 8.9</td>
<td>140</td>
<td>180</td>
<td>225</td>
</tr>
<tr>
<td>9 – 9.9</td>
<td>155</td>
<td>190</td>
<td>250</td>
</tr>
<tr>
<td>10 – 10.9</td>
<td>170</td>
<td>200</td>
<td>275</td>
</tr>
<tr>
<td>11 – 11.9</td>
<td>190</td>
<td>230</td>
<td>275</td>
</tr>
<tr>
<td>12 – 12.9</td>
<td>205</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>13 – 13.9</td>
<td>230</td>
<td>275</td>
<td>350</td>
</tr>
<tr>
<td>14 – 14.9</td>
<td>250</td>
<td>290</td>
<td>375</td>
</tr>
<tr>
<td>15 – 19.9</td>
<td>260</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>20 – 24.9</td>
<td>290</td>
<td>320</td>
<td>450</td>
</tr>
<tr>
<td>25 – 29.9</td>
<td>300</td>
<td>350</td>
<td>450</td>
</tr>
<tr>
<td>30 – 39.9</td>
<td>320</td>
<td>370</td>
<td>500</td>
</tr>
<tr>
<td>40 – 60</td>
<td>350</td>
<td>400</td>
<td>500</td>
</tr>
</tbody>
</table>

The table gives the amount of F100 (full strength) that should be offered to the patients in Transition Phase. They should normally be taking 6 feeds during the day and none at night. The table below gives the amount of RUTF to give per feed if some of the feeds are being given as F100 and others as RUTF.

A common variation is to give 5 or 6 feeds of F100 during the day and then 3 or 2 feeds of RUTF during the night – this gives 8 feeds in total during the day. The volume of F100 is then read off
from the previous table and the grams of RUTF from the next table, both using the 8 meals per day column and the appropriate class of weight.

Criteria to move back from transition phase to phase I

- Increasing edema.
- If a child who did not have edema develops edema.
- Rapid increase in the size of the liver.
- Any other sign of fluid overload.
- Tense abdominal distension.
- Significant refeeding diarrhea with weight loss.
- Develops medical complications.
- If NG – tube is needed.
- If patient takes <75% of the feeds in transition phase even after interchange between RUTF and F100.

**Phase II**

Progress to phase II from transition phase when:

- Good appetite (at least 90% of the RUTF or F100 prescribed in transition phase.
- No or minimal edema (+).

**Table XII: Phase 2 amounts of F100 and RUTF to give at each feed for 5 or 6 feeds per day**

<table>
<thead>
<tr>
<th>Class of weight (Kg)</th>
<th>6 feeds/ day</th>
<th>5 feeds/ day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F100</td>
<td>RUTF</td>
</tr>
<tr>
<td></td>
<td>ml/feed</td>
<td>g/feed</td>
</tr>
<tr>
<td>&lt; 3kg</td>
<td>Full strength F100 and RUTF are not given below 3 kg</td>
<td></td>
</tr>
<tr>
<td>3.0 to 3.4</td>
<td>110</td>
<td>20</td>
</tr>
<tr>
<td>3.5 - 3.9</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>4.0 - 4.9</td>
<td>150</td>
<td>28</td>
</tr>
<tr>
<td>5.0 - 5.9</td>
<td>180</td>
<td>35</td>
</tr>
<tr>
<td>6.0 - 6.9</td>
<td>210</td>
<td>40</td>
</tr>
<tr>
<td>7 - 7.9</td>
<td>240</td>
<td>45</td>
</tr>
<tr>
<td>8 - 8.9</td>
<td>270</td>
<td>50</td>
</tr>
<tr>
<td>9 - 9.9</td>
<td>300</td>
<td>55</td>
</tr>
<tr>
<td>10.0 - 11.9</td>
<td>350</td>
<td>65</td>
</tr>
<tr>
<td>12.0 - 14.9</td>
<td>450</td>
<td>80</td>
</tr>
<tr>
<td>15.0 - 19.9</td>
<td>550</td>
<td>100</td>
</tr>
<tr>
<td>20.0 - 24.9</td>
<td>650</td>
<td>120</td>
</tr>
<tr>
<td>25.0 - 29.9</td>
<td>650</td>
<td>140</td>
</tr>
<tr>
<td>30.0 - 39.9</td>
<td>850</td>
<td>160</td>
</tr>
<tr>
<td>40 - 60</td>
<td>1000</td>
<td>180</td>
</tr>
</tbody>
</table>
### Table XIII: Phase 2 (out-patients): amounts of RUTF to give

<table>
<thead>
<tr>
<th>Class of weight (Kg)</th>
<th>RUTF Paste</th>
<th>PLUMPYNUT®</th>
<th>BP100®</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grams per day</td>
<td>Grams per week</td>
<td>Sachet per Day</td>
</tr>
<tr>
<td>3.0 – 3.4</td>
<td>105</td>
<td>750</td>
<td>1/4</td>
</tr>
<tr>
<td>3.5 – 4.9</td>
<td>130</td>
<td>900</td>
<td>1/4</td>
</tr>
<tr>
<td>5.0 – 6.9</td>
<td>200</td>
<td>1400</td>
<td>2</td>
</tr>
<tr>
<td>7.0 – 9.9</td>
<td>260</td>
<td>1800</td>
<td>3</td>
</tr>
<tr>
<td>10.0 – 14.9</td>
<td>400</td>
<td>2800</td>
<td>4</td>
</tr>
<tr>
<td>15.0 – 19.9</td>
<td>450</td>
<td>3200</td>
<td>5</td>
</tr>
<tr>
<td>20.0 – 29.9</td>
<td>500</td>
<td>3500</td>
<td>6</td>
</tr>
<tr>
<td>30 – 39.9</td>
<td>650</td>
<td>4500</td>
<td>7</td>
</tr>
<tr>
<td>40 – 60</td>
<td>700</td>
<td>5000</td>
<td>8</td>
</tr>
</tbody>
</table>

### MEASLES

- Caused by measles virus.
- Highly contagious and occurs as epidemics.
- Lifelong immunity through effective vaccine or by the natural disease.
- Transmission by respiratory droplets, 4 days before the appearance of the rash up to 4 days after.
- Incubation period is about 2 weeks.
- Generalized maculopapular rash which starts from the hair line and descends down the trunk fading in few days with its order of appearance plus fever, Conjunctivitis, coryza are the essentials of diagnosis.
- Koplik spots (small white spots on the buccal mucosa, when found are pathognomonic.
- Complications include: Otitis media, pneumonia, diarrhea, mouth ulcers, eye complications and rarely, encephalitis.

**Diagnosis:** Clinical

**Treatment**

1) Symptomatic:
   - Treat fever with paracetamol.
   - Bed rest.
   - Increase fluid intake.
   - Isolation of the child from school for 10 days.
2) **Vitamin A**, 50,000 IU, for children less than 6 months; 100,000 IU for 6-12 months; 200,000 IU for greater than 12 months, single dose.

(For S/Es, C/Is and dosage forms, see page 153).

3) **Treatment of complications:**
   - Treat eye infection with tetracycline eye ointment,
   - Treat mouth ulcers with gentian violet.
   - Give antibiotics for pneumonia, Otitis media as appropriate.

4) **Post exposure prophylaxis:**
   - A single intramuscular dose of human immunoglobulin may be given not later than 5 days following exposure.
   - Immunocompromised children should be given the immune globulin despite their vaccination status.
   - Live virus vaccines can be given 3 weeks before or 3 months after the injection of the human immune globulin.

5) **Active immunization:**
   - All children above the age of 9 months who did not have the natural disease should be given the vaccine.
   - In case of epidemics, the vaccine can be given to children above the age of 6 months but this should not be counted and they should be given another dose at the proper schedule.

**MENINGITIS**

1. **Neonatal**

Meningitis in the neonatal period may be caused by bacteria, viruses, fungi or protozoa. Meningitis may be associated with sepsis or present itself as a focal infection. The most common bacterial causes of neonatal meningitis are GBS, *E. coli* and Listeria. The initial signs and symptoms may be indistinguishable from those of other infectious and non-infectious diseases of the newborn. These include lethargy, seizure, full fontanel and rarely nuchal rigidity.
**Diagnosis:** is confirmed by examination of cerebrospinal fluid.

**Treatment**

**Drug Treatment**

*First Line*

- **Ampicillin**, 200mg/kg/day, IV every 6 hours for 14-21 days.
  
  (For S/Es and dosage forms, see page 18)

*PLUS*

- **Gentamicin**, 5 mg/kg/day, IM every 8 hours for 14-21 days
  
  (For S/Es and dosage forms, see page 39)

*Alternative*

If there is no response to the first line antibiotics within 48-72 of initiation of antibiotics, or if the infant has hospital acquired infection, or if the mother had culture proven gram-negative infection,

- **Ceftriaxone**, 100mg/kg/24hr, IV in two divided doses (max. 4g/24hr).
  
  (For S/Es, C/Is S/Es, C/Is S/Es, C/Is and dosage forms, see page 17)

*PLUS*

- **Gentamicin**, 5 mg/kg/day, IM every 8 hours for 14-21 days
  
  (For S/Es, C/Is and dosage forms, see page 39)

**2. Pyogenic**

This is an acute and one of the most potentially serous infections in infants and children that affects central nervous system. The signs and symptoms of meningitis are variable and depend on the age of the patient. In infants whose cranial sutures are still open, fever, vomiting, irritability, lethargy, convulsion and bulging of the anterior fontanelle may be present. During the first two years of life in particular the findings are oftensubtle or nonspecific. In older children focal neurologic signs, such as a sixth nerve palsy, may be more prominent, and signs of meninigial irritation, such as nuchal rigidity, kernig sign or Brudziniskisign are usually present. Examination of cerebrospinal fluid is mandatory if there is clinical suspicion of meningitis. Increased number of white cell count, Low level of CSF glucose and elevated protein level are the usual findings. Gram, stain and Culture will reveal the microorganisim which is responsible. The usual ethioloic agents in causing meningitis
in children are: *H. influenzae*, *N. meningitidis* and *S. pneumoniae*. Occassionally meningitis may be a complication of otitis media.

**Diagnosis** of meningitis is based on clinical manifestation and cerebrospinal fluid examination.

**Treatment**

**Drug Treatment**

*First line*

Chloramphenicol, 50mg/kg IV single dose followed by 100 mg/kg/24 hours divided in to four doses (Q 6 hourly)

(For S/Es, C/Is and dosage forms, see page 23)

PLUS

Crystaline penicillin, 50,000IU/kg IV single dose followed by 250,000IU/kg/24 hours IV divided in 8 doses (Q3hourly)

(For S/Es, C/Is and dosage forms, see page 57)

N.B. Duration of treatment depends on the etiology but in general course of treatment ranges between 10-15 days.

*Alternative*

Chloramphenicol (for Haemophilus influenza B), 100mg/kg/day IV QID for 10 days

(For S/Es, C/Is and dosage forms, see page 23)

Penicillin G (for Pneumococcus), 250,000IU /kg/day IV Q4 hourly for 10 days

(For S/Es, C/Is and dosage forms, see for crystalline penicillin page 38)

Penicillin G (for Meningococcus), 250,000IU /kg/day IV Q4 hourly for 7 days

(For S/Es, C/Is and dosage forms, see for crystalline penicillin)

OR

Ceftriaxone, 100mg/kg IV , IM once daily for 10 days for all cases

(S/Es, C/Is and dosage forms, see page 17)

Adjunct to treatment with antibiotics

Dexamethasone, 0.6mg/kg/day divided QID for four days

(For S/Es and C/Is, see under prednisolone 91, 319)
Dosage forms: Tablet 0.5 mg, 1mg, 2mg; Injection 4mg/ml, 25mg/ml, 50mg/ml

ORAL TRUSH

Punctate or diffuse erythema and white-blings pseudomembranous plaques on the oral mucosa. The lesions may become confluent plagues involving extensive regions of the mucosa. Plages can be removed with difficulty to reveal a granular base that bleeds easily. After the neonatal period, the presence of oral thrush without antibiotic treatment or lasting over 30 days despite treatment or recurring is highly suggestive HIV infection.

Diagnosis: Clinical

Treatment

Drug treatment

First line

Nystatin (100 000) units/ml suspension. Give 1-2 ml into the mouth 4 times a day for 7 days. (S/Es, C/Is and dosage forms, see page 203)

Alternatives

Miconazole, applied thin films of 2% cream BID for four days or until lesion disappears

(For S/Es, C/Is and dosage forms, see page 202)

OR

Ketoconazole, applied thin films of 2% cream BID until lesion disappears.

(For S/Es and C/Is, see under miconazole)

Dosage form: Cream, 2%; ointment, 2%

OR

Gential violet, paint the mouth with half strength twice daily

(For S/Es and C/Is, see page 202)

Dosage forms: Solution, 0.5%, 1%
**OSTEOMYELITIS**

- Infections of bones and joints in children are important because of their potential to cause permanent disability.
- Skeletal infections are more common in infants and toddlers than in older children.
- The risk of permanent disability is increased if the growth plate of bone or the synovium is damaged.
- Bacteria are the most common pathogens in acute skeletal infections with S. aureus being the most common cause in all age groups including newborns.
- Earliest signs and symptoms may be subtle.
- Neonates may exhibit pseudoparalysis or pain with movement of the affected extremity while older infants and children may have fever, pain and localizing signs such as edema, erythema and warmth.

**Diagnosis**

- Diagnosis of osteomyelitis is generally clinical
- Definitive diagnosis is by aspirations of the infected site for gram stain and culture
- X-ray changes may not be seen for the first 7 – 14 days but then periostal elevation and lytic changes may suggest the diagnosis.

**Treatment**

**Drug treatment**

- **Cloxacillin**, 50-100mg/kg/day divided every six hours for 3-6 weeks
  (For **S/Es**, **C/Is** and **dosage forms**, see page 39 - 40)

**PERTUSIS (WHOOPING COUGH)**

Pertusis or whooping cough is a highly contagious clinical syndrome caused by a variety of agents including *Bordetella pertussis*, other Bordetella species and adenovirus. History of similar illness in the vicinity is an important evidence for diagnosis. A course of Pertussis can be divided in to catarrhal, paroxysmal and
convalescent stages. The catarrhal stage is marked by nonspecific upper respiratory tract symptoms including runny nose and low grade fever. The characteristic paroxysmal stage follows during which repetitive coughs are followed by an inspiratory whoop. These episodes may be associated with cyanosis and vomiting. Marked lymphocytosis is common. The convalescent stage begins after 4-6 weeks. Appropriate and timely immunization is protective.

**Diagnosis**: Clinical

**Treatment**

**Non-drug treatment:**
- Nutritional support

**Drug Treatment**

*First line*
- **Erythromycin**, 12.5mg/kg P.O. QID for ten days.
  (S/Es, C/Is and dosage forms, see page 214)

*Alternatives*
- **Clarithromycin**, 15 – 20mg/kg/24hr, P.O. divided in to two doses for 7 days
  (For S/Es, C/Is and dosage forms, see page 133).
- **Azithromycin**, 10mg/kg/24hr, P.O. for 5 days.
  (S/Es, C/Is and dosage forms, see page 272).

**PNEUMOCYSTES CARINI PNEUMONIA (PCP)**

A presumptive diagnosis of pneumocystis pneumonia can be made in a child who has severe or very severe pneumonia and bilateral interstitial infiltrate on chest x-ray. Consider the possibility of pneumocystis pneumonia in children, known or suspected to have HIV, whose ordinary pneumonia does not respond to treatment. Pneumocystis pneumonia occurs most frequently in infants (especially those <6 months of age) and is often associated with hypoxia. Fast breathing is the most common presenting sign.
**Diagnosis**

Clinical and suggestive CXR picture

**Treatment**

**Drug treatment**

*First line*

- **Cotrimoxazole**, trimethoprim 5mg/kg/day, sulfamethoxazole 25 mg/kg/day, 4 times a day for 3 weeks.

  *(For S/Es, C/Is and dosage forms, see page 153)*

*Alternative*

- **Pentamidine** (4mg/kg once per day) by IV infusion for 3 weeks.

  - S/Es: renal impairment, pancreatitis, leucopenia, hypoglycemia
  - C/Is: diabetes, renal damage

  **Dosage forms**: Nebulizer solution, 300 mg/vial; powder for injection, 200 mg/vial. Children who react adversely to trimethoprim-sulfamethoxazole are usually aged under 1 year and often become hypoxic, and require oxygen therapy for several days. Their response to treatment is poor and the case-fatality rate is high. Recovery from hypoxia can be prolonged.

**Prophylaxis**

- **Trimethoprim**, 150mg/ml /24 hours and Sulfamethoxazole 750mg/m2 /24 hours orally divided Q12 hours OR Q24 hours 3 days /week on consecutive days. OR Q12 hours 7 days a week OR Q132 hours on alternative days 3days /week

  *(For S/Es, C/Is and Dosage forms, see page 16)*

  - **N.B.** Children who have had PCP should receive life long prophylaxis

**PNEUMONIA IN CHILDREN**

Pneumonia defined as inflammation of lung parenchyma, is caused virtually by every class of microorganisms and a specific etiologic diagnosis is often difficult in children. Viruses and mycoplasma pneumoniae are the primary agents causing pneumonia followed by bacteria. WHO recommends diagnosis of pneumonia when children under five have acute on-set cough with tachypnea. A child presenting with cough or difficult breathing may be classified as follows:
**Severe Pneumonia** is diagnosed when there is cough or difficult breathing plus at least either of the following signs: lower chest in drawing, nasal flaring, or grunting in young infants. Fast breathing or abnormal breath sounds may also be present.

**Pneumonia** is diagnosed when a coughing child also develops fast breathing but no signs for severe pneumonia.

**No pneumonia cough or cold;** if no sign for pneumonia or severe pneumonia.

**Diagnosis** is clinical and chest X ray. The decision to treat a child who has pneumonia is usually made clinically. Antibiotic therapy is directed at the most likely pathogens as suggested by the child's age, clinical presentation (including severity of illness).

**Treatment**

1. **No pneumonia cough or cold**

   *Soothe the throat; relieve the cough with a safe remedy*

   **Non drug treatment**

   Safe remedies to recommend:
   - Breast milk for exclusively breast-fed infants
   - Home fluids such as tea with honey, fruit juices
   - Harmful remedies to discourage: cough syrups containing diphenhydramine and or codeine

   **Drug Treatment**

   *First line*

   - **Paracetamol**, 10-15 mg /kg up to 4 times a day for the relief of high fever equal to or above 39 °C.
   - *(For S/Es, C/Is and dosage forms, see page 53)*

   *Alternative*

   - **Ibuprofen**, 5 – 10mg/kg/dose every 6 – 8hr P.O. (max. 40mg/kg/24hr).
   - *(For S/Es, C/Is and dosage forms, see page 124)*
2. **Pneumonia**  
   **Drug treatment**  
   *First line*  
   **Trimethoprim/Sulphamethaxozole**, 4-mg/kg+20mg/kg BID for five days.  
   *(For **S/Es, C/Is and dosage forms** : see page 16)*  
   **Alternative**  
   **Amoxicillin**, 15 mg/kg P.O. TID. *(For **S/Es and C/Is**, see page 18)*  
   **Dosage forms:** Capsule, 250mg, 500mg; Injection, 250mg, 500mg in vial;  
   Syrup, 250mg/5ml, 125mg/5ml.

3. **Severe Pneumonia**  
   **Drug treatment**  
   **Benzyl penicillin**, 50,000units/kg/24hrs IM OR IV QID for at least 3 days.  
   *(For **S/Es, C/Is and Dosage forms, see** page 38)*.  
   N.B. When the child improves switch to oral **Amoxicillin:** 15-mg/kg 3 times a day.  
   The total course of treatment is 5 days.  
   *(For **S/Es, C/Is and Dosage forms, see** page 18)*.  
   If the child doesn’t improve within 48 hours, switch to **Chloramphenicol**, 25 mg/kg TID IM/IV until the child has improved and continue orally for the total course of 10 days *(For **S/Es, C/Is and dosage forms, see** page 23)*.  

**Rickets**

Rickets is a disease caused by deficiency of vitamin D. It is a condition in which there is failure to mineralize growing bone or osteoid tissue. The early changes of rickets are seen radiographically at the ends of long bones, but evidence of demineralization in the shafts is also present. If rickets is not treated at this stage, clinical manifestations appear. Rickets can result from either inadequate intake of vitamin D caused by inadequate direct exposure to sunlight, the rays of which do not pass through ordinary window glass or inadequate vitamin D intake, or both. Rickets usually appears toward the end of the first and during the second year of life.
Diagnosis

Clinical Manifestations of Rickets include:

- Craniotabes: one of the earliest clinical sign of rickets caused by thinning of the outer table of the skull (ping-pong ball sensation when pressing firmly over the occiput or posterior parietal bones).
- Box like appearance of the head (caput quadratum)
- Delayed teeth eruption
- Palpable enlargement of the costochondral junctions (rachitic rosaries)
- Thickening of the wrists (wrist widening)
- Thickening of the ankles (double malleoli)
- Pigeon breast deformity (projecting forward of the sternum)
- A horizontal depression along the lower boarder of the chest (Harrison groove)
- Bowing of the legs (genu varum deformity) or knock-knees (genu valgum deformity), are relatively late signs occurring after the child starts to bear weight.
- Deformed pelvis and retardation of linear growth
- Greenstick fractures (late signs)

X-ray diagnosis

Most important features

- Decreased bone density
- Cupping and fraying at the ends of the long bones (best appreciated at the distal end of the radius and ulna).
- Widened joint space (best appreciated at the wrist joint)

Laboratory Diagnosis

- Normal or low serum calcium
- Low serum phosphate
• High serum alkaline phosphatase, and
• High parathormone (where determination is possible)

Prevention

• Regular exposure to direct sun light of infants and young children
• Oral administration of vitamin D especially to those breast fed infants whose mothers are not exposed to adequate sun light (supplemental dose of 400 IU Vitamin D daily, orally).

Treatment

Non-drug treatment

• Regular exposure to direct sun light

Drug treatment

• Mega dose of Vitamin D (600,000 IU intramuscularly as a single dose)

SEIZURES (Neonatal)

Seizures can be the most dramatic indication of neurologic abnormality in the newborn, yet most neonatal seizures are subtle or even silent. There are five types of neonatal seizures: subtle seizures (presenting with apnea, staring, lip smacking, chewing or eye blinking); focal clonic; multifocal clonic; tonic, and myoclonic seizures. The causes of neonatal seizures include metabolic, toxic, structural and infectious diseases.

Diagnosis: Clinical

Drug Treatment

First line

Phenobarbital, I.M/I.V/P.O. 4-6 mg kg/day loading dose, followed by 5 mg/kg in two divided doses. (For S/Es, C/Is and dosage forms, see page 308)
**Phenytoin**  I.M./I.V./P.O. 4-6 mg kg/day loading dose, followed by 5 mg/kg in twodivided doses. (For **S/Es, C/Is** and **dosage forms**, see page 107)

If seizures are associated with,

1. **Hypocalcaemia** *(Hypocalcaemic tetany)*
   
   **Calcium gluconate solution**, 10% 1-2 ml/kg/; repeat PRN after 6 hours.
   
   **S/Es:** bradycardia, cardiac arrest, extra vascular leakage may cause local necrosis.
   
   **Dosage forms:** Syrup 4gm/15ml; injection, 10% solution, 10 ml.

2. **Hypoglycemia**
   
   **Glucose 10%**, (For **Dosage schedule**, see under **Hypoglycemia**.)

3. **Vitamin B 6 deficiency**
   
   **Vitamin B 6 (pyridoxine)**, 50mg IM as single dose.
   
   **Dosage form:** Injection, 50mg/ml in 2ml.

**SEPSIS (Neonatal)**

Neonatal sepsis is defined as bacterimia with systemic manifestation in the absence of other primary systemic problems during the first 28 days of life. Diagnosis is clinical and blood culture. Neonatal sepsis can be divided in to two subtypes:

**Early onset sepsis:** occurs with in the first 72 hours of life. It is caused by organisms prevalent in the genital tract of the mother or in the labour room, which includes mainly group B streptococci and *E. coli*. Majority of the neonates with early onset sepsis clinically manifest with respiratory distress due to intrauterine pneumonia. Early onset sepsis has usually fulminant course and high mortality.

**Late onset sepsis:** the onset is delayed for a minimum of four days in most cases symptoms appear by the end of first week of life. About 2/3 cases of late onset
septicemia are caused by gram negative bacilli while the rest are contributed by gram positive organisms. Meningitis is more frequent.

**Diagnosis**: Clinical and laboratory.

**Treatment**

**Non-Drug treatment**
Supportive care which includes maintenance of normal body temperature including Kangaroo care, adequate calorie and fluid supply, and Correction of associated metabolic abnormalities.

**Drug treatment**
Till the culture report is collected start with broad-spectrum antibiotics, which includes penicillin and Amino glycoside.

*First line*

- **Ampicillin**, 100 mg /kg/day every 6-8 hours i.m. for 10 days. (For S/Es and dosage forms, see page 18)

*PLUS*

- **Gentamicin**, 5 mg/kg /day IM TID for 10 days
  (For S/Es and Dosage forms, see page 39)

*Alternative*

- **Penicillin G Sodium Crystalline**, 50,000IU/kg QID for ten days.
  (For S/Es and dosage forms, see page 57)

*PLUS*

- **Gentamicin**, 5 mg/kg /day IM TID for 10 days.
  (For S/Es, C/ls and dosage forms, see page 39)

**SEPTIC ARTHRITIS**

Septic or pyogenic arthritis is an inflammation of the joint caused by pyogenic microorganisms. It can result from hematogenous dissemination of bacteria, contiguous spread of an osteomyelitis or direct inoculation of microorganisms in to the joint cavity as a result of penetration trauma. *Haemophilus influenza* and *Staphylococcus aureus* are the most common agents causing septic arthritis.
Clinical manifestation: the most common feature of septic arthritis is acute inflammation localized to the region of the joint. This may produce pain, tenderness, swelling, erythema and decreased range of motion.

**Diagnosis:** is both clinical and laboratory investigation.

**Treatment**

**Non drug treatment**
- Irrigation and drainage of the joint
- Immobilization of the joint in a functional position

**Drug treatment**

*First line*

- **Cloxacillin** 50-100mg/kg/day divided every six hours for 4-6 weeks
  (For S/Es, C/Is and Dosage forms, see page 39 - 40)

*Alternatives*

- **Nafcillin**, 150 – 200mg/kg/24hr, divided in 6 – hrly doses
  Dosage forms: Tablet, 500mg; capsule, 250mg, powder for injection, 250mg/5ml
  (For S/Es, C/Is see under penicillin)

OR

- **Cefazolin**, 100 – 150mg/kg/24hr, divided in 8 – hrly doses.
  Dosage forms: Powder for injection, 0.25, 0.5, 1g/vial
  (For S/Es, C/Is, see under ceftriaxone)

**TETANUS (Neonatal)**

Neonatal tetanus is caused by the neurotoxin tetano-sapsmin produced by Clostridium tetani, which infects the umbilical stump. The incubation period is 5 to 14 days. Affected infants develop difficulty in sucking and swallowing, “lockjaw”, generalized hyper tonicity spasms and opisthotonus. Once signs develop the disease progresses to a fatal outcome in 60-70% of cases. Neonatal disease may occur if maternal immunity is lacking and infection is introduced at the time of delivery.

**Diagnosis:** is mainly clinical.

**Prevention:** The administration of the toxoid vaccine to all mothers prior to pregnancy and proper newborn umbilical hygiene can effectively prevent this disease.
Drug Treatment

Tetanus immune globulin (TIG), 500 – 3000 IU IM should be given.
Dosage forms: injection, 3000 IU

PLUS

Penicillin G Sodium Crystalline, 50,000IU/kg/24hrs QID for ten days
(For S/Es, C/Is and dosage forms, see page 57)

PLUS

Chlorpromazine, 1.6 mg/kg/24 hours divided into 4 doses IV/IM.
(For S/Es, C/Is and dosage forms, see page 59)

TINEA CAPITIS

• Is a dermatophyte infection of the scalp most often caused by Trychophyton tonsurans, and occasionally microsporum canis, and less commonly by other microsporum and trychophyton spp.
• Commonly affects children between the age of 4 – 14 years.
• Trichophyton infects the hair shaft (endothrix).

Diagnosis is clinical as well as KOH preparation from scraps or definitive diagnosis by fungal culture.

Treatment

Drug treatment

First line

Griseofulvin, 15 – 20mg/kg/24hrs P.O. for 8 – 12 weeks is effective.
S/Es: nausea, vomiting, headache, blood dyscrasia, photosensitivity and hepatotoxicity.
C/Is: Porphyria, hepatic failure, hypersensitive to it
Dosage forms: Tablet, 125mg, 250mg, 500mg; Suspension, 125mg/5ml

Alternative

Itraconazole, 3 – 5mg/kg/24hrs P.O. with food for 4 – 6 weeks can be given.
100mg alternate days for children weighing 10 – 20kg; 100mg daily for children weighing 20 – 30kg; 100mg alternating with 200mg for 30 – 50kg; and 200mg daily for children weighing >50kg.
S/Es: Rare
C/Is: together with astemisole or terfenadrine
**Dosage forms:** Capsule, 100mg, 200mg; Oral solution, 10mg/ml

**TUBERCULOSIS (TB) IN CHILDREN**

Tuberculosis is a chronic infectious disease caused in most cases by Mycobacterium tuberculosis. Occasionally it can be caused by Mycobacterium bovis or Mycobacterium africanum.

**Diagnosis:** of TB in children is difficult because of the presence of a wide range of non-specific symptoms. It is important to make a clear distinction between infection and disease: in infection, only the Mantoux test may be positive (>10mm), but the child is healthy and does not have any signs and does not, therefore, need anti TB treatment. If there is TB-disease there are clear signs and symptoms.

Symptoms and signs may be confusing in children co-infected with HIV. Diagnosis rests largely on the results of clinical history, a history of TB contact in the family, clinical examination, x-ray examination and tuberculin testing.

In most cases, sputum cannot be obtained and if obtained may be negative because the bacterial load is generally low. Attempts should always be made, however, to obtain a sputum sample for direct smear microscopy. Early morning gastric aspirates may yield AFBs and can be carried out if spontaneous sputum cannot be obtained.

Children should be strongly suspected of having TB when they are contacts of a known adult case of pulmonary TB and have clinical signs and symptoms (recent weight loss or failure to gain weight and/or cough or wheezing > 2 weeks).

In the absence of confirmation, the diagnosis of active TB can be made and treatment commenced when any one of the following conditions is met:

- Radiological picture of miliary pattern.
- Pathologic findings compatible with TB from a biopsy or surgically removed lesion.
Doubtful cases who are suspected of having TB but who do not meet the criteria for the diagnosis should be seen after 6-8 weeks for re-evaluation.

Table XIV: Criteria for the diagnosis of tuberculosis in children

<table>
<thead>
<tr>
<th>Suspected tuberculosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ill child with a history of contact with a confirmed case of pulmonary tuberculosis</td>
</tr>
</tbody>
</table>

Any child:
- Not regaining normal health after measles or whooping cough
- With loss of weight, cough and wheeze not responding to antibiotic therapy for respiratory disease
- With painless swelling of superficial lymph nodes

<table>
<thead>
<tr>
<th>Probable tuberculosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A suspect case and any of the following:</td>
</tr>
</tbody>
</table>
- Positive (10 mm in diameter) induration on tuberculin testing (see appendix V)
- Suggestive appearance on chest radiograph (e.g. unilateral hilar/mediastinal lymphnode enlargement with or without lobar or segmental opacity, miliary pattern, pleural effusion, infiltrates and cavitations)
- Suggestive histological appearance of biopsy material

<table>
<thead>
<tr>
<th>Confirmed tuberculosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Detection by microscopy or culture of tubercle bacilli from secretions or tissues</td>
</tr>
<tr>
<td>• Identification of tubercle bacilli as Mycobacterium, tuberculosis by culture</td>
</tr>
</tbody>
</table>
Treatment

Short course chemotherapy as Category III

The treatment regimen for this category is 2(RHZ)/6EH

This regimen consists of 8 weeks treatment with Rifampicin, Isoniazid and Pyrazinamide during the intensive phase followed by six months ethambutol and Isoniazid

(For S/Es, C/Is and Dosage forms of the anti TB drugs, see page 31)
CHAPTER IV
DERMATOLOGICAL DISORDERS

Acne vulgaris
   Actinic keratosis
Bacterial folliculitis
Candidiasis
   Balanoposthitis
   Candidal intertrigo
   Candidal paronychia
   Genital candidiasis
   Oral candidiasis
Carbuncle
Cellulites
Cutaneous leishmaniasis
Dermatophytes
Eczema
   Atopic Dermatitis
   Contact dermatitis
      Allergic contact dermatitis
      Irritant Contact Dermatitis
      Lichen simplex chronicus
Erysipelas
Furunclosis
Herpes simplex
Herpes zoster
Impetigo
Molluscum contagiosum
Pediculosis corporis and capitis
Pityriasis versicolor
Psoriasis
Rosacea
Scabies
Urticaria
   Papular urticaria
Verruca vulgaris
ACNE VULGARIS

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous follicles, characterized by comedones, papules, pustules, nodules, and often scars. Acne typically begins at puberty. The disease is characterized by a great variety of clinical manifestations, non inflammatory or inflammatory. The non inflammatory lesions are comedones (black, or white heads). The inflammatory lesions can be small papules, pustules, nodules, cysts and even scars. They are mostly confined to the face, upper arm, chest and back although other parts of the body can also be the site of the disease.

Diagnosis: Clinical

Treatment

Non drug treatment

- Cleansing the face with oil-free cleansers twice daily
- Avoid oil containing moisturizers and vaseline. Use oil free moisturizers and alcohol containing toners instead.

Drug Treatment

1. Mild Acne:

First line

Clindamycin, 1% gel or lotion;

Alternatives

Erythromycin 2-4% gel, lotion or cream,
(For S/Es and dosage forms, see pages 214)

OR

Azelaic Acid 20% applied twice daily.

S/Es Skin irritation

Dosage form: Cream, 20%

OR

Retinoids (Tretinoin) – start with 0.025% cream or 0.01% gel and gradually increase the concentration to 0.05% cream or 0.025% gel, then to 0.1% cream, then to 0.05% lotion. Start with every other day regimen and make twice daily based on tolerance of the skin for
irritating effect of retinoids. Improvement is seen after 2 – 5 months.
(For S/Es and dosage forms, see page 218)

2. Moderate Acne
   First line
   Doxycycline, 100mg twice QD
   (For S/Es, C/Is and dosage forms, see page 21)

   Alternatives
   Tetracycline 250 - 500mg two to four times daily for a minimum of six months. (For S/Es, C/Is and dosage forms, see page 19)
   OR
   Erythromycin, 500mg four times daily
   OR
   Cotrimoxazole, 2 double strength tablets twice daily is an alternative oral regimen in selected patients (For S/Es, C/Is and dosage forms, see pages 214, 315 and 153, respectively)

3. Severe Acne
   First line
   Isotretinoin, 0.5 - 2mg per kilogram of body weight in two divided doses with food for 15 to 20 weeks.
   NB Contraception should be secured in females for treatment time and for 4 months after treatment and serum lipid monitoring in all patients is mandatory.
   Dosage form: Capsule, 10mg, 20mg

   Alternatives
   Spironolactone, 50–100 mg daily for up to six months
   OR
   Combined Oral Contraceptive Pills for women for up to six months.
   (For S/Es, C/Is and dosage forms, see page 354)
**OR**

**Prednisolone** 30 - 50 mg/d p.o. short course (for 2 – 3 weeks) and combined with other treatments is good for severely inflamed acne. Intraliesional Triamcinolone acetonide 40mg per ml diluted with equal amount of normal saline or local anesthesia repeated every two weeks is effective for few nodules or hypertrophied acne scars. Steroid therapy would better managed by dermatologists.

(For S/E, C/I and dosage forms, see page 91)

**BACTERIAL FOLLICULITIS**

Bacterial folliculitis (follicular pustules) is infection usually caused by *Staphylococcus aureus*. Predisposing factors may be local or systemic impairment of the immune system, increased or changed bacterial flora of the follicles, systemic diseases e.g. diabetes mellitus, prolonged contact or treatment with fatty oils. It can progress to furuncles.

**Diagnosis:** Clinical

**Treatment**

Before treatment is started, evaluate the patient for systemic or local causes, underlying diseases or occupational exposure to oil and others.

- Evacuate the pustules with sterile needle and apply a disinfecting solution e.g. 0.5% gentian violate paint.
- Frequent washing with detergents e.g. soap and water can reduce the bacterial flora.
- Severe cases require topical antibiotics like tetracycline, bacitracin, or fusidic acid applied twice daily to the affected area until the lesion heals completely.
CANDIDIASIS (Candidiasis, Moniliasis, Thrush)
Candidiasis is an infection caused by yeast like fungus *Candida albicans*. The yeast like fungus may cause different types of lesions on the skin, nail, mucous membrane and viscera. The areas where warmth, and maceration of the skin permit the organism to thrive are frequently affected. These are the perianal and inguinal folds, the interdigital areas and the axillae. It may be a normal inhabitant at various sites until there is some change in the state of the area, and then it becomes pathogen. Abnormal moisture also promotes its growth, as in moist lip corner (perleche).

**Diagnosis**

Clinical
Laboratory: Microscopic examination after KOH preparation

1. **Balanoposthitis**
The glans penis is red tender and covered with superficial vesicles and erosion. A mild, urethral discharge, and phimosis may develop.

**Diagnosis:** Clinical

**Treatment**

*First line*

- **Clotrimazole**, thin film of 1% cream applied to the lesion bid for about 2-3 weeks (For S/Es and dosage forms, see page 109)

*Alternative*

- **Miconazole**, thin film of 2% cream applied to the lesion bid for about 2-3 weeks. (For S/Es and dosage forms, see page 202)

2. **Candidal Intertrigo**
Usually involves the great folds of the body (groin, inframammary, axillae, perianal areas). It also affects the area between the fingers and toes. The affected folds show a red, oozing band with a whitish macerated centre and a scaly border. At the periphery, there are isolated, flaccid, satellite, vesiculo-pustules which, when they break, show collar of scales.
Diagnosis: Clinical

Treatment

Non-drug treatment

Avoidance of chronic exposure to moisture is an important prophylactic measure.

Drug-treatment

In those suffering from diabetes mellitus, treatment consists of bringing the diabetes under control. (See under diabetes mellitus page 100)

- Topical application of Clotrimazole, Miconazole, Nystatin cream, 2% Gentian violet (For dosage schedules, S/Es, C/Is and dosage forms, see pages 109, 202, 202 and 203, respectively)

3. Candidal paronychia

Chronic inflammation of the nail fold. This type of infection is usually caused by C. albicans but frequently is of bacterial causation. It is often seen individuals whose hands are constantly wet as a result of their occupation and in elderly diabetics. Chronic paronychia causes redness, swelling, and pain of the tissue around the nail. Pressure on this region may elicit a malodorous pus. The nail may eventually be involved from the proximal end forward, it becomes rigid, ridged, and discoloured, but there is no debris beneath it.

Diagnosis: Clinical

Treatment

Avoidance of chronic exposure to moisture is an important prophylactic measure.

Drug treatment

- In those suffering form diabetes mellitus, treatment consists of bringing the diabetes under control. (For dosage schedule, S/Es, C/Is and dosage forms of antidiabetic drugs), see under diabetes mellitus

- Topical application of Clotrimazole, Miconazole, Nystatin cream, 2% Gentian violet (For dosage schedules, S/Es, C/Is and dosage forms, see pages 109, 202, 203 and 203, respectively)
4. **Genital Candidiasis (Vulvovaginitis)**

*C. albicans* is a common inhabitant of the vaginal tract, and in some cases, it may cause severe pruritus, irritation, and burning. The vaginal discharge is usually scanty and watery, but may be erythematous, moist, and macerated. The cervix is hyperaemic, swollen and eroded showing small vesicles on its surface. This type of infection may develop during pregnancy, in diabetes or as secondary to therapy with broad spectrum antibiotics.

**Diagnosis:** Clinical

**Treatment**

*First line*

- **Nystatin**, 100,000 IU inserted into the vagina at night for 14 days
- **S/Es:** rare
- **Dosage forms:** pessary (vaginal), 100,000 IU

*Alternatives*

- Clotrimazole, 100 mg tablet inserted into the vagina at night for 6 days
- **S/Es:** burning, itching
- **Dosage forms:** Cream (vaginal), 1%; tablet (vaginal), 100mg, 500mg

*OR*

- **Miconazole**, thin film of 2% cream applied nightly for 7 days or inser 200 mg tablet into vagina every night for 3 days.
- **S/Es:** burning, itching
- **Dosage forms:** Cream (vaginal), 2%; tablet (vaginal), 200mg, 400mg

5. **Oral candidiasis (thrush)**

This is an infection of the buccal mucosa commonly seen in infants. It is characterized by creamy-white to grey membrane, which can be easily removed, showing a red, oozing base. The cheeks and tongue are usually affected. In adults, it is seen in seriously ill patients (especially those with diseases associated with immunosuppression) or those under prolonged steroid or antibiotic therapy.
**Drug treatment**

*First line*

- **Nystatin**, 500,000 IU to be kept in the mouth and swallowed. Every 6 hours for 10 days, doubled in severe cases. Children: 100,000 IU every 6 hours for 10 days.
- **S/Es**: bitter taste, nausea
- **Dosage forms**: Cream (vaginal), 100,000 IU; pessary (ovules), 100,000 IU

PLUS

- **Gentian violet**, paint the entire inside of the mouth with 2%.
- **S/Es**: rare
- **Dosage forms**: Solution, 0.5%, 1%

*Alternative*

- **Miconazole**, apply thin film of 2% cream bid or tid for 2-3 weeks.
  (For **S/Es and dosage forms**, see page 202)

**CARBUNCLE**

Carbuncle is a deeper bacterial infection, usually a confluence of two or more furuncles with separate heads

**Diagnosis**: Clinical

**Treatment**

In addition to the measures outlined for furunclosis incision and drainage is usually necessary

**CELLULITIS**

Cellulitis is a diffuse inflammation of the subcutaneous tissue and the skin due to bacterial infections. It usually occurs through a breach in the skin surface especially if tissue edema is present, but may abruptly affect normal skin. Cellulitis is usually caused by *Streptococcus pyogenes* but other bacteria such as *Haemophilus influenzae* and gram–negative organisms can cause cellulitis especially in children.

**Diagnosis**: Clinical

**Treatment**
Non-drug treatment
Supportive care including bed rest, application of warm compresses and elevation of an affected limb is useful.

Drug treatment
First line:

Procaíne penicillin: Adults, 1.2 million IU intramuscularly daily for 7 to 10 days. Children: 50,000u/kg/24 hrs. in a single dose for 10 days. If no improvement occurs within a day, penicillinase resistant staphylococcus should be suspected and semi-synthetic penicillins (e.g. Cloxacillin 0.5 – 1gm every 4 hrs.) should be administered intravenously until the fever subsides, (usually 2 – 3 days). Then Cloxacillin 500 mg. P.O QID should be continued for 7 days. (For S/Es, C/Is and Dosage forms of Procaíne penicillin and Cloxacillin, see pages 212 and 39 - 40, respectively)

Hospitalized patients should be treated with Crystalline Penicillin 1.2-2.4 million units IV 4 hourly. (For S/Es, C/Is and dosage forms, see page 38)

Alternative

Erythromycin. (For dosage schedule, S/Es, C/Is and dosage forms, see page 214, 315)

N.B. In all children with facial or periorbital cellulitis, coverage for Haemophilus should be provided with Chloramphenicol 30 to 50mg/kg/d divided in two four doses (For S/Es, C/Is and dosage forms, see page 23)

Or

With Cephalexin Dosage form: Capsule 250 mg, 500mg; syrup,125 ml (for S/Es and C/Is, see under ceftriaxone)

CUTANEOUS LEISHMANIASIS (CL)
Cutaneous leishmaniasis are skin infections by related species of leishmania.

Clinical Appearance: There are several syndromes which don’t always harmonize with the taxonomic systems.

1. A single, dry, cutaneous lesion
2. Multiple, often exudative lesions
3. Relapsing lesions
4. Chronic relapsing lesions
5. Difuse cutaneous leishmaniasis
6. Mucocutaneous leishmaniasis

**Diagnosis:** Clinical

**Laboratory**
- Skin – Slit smear from the edge of a lesion for L.D bodies
- Skin biopsy in difficult cases
- Culture in NNN media
- Serological tests.

**Treatment**

Decisions on how to treat depends on the type of lesions and the species, number, size, evolution and chronicity. Many forms of CL are self-limiting and require no treatment other than protection from secondary infection.

**Drug treatment**

*First line*

- **Sodium stibogluconate (SSG)** Intralesional infiltration 3 to 5 times every other day OR 20mg./kg. slowly injected IV or IM daily for 20 to 28 days. If toxic effects appear, the drug should be given on alternate days or the dose reduced or administration stopped
  - **S/Es:** Myalgia, arthralgia, fatigue, pancreatitis, ECG Abnormalities.
  - **Dosage forms:** Injection, 100mg.ml

*Alternatives*

- **Pentamedine isothionate**, 2 to 4 mg/ kg IM daily or every other day for up to 15 doses
  - **S/Es:** Nephrotoxicity, pancreatitis and diabetes
  - **Dosage forms:** Powder for injection, 200mg

*OR*

- **Amphotericin B** 0.75 to 1mg./kg by slow infusion everyday or every other day for up to 9 weeks.
  - **S/Es:** GI symptoms, nephotoxicity.
  - **Dosage forms:** Powder for injection, 50mg/vial; Liposomal injection, 50/vial; lozenges, 10mg; oral suspension, 100mg/ml
DERMATOPHYTES

Superficial fungal infections (Dermatophytes) usually affect all parts of the skin from head to toes. These include:

- Infection of the scalp - tinea capitis
- Infection of the skin of the trunk and extremities - tinea corporis
- Infection of the axillae or groin - tinea cruris
- Infection of the nails - tinea unguium (onychomycosis)
- Infection of the palms and soles - tinea palmo-plantaris
- Infection of the cleft of the fingers and toes - tinea interdigitalis

**Diagnosis**

Clinical: appearance of the lesion with ring shaped scaly erythema with active margins. Deformed nails and onycholysis in case of nail infections. Hair loss and whitish scale in tinea capitis.

Laboratory: KOH mount.

**Drug Treatment**

The application of topical antifungals is usually enough for tinea corporis and cruris whereas patients with tinea capitis, tinea unguium will require systemic treatment.

**Topical:**

*First line*

**Benzoic acid + Salicylic acid**, thin film of 6%+3% ointment applied BID until the infection clears (usually for 2-3 weeks).

S/Es: photosensitivity

**Dosage forms:** Ointment, 6%+3%, 12%+6%

*Alternatives*

**Clotrimazole**, thin film of 1% cream applied BID for 2-3 weeks.

S/Es: skin irritation,

**Dosage forms:** Cream, 10%; solution, 1%

*OR*

**Ketoconazole**, thin film of 2% cream applied BID until the infection clears (usually for 2-3 weeks).

S/Es: Occasionally, skin irritation or sensitivity

**Dosage form:** Cream, 2%; lotion, 2%; shampoo, 2%
**Miconazole** thin film of 2% cream applied BID until the infection clears (usually for 2-3 weeks).

(For S/Es, see under ketoconazole page 202, 220)

**Dosage forms:** Cream, 2%; lotion, 2%; tincture, 2%.

---

**Table I. Common Systemic Anti-fungal Drugs and Their Dosage schedules**

<table>
<thead>
<tr>
<th></th>
<th>First line</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Griseofulvin</td>
<td>Ketoconazole</td>
</tr>
<tr>
<td><strong>Tinea corporis &amp; cruris</strong> (only to those resistant to topical RX)</td>
<td>Adult 500-1000 mg P.O. daily</td>
<td>Adult 200-400mg/day P.O.</td>
</tr>
<tr>
<td></td>
<td>Children: 15-25mg/kg/day Duration 2-6 weeks</td>
<td>Children-3mg./kg/day Duration: 3 weeks</td>
</tr>
<tr>
<td><strong>Tinea capitis</strong></td>
<td>Same dose as above</td>
<td>Adult same dose as above duration 4 weeks Children same dose duration 4 weeks</td>
</tr>
<tr>
<td></td>
<td>Duration 6-8 weeks occasionally up to 12 weeks</td>
<td></td>
</tr>
<tr>
<td><strong>Tinea unguium</strong> (Onychomycosis)</td>
<td>Finger nails Adult 500-1000mg P.O. daily for 6-9 months children 15-25 mg/kg/day 6-9 months Toe nails Adult same dose for 9-18 months Children same dose for 9-18 months</td>
<td>Not recommended because long duration of treatment increases toxicity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tinea pedis</strong></td>
<td>Adult 500-1000mg P.O. Daily</td>
<td>Adult: 200-400mg/day P.O.</td>
</tr>
<tr>
<td></td>
<td>Children:15-25 mg/kg/day Duration: 4-8 weeks</td>
<td>Children-3mg./kg/day duration: 3 weeks</td>
</tr>
</tbody>
</table>
Table II: Side effects, contraindications and dosage forms of common systemic antifungal drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>S/Es</th>
<th>C/Is</th>
<th>Dosage forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Griseofulvin</td>
<td>hypersensitivity reactions, neutropenia, headache, nausea, vomiting, rashes</td>
<td>liver failure, prophyria, pregnancy and hypersensitivity</td>
<td>Tablet, 125mg, 250mg, 500mg; suspension, 125mg/5ml</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>Nausea, vomiting, headache, rash, abdominal discomfort, diarrhea</td>
<td>Hepatic damage</td>
<td>Capsule/tablet, 50mg, 100mg, 200mg; oral suspension, 50mg/5ml, 200mg/5ml</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>Nausea, vomiting, urticaria, abdominal pain, pruritis, articaria, rashes, headache</td>
<td>Hepatic impairment, purpura</td>
<td>Tablet, 200mg; suspension, 100mg/5ml</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>Same but milder</td>
<td>Hepatic damage</td>
<td>Capsule, 100mg, 200mg; oral solution, 10mg/ml</td>
</tr>
<tr>
<td>Miconazole</td>
<td>nausea, vomiting, abdominal pain, headache, rashes, urticaria, pruritus</td>
<td>hepatic impairment, porphyria</td>
<td>Tablet, 200 mg., suspension, 100ml./5ml.</td>
</tr>
</tbody>
</table>

ECZEMA

1. Atopic Dermatitis (AD)

   AD is a Chronic, highly pruritic inflammatory skin disease, associated with remitting & flaring course, that starts during infancy and early childhood and persists into puberty and sometimes adulthood. AD may be exacerbated by social, environmental, and biologic factors and is characterized by an immediate (type 1) hypersensitivity reaction similar to the other atopic diseases (allergic rhinitis, bronchial asthma and allergic sinusitis).

   **Diagnosis:** Clinical

   **Treatment**

   **Treatment Objectives:** To alleviate the pruritus, and prevent scratching, decrease triggering factors, suppress inflammation, lubricate the skin and manage complications.

   **Non-drug treatment**

   Atopic patients should bathe with cold or luke warm water once daily using mild soaps. Patient should dry quickly and immediately (with in 3 minutes) and lubricate the skin.
Drug treatment

First line

Topical corticosteroids are the standard of care compared with other treatments:

- Eczematous lesions should be treated by mid-high strength topical steroids for up to 2 weeks except on the face, neck, breast, axillary, groin and perianal areas.
- For the face, neck, axillae and other soft areas of the body low-to-mild strength medications are preferred. Patients should apply the ointment after bath.
- The use of long-term intermittent application of corticosteroids appears helpful and safe.
- Systemic steroids are preferably avoided.

Alternatives

Prednisone, 20mg/day P.O. for 7 days for the most severe cases.
(For S/Es and dosage forms, see page 33)

PLUS

Cloxacillin (For dosage schedule, S/Es, C/Is and dosage forms, see page 39-40) if a superimposed bacterial infection is suspected.

For Itching:

Diphenhydramin: For dosage schedule
S/E: sedation
C/Is: driving, involvement in heavy physical activity
Dosage Forms: Capsule, 25mg, 50 mg; elixir, 12.5mg/5ml; injection, 50 ml in 1 ml ampoule.

2. Contact dermatitis

2.1. Allergic contact dermatitis (ACD)

Allergic Contact Dermatitis is an inflammatory response of the skin to an antigen that can cause discomfort or embarrassment.

Allergic contact Dermatitis can be classified as acute, subacute and chronic
- Acute contact dermatitis manifest by fluid filled vesicles or bullae on an edematous skin
- Subacute contact dermatitis is characterized by less edema and formation of papules, excorations and scaling
- Chronic eczema is characterized by scaling, skin fissuring and lichenification.

**Diagnosis:** Clinical and Patch test

**Treatment**

**Non-drug treatment**

- Removal of the offending agent
- Lukewarm water baths (antipruritic)
- Application of emollients (eg. white petrolatum, Eucerine)

**For acute lesions**

- Topical soaks with cool tap water plus saline (TSP/Pint)
- Oat meal bath

**Drug treatment**

**Topical steroids:**

*First line*

**Triamcinolone acetonide**, thin films applied BID initially, reduce to once daily as lesions remit.

(For **S/Es** and **dosage forms**, see page 199)

**Alternative**

**Hydrocortisone**, thin films applied on face, axillae, breasts, groins and perianal area twice daily initially, reduce as the lesions remits

**Dosage forms:** Cream, ointment, 1%

OR

**Mometasone**, thin films applied QD

**Dosage forms:** Cream, lotion, ointment, 0.1%
**Systemic steroids** (for severe, recalcitrant and generalized cases)

**Prednisone**, 0.5 - 1.0 mg/kg P.O.. QD for one week taper by a 10-mg weekly as the lesions remit improve. *(For S/Es, C/Is and dosage forms, see page 33)*

**Antihistamines**: (adjuncts to relieve pruritus)

*First line*

**Diphenhydramine**, 25-50mg cap P.O. QID, PRN

*(For S/Es, C/Is and dosage forms, see page 209.)*

*Alternative*

**Chlorpheniramine**, 4-6mg P.O. BID, PRN

*S/Es*: sedation, dizziness

*C/Is*: active work such as driving

**Dosage forms**: Tablet, 2mg, 10mg; syrup, 2mg/5ml

**Emollients:**

Urea cream OR **Eucerine OR Vaseline)** cream OR **Liquid paraffin**, thin films applied liberally PRN to affected area

**Dry skin agents**: (antipruritic)

**Camphor**, thin films applied to the affected area PRN

**Dosage forms**: Cream, lotion, ointment

### 2.2. Irritant Contact Dermatitis (ICD)

ICD is inflammation of the skin, which manifest by edema, and scaling and is a nonspecific response to the skin by irritants and direct chemical damage (e.g. corrosive agents which cause chemical burn followed by cutaneous ulceration). The hands are the most important sites of ICD. Most occupational skin disorders of ICD occur due to exposure of the hand to soap, cleansers and solvent.

- Irritant contact dermatitis is of two types.
- Mild irritant require prolonged or repeated exposure
- Strong irritants (e.g. strong acids, alkalis) can produce immediate reaction
**Diagnosis:** Clinical and laboratory

**Clinical**
- Macular erythema, hyperkeratosis, or fissuring
- Glazed, parched, or scalded appearance of the epidermis
- Healing process on withdrawal

**Laboratory**
- A KOH and culture examination to rule out fungal infection.
- Patch testing can be done to rule out ACD.
- Skin biopsy can help exclude other disorders such as fungal infection, psoriasis, cutaneous T-cell lymphoma.

**Treatment**
See treatment of ACD

**ERYSIPELAS**

Erysipelas is a bacterial infection of the skin and subcutaneous tissues. Predisposing factors include mechanical trauma, endogenous infection, venous and lymphatic system disorders (as in erysipelas recurrences). General susceptibility is increased by malnutrition, alcoholism and dysgammaglobulinemia. It is usually caused by Group A streptococci, and is contagious. Clinically it presents with red, tender and erythematous skin without vesicles. Systemic symptoms like fever, chills and malaise are common.

**Diagnosis:** Clinical

**Treatment**

**Non-drug treatment**

Bed rest, limb elevation and immobilization. Warm compresses and analgesia add to the patient’s comfort and speed resolution of illness.

**Drug treatment**

*First line*

**Procaine Penicillin:** Adults, 1.2 million IU intramuscularly daily for 7 to 10 days.

Children, 50,000 IU/kg/d in single dose for 7 – 10 days.

Severe cases require intravenous therapy with crystalline penicillin in hospital until the fever subsides, at which time treatment is continued with procaine penicillin.
Relapsing erysipelas requires a small maintenance dose of penicillin or erythromycin for months or years.

**S/Es:** hypersensitivity reactions: urticaria, fever, joint pains, angioedema, anaphylactic shock.

**C/Is:** known hypersensitivity to penicillin and cephalosporins

**Dosage forms:** Injection (Buffered), Vial of 4 million unitsIU

*Alternative*

**Erythromycin**, if the patient is penicillin allergic (For dosage schedule, S/Es, C/Is and Dosage forms, see under furunculosis page 214, 315)

**Furunclosis**

A furuncle is a deep seated infectious folliculitis and perifolliculitis with a purulent core caused by *Staphylococcus aureus*. It affects mainly young men who are otherwise healthy but patients must be evaluated for predisposing factors: alcoholism, drug abuse, diabetes mellitus, leukemias and other malignancies, AIDS and chronic liver disease.

**Diagnosis:** Clinical

**Treatment**

Local therapy is sufficient in most cases. In furuncles of the nose and upper lip, the infection may spread through the vena angularis with resultant sinus thromboses or meningitis and therefore require systemic treatment.

**Non-drug treatment**

Patients with systemic symptoms, impaired immunity and with involvement of the face should be on bed rest.

**Drug treatment**

Systemic therapy is required for furunclosis of the face or when generalized symptoms or impairment of the immune system are present. Penicillinase resistant antibiotics like cloxacillin or dicloxacillin are preferable.
**First line**

**Cloxacillin:** Adults: 500 mg P.O. QID for 7 to 10 days  
Children: 50 – 100 mg/kg/day P.O. for 7 to 10 days divided into four doses  
**S/Es:** Hypersensitivity reactions, nausea, loose stools, increased transaminases  
**Cls:** Hypersensitivity to penicillin  
**Dosage forms:** Capsule, 250 mg., Syrup 250 mg/5ml and 125mg/5ml. Injection 500 ml vial

**Alternatives**

**Erythromycin:** Adults: 500mg PO QID for 7 to 10 days  
Children: 30–50mg/kg/day for 7 to 10 days in 4 divided doses  
**S/Es:** Hypersensitivity reactions, GI symptoms, Cholestatic jaundice  
**Cls:** Liver disease, hypersensitivity to the drug  
**Dosage forms:** Capsule 250mg, 500mg. Syrup 125 mg. & 250 mg/5 ml  

OR

**Cephalexin:** Adults: 250 to 500mg QID for 7 to 10 days  
Children: 25 to 100mg/kg in 4 divided doses for 7 to 10 days.  
(For **S/Es, C/Is** and **dosage forms**, see page 204)

**HERPES SIMPLEX (HS)**

Herpes simplex skin lesion is characterized by painful grouped microvesicles which soon rupture to form yellow crust. The site of predilection is the adjacent areas of mucous membranes and skin. It has a tendency to recur. Infection with H.S. virus is so common in man as to be regarded as almost universal and antibodies can be demonstrated in the plasma of virtually in over 8.5 % of the adult population. A fetus may be infected in utero. It is caused by Herpes virus hominis.

The mode of transmission is probably by droplet infection. Infection takes place in two stages, during the first few years of life and after puberty.
**Diagnosis:** Clinical

**Drug Treatment**

**Acyclovir,** 200 mg P.O. 5 times daily for 7 days. Children <2 years: half adult dose. - 400 mg P.O. three time daily for 7 days. Children >2 years: adult dose. (For **S/E, C/I and dosage forms:** see below)

Other antiviral therapy – see STI section

**N.B.** Secondary bacterial infection can be treated by systemic antibiotics (see pyoderma).

**HERPES ZOSTER (SHINGLES)**

Herpes zoster is a skin lesion characterized by vesicles and bullae following multiple contiguous dermatomes, usually in a unilateral distribution and associated with severe pain. It is more commonly seen among HIV infected patients

**Diagnosis:** Clinical.

**Treatment**

**Drug treatment**

**Topical:**

Gentian violet *(For dosage schedule, S/Es and dosage forms, see page 203)*

OR

Calamine, applied on the affected skin.

**Dosage form:** Lotion, 5%

**Systemic:**

**Acyclovir,** 400-800mg P.O. 5 times daily for 7 days or intravenously 5-10mg/kg body weight every 8 hours for 7 days.

**S/Es:** rashes, gastrointestinal disturbances, rises in bilirubin and liver related enzymes, increases in blood urea and creatinine, decreases in haematological indices, headache, and fatigue.

**P/C:** Discontinue any concurrent administration of steroids

**Dosage forms:** Tablet, 200mg, 400 mg.
N.B.
Broad spectrum antibiotics (tetracycline, amoxicillin, etc.) might be needed to avoid secondary infection (see pyoderma). After the vesicles have resolved, if the patient complains of neuralgia low dose systemic steroid, 15-30mg of daily prednisone or its equivalent, may be used. Topical therapy in the acute state includes disinfectant solution or antibiotics and drying with 1% gentian violet. Post herpetic neuralgia is intractable, however oral carbamazepine (Tegretol) 100-200mg/day or phenytoin 100mg may also be tried. Amitriptyline 25 mg qhs increasing the dosage to 75 mg qhs q3-5 days is also effective.

IMPETIGO

Impetigo is a contagious superficial infection of the skin. It is caused by Streptococci or Staphylococci or by both organisms. Infection is acquired either from external sources by direct contact or through objects or from internal infection, e.g. nasopharyngeal sources. Impetigo contagiosa is highly infectious and is common in children.

There are two forms:
1. Superficial or common impetigo - lesions are thick, adherent and recurrent dirty yellow crusts with an erythematous margin.
2. Bullous impetigo – characterized by superficially thin walled bullous lesions that rupture and develop thin, transparent, varnish like crust.

Diagnosis: Clinical

Treatment
Non-Drug treatment
Careful removal of crusts by bathing with normal saline or Hydrogen peroxide ensures more rapid healing.

Drug Treatment

   Topical:

   First line

   Mupirocin, applied thin film of 2% cream/ointment 2-3 times a day for 10 days.

   S/Es: irriotaion

   Dosage forms: Ointment, 2%
Alternatives

- **Fucidic acid**, applied thin film of 2% cream 2-3 times in a day for 10 days.
  - **S/Es**: irritation
  - **Dosage form**: Cream, 2%

**OR**

- **Genitian violet**, applied 0.5% solution diluted in freshly boiled and cooled water 2-3 times daily for a couple of days for oozing lesions helps as an antiseptic and drying agent.
  - **S/Es**: stains clothes and skin; mucosal ulcerations
  - **Dosage forms**: Solution, 1%

**N.B.** Anti-bacterial ointments are usually applied after the wet lesion has dried.

**Systemic:**

*First line*

- **Clindamycin**, (For dosage schedule, S/Es, C/Is and dosage forms, see furunculosis, page 39 - 40)

*Alternative*

- **Cephalexin**, 250mg to 500mg P.O. qid for 7 to 10 days for adults; 25 to 100 mg/kg P.O. in 4 divided doses for 7 to 10 days for children
  (For S/Es, C/Is and Dosage forms See page 204)
  - **Dosage forms**: Capsule, 250mg, 500mg; Syrup, 125mg/5m

**OR**

- **Erythromycin**, (For dosage schedule, S/Es, C/Is and dosage forms, see page 214, 315)

MOLLUSCUM CONTAGIOSUM

Molluscum Contagiosum is a common childhood disease caused by Pox virus. Its second peak in incidence occurs in young adults because of sexual transmission. The typical lesion pearly, skin colored papule with central umblication.

**Diagnosis**: Clinical

**Treatment**

Because molluscum contagiosum generally resolves spontaneously and is self-limited, treatment may not be required if the lesions are few in number. When treatment is decided it should not be excessive or over-aggressive. However,
treatment is advisable in healthy persons to prevent autoinoculation or transmission to close contacts and sexual partners. Major forms of treatment comprise surgical, cyto-destructive or antiviral treatments.

**Drug treatment**

*First line*

- **Iodine**, applied 2-3 times per week by uproofing the top of the lesion and the procedure is continued until the lesions disappear (1-2 weeks).

  - **S/Es**: rare, complication of ulcer, skin hypersensitivity

  - **Dosage forms**: Solution, 2%

*Alternative*

- **Retinoic Acid (Tretinoin)**, thin films applied to the lesions daily.

  - **S/Es**: Irritation erythema, peeling, changes in pigmentation, photosensitivity.

  - **C/Is**: Pregnancy, eczema, broken or sunburned skin, personal or family history of epithelioma.

  - **Dosage forms**: Cream, 0.25%; gel, 0.01%, 0.025%; lotion, 0.025%, 0.05%; ointment, 0.05%.

*OR*

- **Silver nitrate + Potassium Nitrate**, thin film ointment applied 2 to 3 times per week

  - **S/Es**: Rare

  - **Dosage forms**: Ointment, 95% + 5%

**B. Surgery**

Curettage – with or without electrodessication under local anesthesia

**N.B.**

Therapy based on physical removal of the lesions is considered best.

Sexual partners should also be examined and treated. Treatment is aimed at removal of the lesions or at least the central core of each lesion. This is thought to initiate the lost immune response via injury to the epidermis and release of viral antigens.
PEDICULOSIS CORPORIS AND CAPITIS

It is a disorder due to lice infestations. It is caused by Human Ectoparasite: 
\textit{Pediculus humanus corporis} - the body louse and \textit{Pediculosis humanus capitis} - the head louse

The primary bite lesion is a small red macule, or occasionally a papule with a characteristic central haemorrhagic punctum. Sites of predilections are shoulders, trunks and buttocks. Bacterial infection is a typical complication in neglected cases. Untreated cases may persist indefinitely. Crowded population with inadequate sanitation, lack of opportunity to change clothes frequently, poor persons living in cold climate with heavier clothing contribute for this disease.

\textbf{Diagnosis :} Clinical

\textbf{Treatment}

\textbf{Therapeutic objective:}

- Eradication of the parasite from the clothing is the objective. Dust the cloth with 10\% DDT; or boil the clothes with hot water or iron the clothes after washing with cold water

- Nits should be removed using fine comb

\textbf{Drug Treatment}

\textit{First Line}

\textbf{Malathion}, applied to the scalp and left for 2 hours before rinsing.

\textbf{S/Es:} Rare

\textbf{P/C:} when used for pregnant women, lactating women and infants

\textbf{Dosage forms:} Shampoo, 1%

\textit{Alternative}

\textbf{Gamabenzene hexachloride,(Lindane),} , applied on the scalp for 4 minutes and washed off

\textbf{S/Es:} Rare, Local irritation

\textbf{Dosage forms:} Cream, 1%

OR

\textbf{Permethrin} , applied on the scalp for 10 minutes and washed off

\textbf{S/Es:} pruritis, stinging, transient burning

\textbf{Dosage forms:} Cream, 5%; lotion, 1%, 5%
PITYRIASIS VERSICOLOR (PV)

PV is a chronic asymptomatic scaling dermatosis associated with the overgrowth of the hyphal form of Pityrosporum ovale, Malassezia furfur, characterized by well-demarcated scaling patches with variable pigmentation, occurring most commonly on the trunk. It is a common disorder seen in older children and adolescents around puberty and young adults. The lesions sometimes may involve other areas such as the abdomen, upper arms, thighs and face. The disorder is insidious in onset and persistent. After successful treatment recurrences are common.

**Diagnosis:**

**Clinical**

**Laboratory:** KOH preparation and culture

**Drug Treatment:**

1. Topical imidazoles such as clotrimazole, miconazole and ketoconazole cream can be applied once or twice daily for four to six weeks. Ketoconazole shampoo can also be used to wash and left for 10 minutes to the affected areas daily for a period of 7 days. Similarly 2.5% selenium sulfide shampoo can be used.

2. Systemic therapy: in cases with extensive and long standing eruptions one of the following regimens can be used,

   **First line**
   
   **Ketoconazole** 200 mg daily or 3-4 mg/kg/day for 7-14 days. OR 400 mg single dose, repeated after a week.

   (For S/Es, C/Is and dosage forms, see table II, page 181)

   **Alternative**

   **Fluconazole**, 400 mg single dose, repeated after a week.

   (For S/Es, C/Is and dosage forms, see table II, page 42)

   **OR**

   **Itraconazole**, 200 mg po bid on first day, then 200 mg P.O. daily for 5 days.

   (For S/Es, C/Is and dosage forms, see table II, page 192)

3. Secondary prophylaxis

   I. **Selenium sulfide or ketoconazole** shampoo once or twice a week

   II. **Salicylic acid/ sulfur bar, zinc pyrithione** (bar or shampoo) can be used weekly.
Psoriasis
Psoriasis is a common, chronic, and recurrent inflammatory disease of the skin characterized by circumscribed, erythematous, dry scaling plaques of varying sizes often with predilection to certain parts of the body. Psoriasis is universal in occurrence. It is usually a life long disease. But most patients develop the initial lesion in the third decades of life.

Diagnosis: Clinical and Histopathologic Examination

Treatment

Non drug treatment
- Explain the recurrent nature of the illness
- Instruct the patient never to rub or scratch the lesions because this trauma stimulates the psoriatic proliferative process (Koebner’s phenomenon).
- Liberal use of moisturizers like urea, 10 – 20% or yellow soft paraffin should be done between treatments
- Removal of excessive scale by soaking in water or by using salicylic acid, 5 – 10% in vaseline base applied twice daily
- Frequent exposure to sunlight

Drug treatment

Topical:

First line

Dithranol started using low concentrations (0.05 to 0.1%) incorporated in petrolatum or zinc paste and given once daily. To prevent autooxidation, salicylic acid (1 to 2%) can be added. Short contact therapy (Minute therapy for 10-30 minutes). The concentration is increased weekly starting from 1% up to about 5% until the lesions resolve, then it can be tapered and discontinued gradually.

Dosage forms: Paste, 1%; Scalp application, 0.25%, 0.5%

Alternative
Calcipotriene, thin films applied twice daily at the area of plaques. Not more than 100gms per week should be used. Exposure to sunlight facilitates remission.
Salicylic acid should not be used in combination with calcipotriol due to the possible inactivation of this compound by the former. Dosage forms: Cream, 0.005%; ointment, 0.005%; scalp application, 0.005%

OR

Betamethasone dipropionate, thin film applied twice daily for short period of time are effective. For lesions of the face, neck, flexural areas and genitalia mild potency steroids are preferred.

Dosage forms: Cream, 0.025%, 0.05%

N.B: Topical steroids under occlusion or Cordran tape applied every night and removed in the morning are effective for thick plaque lesions. Patients not responding to treatment should be referred to a specialized dermatology center where the can be offered treatment with Ultraviolet light or systemic agents like Methotrexate.

SCABIES

Scabies is a persistent and intensely itchy skin eruption due to the mite Sarcoptes scabiei. The disease is commonly seen in people with low socio-economic status and poor personal hygiene. Clinical findings consist of red papules and burrows in the axillae, groin and digital web spaces associated with complaints of nocturnal pruritus. In infants, the face, palms and soles are often involved and blisters may develop.

Diagnosis: Clinical

Treatment

Topical:

First line

Benzyl Benzoate, applied to the entire body, neck to toe for 3 to 5 consecutive evenings. Bath should be taken before the first and after the last application.

S/Es: skin irritation, burning sensation especially on the genitalia, excoriations, occasionally rashes.

Dosage form: Lotion, 25%
Alternative

**Sulphur ointment**: Children 5%, Adult 10%: thinly applied to the entire body for 3 consecutive nights. The patient should wash thoroughly before each new application and 24 hours after the last treatment.

* S/E: skin irritation.
* C/ls: pregnancy or lactation, children younger than 2 years.
* Caution: avoid contact with eyes, mouth and mucous membranes.
* Dosage forms: Ointment, 5%, 10%.

OR

**Permethrin**, Thin films of cream applied to all areas of body from the neck down for 8-14 hrs. then washed off. (For S/Es and dosage forms, see page 219)

OR

**Gamma-benzene hexachloride (Lindane)**, applied to the affected area once and washed off after 12-24 hours. Contraindicated in pregnancy. (For S/Es and dosage forms, see page 219)

**Malathion**, applied to the area and left for 24 hours. Second application after one week.

(For S/Es and dosage forms, see page 219)

OR

**Crotamiton**, apply thinly to the affected area twice daily for 2-3 days.

* S/Es: skin irritation, contact hypersensitivity
* C/ls: acute exudative dermatoses
* P/Cs: avoid contact with eyes and broken skin
* Dosage forms: Cream, 10%; lotion, 10%

Systemic:

**Ivermectin**, s 200µg/kg as a single dose, for Norwegian (crusted scabies) and resistant forms of scabies. and it is ideal for institutional outbreaks. (For S/Es, C/ls and dosage forms, see page 43)
N.B. Washing clothes in hot water or ironing after normal washing are important means of decontamination. Any person who has close contact with the infected patient should be treated.

**URTICARIA**

Urticaria or hive, is a common disorder affecting up to 25% of the population. The usual urticarial lesion is an intensely pruritic, circumscribed, raised, erythematous plaque, often with central pallor. Individual lesion enlarges and coalesces with other lesions, and then typically will disappear over a few hours. Urticaria may be the presenting feature of other systemic diseases such as systemic lupus erythematosus, cryoglobulinemia, autoimmune thyroid diseases, and urticarial vasculitis. Urticaria may present in the acute or chronic form.

**Acute urticaria:** Acute urticaria is defined as outbreaks of urticarial lesions that do not extend in duration beyond six weeks. The lesions of acute urticaria are characterized by a rapid onset and resolution within several hours and they can be recurrent. A presumptive trigger such as drug, food ingestion, insect bite, or infection can occasionally be identified.

**Chronic urticaria:** Chronic urticaria is defined by the presence of hives, usually on most days of the week, for a duration of longer than six weeks. The chronic form accounts for approximately 30% of cases of urticaria. A careful history should be performed to identify external triggers. However, in 80 to 90% of adults and children with chronic urticaria, no external cause can be identified.

**Diagnosis:**

**Clinical**

**Laboratory:** tests may be occasionally needed to identify associated systemic diseases.

**Treatment**

General The primary treatment of urticaria involves identification and discontinuation of the offending trigger but when this is not possible, as is in most of the cases with acute and chronic urticaria, antihistamines are the mainstay of therapy.

**Drug treatment**
First line

**Diphehydramine:** From 2 to 6 years: 6.25mg every 4-6 hours; maximum: 37.5mg/day. From 6 to 12 years: 12.5-25mg every 4-6 hours; maximum: 150mg/day above 12 years and adults: 25-50mg every 4-6 hours; maximum: 300mg/day. (For S/Es, C/Is and dosage forms, see page 209)

OR

**Chlorpheniramine:** 0.35 mg/kg/day P.O. in divided doses every 4-6 hours. 2-6 years: 1mg every 4-6 hours, not to exceed 6mg in 24 hours. 6-12 years: 2mg every 4-6 hours, not to exceed 12mg/day. Adults: 4mg every 4-6 hours, has the best record in pregnancy.

**Alternatives**

**Cetirizine:** 6-12 months: 2.5 mg P.O. QD. 12 months to 2 years: 2.5 mg P.O. once daily; may increase to 2.5 mg every 12hrs if needed. 2-5 years: Initial: 2.5mg P.O. once daily; may be increased to 2.5 mg every 12 hours or 5 mg QD. More than 6 years and adult dosing: 10mg P.O. QD. 

**Dosage forms:** Tablet, 5mg, 10mg; oral solution, 1mg/ml

OR

**Loratadine:** < 2 years: 2.5 mg P.O. QD. 2-5 years: 5mg daily P.O. above 5 years and adults: 10mg P.O. QD (or BID)

OR

**Ranitidine:** children: 1 month to 16 years: 2-4 mg/kg/day P.O. QD; maximum treatment dose: 150mg/day. Adults: 150mg P.O. QD to BID. (For S/Es, C/Is and dosage forms, see page 132)

OR

**Cimetidine:** children: 20-40 mg/day P.O. BID. for adult: 300 to 800 mg P.O. BID. (For S/Es, C/Is and dosage forms, see page 106)
Note: H2 blockers should be used in combination with with H1 blocker.

**OR.**

**Prednisone,** 30-40mg per day P.O. in a single early morning dose. After one week of treatment time taper by 5 mg every two to three days until the minimal dose that controls the urticaria is found. (For **S/Es, C/Is and dosage forms**, see page 33)

**OR**

**Ketotifen,** 3 to 8 mg P.O. per day (for physical urticaria).

**Dosage forms,** Eye drop, 0.25mg/ml

**VERRUCA VULGARIS (COMMON WARTS)**

Benign epidermal overgrowths caused by human papilloma virus (HPV). Transmitted by contact, often at small skin breaks, abrasions, or other trauma. Variable onset from exposure is 1-6 months. Duration is variable, spontaneous resolution with time is typical. In children, approximately two-thirds of warts spontaneously regress within 2 years. Warts in immunocompromised persons can be widespread and chronic. Warts appear as flesh-colored papules that evolve into dome-shaped, gray-brown surface black dots and are usually few. Common sites are the hands, periungual skin, elbows, knees and planter surfaces.

**Diagnosis:** Clinical

**Treatment**

Multiple treatment options are available. No treatment is consistently highly effective. Avoid painful treatment, especially for children. Many patients seek treatment because of unsightly appearance, fear of spread or enlargement, or discomfort. The options for treatment include.

**Non-drug treatment**

*Duct tape:* cut wart size and applied. Leave for 6 days, then remove, wash skin, gently debride. Reapply as required, up to one month.
Drug treatment

Salicylic acid, thin films of ointment applied once a day. Occlusion with tape increases penetration. Treatment duration may be 8-12 weeks.

Dosage forms: Ointment, 2%, 5%, 10%

N.B. Multiple visits are often necessary when treating with ablative therapy.
CHAPTER V

SEXUALLY TRANSMITTED INFECTIONS (STI)

Acute Epididymitis
Ectoparasitic infections
   Pediculosis pubis
Exophytic processes
   External genital warts (Condylomata acuminata)
Genital ulcer disease syndrome
   Chancroid
   Genital herpes
   Granuloma inguinale (donovanosis)
   Lymphogranuloma venereum
   Syphilis
Urethritis (urethral discharge) syndrome
   Chlamdial infections
   Gonorrhea
   Non-gonococcal urethritis
SEXUALLY TRANSMITTED INFECTIONS (STI)

Patients presenting with STIs should be counseled to undergo HIV testing.

Acute Epididymitis

Epididymitis is characterized by scrotal swelling, pain and exquisite tenderness of the affected testicular epididymal complex. Symptoms usually develop and intensify over a 1-2 day period, but both gradual onset and acute onset of symptoms may be seen. Pain and tenderness are generally unilateral, and signs and symptoms of urethritis are often, but not always present. In sexually active < 35 years old patients the most common pathogens are *N. gonorrhoeae* or *C. trachomatis*. Coliforms such as *E. coli* are most common in the following groups (a) men > 35 years old, (b) men of any age who have recently undergone urinary tract instrumentation or surgery, (c) men who practice insertive anal intercourse, and (d) men with anatomical abnormalities of the urinary tract.

**Diagnosis:** Clinical and laboratory tests

1. Physical examination reveals epididymal and/or testicular tenderness, swelling and induration. Urethral discharge may or may not be noted.

2. Laboratory testing should include the following Urethral Gram-stained smear

**Treatment**

**Non Drug treatment**

Scrotal support, ice packs, or analgesics for symptomatic relief

**Drug Treatment**

*First line*

- **Ceftriaxone**, 250 mg IM single dose
  
  (For *S/Es, C/Is* and dosage forms, see page 17)

  PLUS

- **Doxycycline**, 100 mg PO BID for 10 days.
  
  (For *S/Es, C/Is* and dosage forms, see page 21)
Alternatives

Ofloxacin, 300 mg P.O. BID for 10 days
(For S/Es, C/Is and dosage forms, see page 16)

OR

Levofloxacin, 500 mg P.O. QD for 10 days.
(For S/Es, Gastrointestinal disturbances
C/Is: children under 12 years old
Dosage forms: Tablet, 500mg

N.B. The patient should be re-examined in 72 hrs to ensure response to therapy.

Sex Partners

1. Chlamydial or gonococcal epididymitis - All partners 60 days prior to onset of symptoms should have full STD evaluation and syndromic management.
2. Coliform epididymitis: routine evaluation of partners is not indicated.

ECTOPARASITIC INFECTIONS

Pediculosis pubis, (pubic lice, “crab”)

Pediculosis Pubis is an ectoparasite infestation caused by Phthirus pubis, the crab louse. Transmission is generally via intimate contact with an infected person, although exposure to infected bed linen or clothes may transmit the organism. Patients may present with itching in the public area, often associated with erythema, irritation, and inflammation. Mobile crab-like organisms may be visible on public skin or hair and lice eggs, or nits, may also be visible on hair shafts. Occasionally the thighs, trunk, eyelashes or eyebrows are involved.

Diagnosis

Typical pubic lice or their nits observed in pubic hair are diagnostic. Pubic lice may be perceived as small “scabs” or crusts which, when removed for microscopic examination, begin to walk away before the cover glass is in place.

Drug Treatment

First line

Permethrin, thin films of 1% cream, applied for 10 minutes then washed off; (For S/Es, C/Is and dosage forms, see page 219)
Alternatives

Gamabenzene hexachloride (Lindane), 1% shampoo, applied for 4 minutes then washed off;
(For S/Es, C/Is and dosage forms, see page 219)

OR

Benzyl benzoate, 25% emulsion applied once.
(For S/Es, C/Is and dosage forms, see page 222)

N.B. Treat all skin between the chest and thighs, including axillae, Launder all clothes, sheets, blankets in hot water. Shave the pubic area.

Sex partners
Routine STD evaluation is recommended. Epidemiologic treatment is generally warranted for sex partners within the preceding month.

EXOPHYTIC PROCESSES
External genital warts (Condylomata acuminata)
Warts are caused by infection with Human Papilloma Virus (HPV). Most exophytic warts are due to HPV types 6 and 11, but certain other HPV types, especially types 16 and 18 (high risk) and 31, 33 and 35 (intermediate risk), have been epidemiologically linked to the development of cervical cancer in women.

Diagnosis
Clinical: “Cauliflower" lesions usually involving the external genitalia, perineum, or perianal area, cervix.

Treatment
Appropriate treatment can be either provider- applied or patient- applied, depending upon clinical circumstances and patient preferences.

A. Provider- applied:

Podophyllin resin, applied 10-25% once or twice weekly until wart resolves.
Maximum use 0.5 cc per application, max coverage 10 cm².

Dosage forms: Compounded preparation
N.B. Podophyllin should be washed off 1-4 hours after the first application. If there is no unusual pain or inflammation, each subsequent application may remain for 4-8 hours or for up to 24 hours.

Surgical: For extensive warts, cervical condylomata and warts not responding to the above measures over 3-4 weeks.

B. Patient applied:

First line

Imiquimod, thin film applied with fingertip at bed time, 3 times per week and treatment area washed with mild soap and water 6-10 hours after application. Duration of therapy up to 16 weeks, although warts may resolve within 8-10 weeks or sooner.

Alternative

Podofilox, applied with cotton swab twice daily for 3 days, followed by 4 days of no therapy. Cycle may be repeated as necessary up to a total of 4 cycles. Maximum use 0.5cc per day, maximum coverage for 10 sq.cm.

Dosage forms: Solution/gel, 0.5%

N.B. Patients should be advised that despite resolution of visible warts, cure of HPV infection can not be assured and that warts may reappear. Discuss use of condoms and recommend annual Pap smears for women.

Sex Partners

Routine STD examination is recommended for all patients, including cervical cytology for female partners of infected men. Discuss likelihood of subclinical infection in males and females alike.

GENITAL ULCER DISEASE SYNDROME

I. Chancroid

Chancroid is an ulcerative disease of the genitalia caused by infection with Haemophilus ducreyi. Symptoms include painful, non indurated, excavated genital ulcers with undermined borders. Tender enlarged inguinal lymph nodes are often
seen, these may suppurate, and pus containing infectious material may be aspirated from the resultant buboes.

**Diagnosis**

Clinical

Laboratory: Culture and Gram stain confirms diagnosis

**N.B.** Tests for HSV and syphilis should be done.

**Drug Treatment**

*First line*

- Azithromycin, 1.0 gm PO, single dose
  - (For S/Es, C/Is and dosage forms, see page 272)

**Alternatives**

- Ceftriaxone, 250 mg IM, single dose;
  - (For S/Es, C/Is and dosage forms, see page 17)

OR

- Ciprofloxacin, 500 mg P.O.BID for 3 days
  - (For S/Es, C/Is and dosage forms, see page 16)

OR

- Erythromycin base, 500 mg P.O. QID for 7 days
  - (For S/Es, C/Is and dosage forms, see page 214, 315)

OR

- Amoxicillin-Clavulanic acid, 625 mg P.O.TID for 7 days
  - (For S/Es, C/Is and dosage forms, see page 52)

**N.B.** Patient should be re-examined in 2-3 days, then weekly until healed. Repeat RPR and HIV serology (if HIV- negative, or not tested at time of diagnosis) in 3-6 months.

**Sex partners:**

Recommend routine STD examination for all partners within one month prior to onset. Treat all partners exposed within 10 days preceding onset of symptoms and signs in the patient. Encourage HIV testing in all patients.
II. Genital herpes

Genital herpes is caused by infection with herpes simplex (HSV) type 1 and 2. Infection is typically characterized by the development of painful grouped vesicles in the anogenital region. The lesions evolve over several days into shallow ulcerations, which generally heal within 1-2 weeks. While both HSV-1 and HSV-2 can be sexually transmitted, most genital herpes infections are caused by HSV-2 (in Ethiopia only HSV-2 is identified). Asymptomatic transmission is thought to account for a significant share of disease.

Diagnosis

Clinical laboratory

N.B. Tests for syphilis should be done.

Treatment

Non drug treatment

Local care: Keep affected area clean and dry

Drug Treatment

1. First clinical episode (primary or initial infection)

   First line

   Acyclovir, 400 mg P.O. TID or 200 mg P.O. 5 times daily for 7-10 days
   (For S/Es, C/Is and dosage forms, see pages 215)
   N.B. When possible start therapy within 2 days of onset of symptoms, but may be effective up to 7-10 days after onset.

   Alternative

   Valacyclovir, 1gm BID for 7-10 days.
   (For S/Es and C/Is, see under acyclovir, page 215)
   Dosage forms: Tablet 500mg

   OR

   Famiciclovir, 250mg BID for 7-10s.
   Dosage forms: Tablet, 125mg, 250mg, 500mg
   (For S/Es and C/Is, see under acyclovir, page 215).

   N.B There is no medically proven role for topical acyclovir and its use is discouraged.
2. **Episodic treatment of recurrent episodes**

Treatment should be initiated during the prodrome or immediately after onset of symptoms.

**Non drug treatment**

Local care: Keep affected area clean and dry.

**Drug Treatment:**

*First line*

- **Acyclovir**: 800mg P.O. BID OR 400 mg P.O. BID OR 200mg P.O. 5 times a day for 7 days,

*Alternatives*

- **Valacyclovir**: 500mg P.O. BID for 3-5 days
  - *(For S/Es and C/Is, see under acyclovir, page 215)*
- **Dosage forms**: Tablet, 500mg

*OR*

- **Famiciclovir**: 125mg P.O. BID for 5 days
  - *(For S/Es and C/Is, see under acyclovir, page 215)*
- **Dosage forms**: Tablet, 125mg, 250mg, 500mg

3. **Suppressive treatment**: recommended for patients with 6 recurrences or more per year

*First line*

- **Acyclovir**: 400mg P.O. BID for 1 year.
  - *(For S/Es, C/Is and dosage forms, see page 215)*

*Alternatives*

- **Valacyclovir**: 500-1000mg P.O. QD for 1 year.
  - *(For S/Es and C/Is, see under acyclovir, page 215)*
- **Dosage forms**: Tablet, 500mg

*OR*

- **Famiciclovir**: 250mg P.O. BID for 1 year.
  - **Dosage forms**: Tablet, 125mg, 250mg, 500mg
  - *(For S/Es and C/Is, see under acyclovir, page 215)*

**N.B.** The need for continued suppressive therapy should be reassessed.
III. Granuloma inguinale (donovanosis)

It is a progressive ulcerative condition caused by the intercellular Gram-negative bacterium *Calymmatobacterium granulomatis*. The disease is endemic in parts of the developing world, including India, Papua New Guinea, Southern Africa and central Australia. Lesions present as painless, beefy red ulcerative lesions in the genital tract, without lymphadenopathy. The lesions are highly vascular and bleed easily on contact.

**Diagnosis**

Clinical:

Laboratory: Tissue crush preparation or biopsy.

**Treatment**

*First line*

- **Doxycycline**, 100mg BID for a minimum of 3 weeks.
  
  *(For S/Es, C/Is and dosage forms, see page 21)*

*Alternatives*

- **Sulfamethoxazole+trimethoprim**, 160mg/800mg BID for adults; 8mg/40mg/kg/day P.O. in 2 divided doses for children for a minimum of 3 weeks.
  
  *(For S/Es, C/Is and dosage forms, see page 16)*

  OR

- **Ciprofloxacin**, 750 mg P.O. BID for a minimum of 3 weeks.
  
  *(For S/Es, C/Is and dosage forms, see page 16)*

  OR

- **Erythromycin base**, 500 mg P.O. QID for a minimum of 3 weeks.
  
  *(For S/Es, C/Is and dosage forms, see page 214, 315)*

  OR

- **Azithromycin**, 1.0 gm P.O. weekly for a minimum of 3 weeks.
  
  *(For S/Es, C/Is and dosage forms, see page 272)*

**NB:** Continue therapy until all lesions have healed completely.

PLUS (if lesions do not respond within the first few days of oral therapy)
**Gentamicin**, 1.0 mg/kg TID.  
*(For S/Es, C/Is and dosage forms, see page 39)*

**Sex partners**

Recommend routine STD examination and treatment for all partners who have had sexual contact within past 60 days and have clinical signs and symptoms of disease.

**IV. Lymphogranuloma venereum**

Lymphogranuloma Venereum (LGV) is caused by *Chlamydia trachomatis* serovars L1, L2, or L3. It is most commonly characterized by unilateral tender inguinal lymphadenopathy, with or without evidence of non-gonococcal urethritis or a transient genital ulceration. Over time, impaired lymphatic flow may occur in the genital tract leading to genital elephantiasis, stricture, or fistulous tracts of rectum.

**Diagnosis:** Clinical:

**Drug Treatment**

*First line*

- **Tetracycline**, 500mg P.O. QID for 3 weeks  
  *(For S/Es, C/Is and dosage forms, see page 19)*

*Alternatives*

- **Doxycycline**, 100 mg P.O. BID for 3 weeks;  
  *(For S/Es, C/Is and dosage forms, see page 21)*

**OR**

- **Erythromycin base**, 500 mg P.O. QID for 3 weeks  
  *(For S/Es, C/Is and dosage forms, see page 214, 315)*

**Sex Partners**

Recommend routine STD examination plus chlamydia cultures and serology for all partners within 2 months. Treat all partners who had sexual contact with the patient during the 30 days prior to the onset of symptoms.
V. Syphilis

Syphilis is a sexually acquired infection caused by Treponema pallidum. Syphilis progresses in stages and may become a chronic infection if untreated. Disease is characterized by episodes of active disease interrupted by periods of latent infection. Incubation period is estimated to be between 10-90 days (average 3 weeks). Early clinical manifestations (primary and secondary stage) primarily involve the skin and mucosal surfaces. Latent disease has no clinical signs or symptoms. Late manifestations may affect virtually any organ system. Neurosyphilis can occur at any stage of syphilis.

Diagnosis

Clinical Laboratory:
1. Dark field microscopy of genital lesion exudates (primary syphilis).
2. Direct Fluorescent Antibody (DFA) examination of lesion exudates (primary syphilis).
3. Non-treponemal serologic test:
   • RPR (Rapid Plasma Reagin); Or
   • VDRL (Venereal Disease Research Laboratory)

Drug Treatment

1. Early syphilis: primary, secondary, early latent (≤ 2 years duration)
   First line
   Benzathine penicillin, 2-4 million units IM single dose
   (For S/Es, C/Is and dosage forms, see pages 348)
   Alternative
   Procaine penicillin, 1 million units IM daily for 10 days
   (For S/Es, C/Is and dosage forms, see page 212)
   OR
   Doxycycline, 100 mg P.O. BID for 14 days
   (For S/Es, C/Is and dosage forms, see page 21)
   OR
   Tetracycline, 500 mg P.O. QID for 14 days
   (For S/Es, C/Is and dosage forms, see page 19)
   OR
Erythromycin, 500 mg P.O. QID for 14 days
(For S/Es, C/Is and dosage forms, see page 214, 315)

For Children:
Benzathine Penicillin, 50,000 units/kg IM (up to the adult dose of 2-4 million units) single dose.
(For S/Es, C/Is and dosage forms, see pages 348)

2. Late syphilis (≥ 2 yrs duration except neurosyphilis)

First line
Benzathine Penicillin, 2.4 million units IM every week for 3 weeks.
(For S/Es, C/Is and dosage forms, see page 348)

Alternatives
Doxycycline, 100 mg P.O. BID for 28 days
(For S/Es, C/Is and dosage forms, see pages 21)
OR
Tetracycline, 500 mg P.O. QID for 28 days
(For S/Es, C/Is and dosage forms, see page 19)

For Children
Benzathine penicillin, 50,000 units/kg IM (up to the adult dose of 2.4 million units) weekly for 3 weeks (Total 150,000 units/kg up to max 7.2 million units) (For S/Es, C/Is and dosage forms, see page 348)

N.B. CSF examination should be done, and should be identified whether it is congenital or acquired

Neurosyphilis

First line
Crystalline penicillin G, 18-24 million units daily IV (3-4 million units every 4 hours) for 10-14 days, followed by a single dose of Benzathine Penicillin 2.4 million units IM at the completion of IV therapy.
(For S/Es, C/Is and dosage forms, see pages 348)
Alternatives

**Procaine Penicillin**, 2.4 million units IM daily PLUS **Probenecid** 500 mg P.O. QID, both for 10-14 days, followed by a single dose of **Benzathine penicillin**, 2.4 million units IM at the completion of IM therapy.

(For S/Es, C/Is and dosage forms, see pages 212, 111, and 348, respectively)

OR

**Ceftriaxone**, 2 gm IV OR IM QD for 10-14 days, also appears safe and effective. Follow treatment with single dose of **Benzathine penicillin** 2.4 million units IM at completion of treatment.

(For S/Es, C/Is and dosage forms, see pages 17 and 348, respectively)

URETHRITIS (URETHRAL DISCHARGE) SYNDROME

**I. Chlamydia**

Infection with *Chlamydia trachomatis* is a major cause of urethritis in males and cervicitis in females. Symptoms may include mucoid urethral discharge and/or dysuria in males, and vaginal discharge in females, although many infections remain asymptomatic.

**Diagnosis**

Clinical

Laboratory: Gram-stained urethral smear showing ≥ 5 polymorphonuclear leucocytes.

**Drug Treatment**

*First line*

**Doxycycline**, 100 mg P.O. BID for 7 days.

(For S/Es, C/Is and dosage forms, see page 21)

*Alternative*

**Tetracycline**, 500 mg P.O. QID for 7 days.

(For S/Es, C/Is and dosage forms, see page 19)

OR

**Azithromycin**, 1.0 gm PO single dose.

(For S/Es, C/Is and dosage forms, see page 272)
OR

**Erythromycin** base, 500 mg QID for 7 days.

(For S/Es, C/Is and dosage forms, see page 214)

OR

**Levofloxacin**, 500mg PO daily for 7 days

(For S/Es, C/Is and dosage forms, see page 230)

**N.B.** Repeat chlamydial testing is indicated at 3rd week of treatment.

**Sex Partners:**

1. Evaluate and treat empirically all sex partners within 60 days of onset of symptoms or diagnosis.
2. Treat most recent sex partners, even if last sexual contact was greater than 60 days.
3. Abstain from sexual contact until 7 days after treatment is initiated.

**II. Gonorrhea**

Gonorrhea is a common sexually transmitted infection caused by the gram negative diplococci, *Neisseria gonorrhoeae*. The primary sites of infection are the urogenitals, rectum and oropharynx that are directly involved in sexual activity. Non-genital tract diseases results from direct, contiguous, or hematogenous spread. Newborns may acquire infection from their mothers during passage through the infected birth canal.

**Diagnosis**

Clinical Laboratory: Gram stain and culture

**Treatment**

Effective treatment of gonorrhea routinely includes a single dose of anti-gonococcal agent plus a course of therapy to eradicate possible co-infection with *C. trachomatis*.

*First line*

**Ciprofloxacin**, 500 mg P.O. single dose

(For S/Es, C/Is and dosage forms, see page 16)
PLUS

**Doxycycline**, 100mg PO BID for 7 days
(For S/Es, C/Is and dosage forms, see page 21)

OR

**Azithromycin**, 1.0 gm PO single dose
Dosage forms: Capsule, 250mg; powder for oral suspension, 200mg/ml.
(For S/Es and C/Is see under Erythromycin 214)

Alternatives

**Ceftriaxone**, 250mg IM single dose. (For S/Es, C/Is and dosage forms, see page 17)

OR

**Norfloxacin**, 800 mg PO single dose
dosage forms, Tablet, 400 mg
(For S/Es and C/Is, see under levofloxacin)

OR

**Spectinomycin**, 2 gm IM single dose.
Dosage forms: Injection, 2g vial

PLUS

**Doxycycline OR Azithromycin**
(For the dose schedule, S/Es, C/Is and dosage forms, see above)

For Suspected disseminated gonococcal infection (DGI)

Patients should be admitted and inpatient care will include culture of blood, mucosal sites, skin lesions and joint aspirates, and treatment with .

**Ceftriaxone** 1.0 gm IV OR IM QD until clinical improvement, then should complete a 10-14 days course with the oral treatment shown above for gonococcal urethritis.
(For S/Es, C/Is and dosage forms, see page 17)

Sex partners

- Evaluate and treat empirically all sex partners within 60 days of onset of symptoms or diagnosis.
- Abstain from sexual contact for 7 days after treatment is initiated.
III. Non gonococcal urethritis (NGU)

NGU is characterized by the development of an inflammatory urethral response (discharge, dysuria) in the absence of gonococcal infection. Many cases of NGU are caused by C. trachomatis, but most cases are chlamydia-negative. Other agents implicated include Mycoplasma genitalium, Ureaplasma urealyticum, Trichomonas vaginalis and occasionally herpes simplex virus. Typically, the urethral discharge of NGU is less purulent and more mucoid than that seen in gonococcal infections, although aggressive infections may give a purulent discharge which mimics gonorrhea.

Diagnosis

Clinical:

Laboratory: Urethral Gram-stained smear showing ≥ 5 polymorphonuclear leucocytes /1000 X magnification

Treatment

1. Initial or isolated episode (no episode in previous 6 weeks)

   First line

   Doxycycline, 100 mg P.O BID for 7 days
   (For S/Es, C/Is and dosage forms, see page 21)

   Alternatives

   Tetracycline, 500 mg P.O QID for 7 days.
   (For S/Es, C/Is and dosage forms, see page 19)

   OR

   Erythromycin base, 500mg P.O QID for 7 days
   (For S/Es, C/Is and dosage forms, see page 214)

   OR

   Levofloxacin 500 mg PO QD for 7 days

   Dosage forms: Tablet, 500mg
   (For S/Es and C/Is, see under ciprofloxacin, page 16)
2. **Symptomatic persistent or recurrent NGU**
   a. Poor compliance or partner not treated:
      Repeat initial regimen, consider adding **Metronidazole** 2.0 gm P.O. single dose to cover possible trichomonal infection *(For S/Es, C/Is and dosage forms, see page 14)*
   b. Good compliance and partner treated:
      **Metronidazole** 2.0 mg P.O. single dose

      PLUS

      **Erythromycin**

      *(For dosage schedule, S/Es, C/Is and dosage forms, see page 214)*

**Sex Partners.**

Initial or Isolated NGU

a. Evaluate and treat all partners within past 60 days. Partners should generally be treated empirically with anti-chlamydial regimens, even though most will test negative for chlamydia.

b. Abstain from sexual contact until 7 days after therapy is initiated.
CHAPTER VI

OPHTHALMOLOGICAL DISORDERS

Acute Dacryocystitis

Acute Infectious Dacryoadenitis
- Bacterial or infectious
- Viral

Allergic Conjunctivitis
- Atopic Keratoconjunctivitis
- Hey fever and Perennial allergic Conjunctivitis
- Vernal Keratoconjunctivitis

Bacterial Conjunctivitis
- Conjunctivitis in Children and Adults
- Neonatal Conjunctivitis

Blepharitis
- Seborrhoeic blepharitis
- Staphylococcal blepharitis

Chemical Burns

External Hordeolum (Stye)

Internal Hordeolum

Mebomian Cyst (Chalazion)

Molluscum Contagiosum

Ophthalmic Zoster (Herpes Zoster Ophthalmicus)

Orbital Cellulitis

Preseptal Cellulitis

Trachoma

Vitamin A deficiency
ACUTE DACRYOCYSTITIS

Acute dacryocystitis is an inflammation or infection in the lacrimal sac. It may have various etiologies. It is, however, commonly caused by complete nasolacrimal duct obstruction preventing normal drainage from the lacrimal sac into the nose. Symptoms include, pain, tenderness, redness, swelling on the innermost aspect of the lower eyelid (over the lacrimal sac), tearing, discharge, and fever. Chronic tear stasis and retention lead to secondary infection with bacteria leading to erythematous, tender swelling on the nasal aspect of the lower eyelid, mucoid or purulent discharge which can be expressed as pressure to the lacrimal sac. Fistula formation, lacrimal sac cyst or mucocele can occur in chronic cases.

Diagnosis: Clinical, Gram’s stain and pus culture

Treatment

Non-drug treatment

- Warm compresses and gentle massage to the inner canthal region QID
- Incision and drainage of a pointing abscess
- Surgical correction (Dacryocystorhinostomy=DCR), once the acute episode has resolved, particularly with chronic dacryocystitis

Drug treatment

A. Mild Cases
   
   First line

   **Cloxacillin**, 500mg P.O. QID for 10-14 days for adults; and 50-100mg/kg/day in 4 divided doses for 10-14 days for children
   (For S/Es, C/Is and Dosage forms, see page 39, 214)

   **Chloramphenicol**, 1 drop QID for 10-15 days
   (For S/Es C/Is and Dosage forms, see page 23)

   Alternatives

   **Cefaclor**, 250-500mg P.O. TID for 10-14 days for adults
   **Dosage forms:** Capsule, 250 mg oral suspension 125 mg/5ml, 250 mg/5ml
   (For S/Es and C/Is, see under ceftriaxone)
PLUS

**Gentamicin,** 1 drop QID for 10-15 days

(For S/Es, C/Is and Dosage forms see page 39)

OR

**Amoxicillin/clavulanate,** 20-40mg/kg/day P.O. TID for 10-14 days for children

(For S/Es, C/Is and Dosage forms, see page 52)

PLUS

**Gentamicin,** 1 drop QID for 10-15 days

(For S/Es, C/Is and Dosage forms, see page 39)

**B. Moderate-Severe Cases:** Hospitalize and treat with IV medications

*First line*

**Cefazolin,** 1 g IV TID for 10-14 days for adults

Dosage forms: Injection, 250 mg, 500mg, 1f in vial

(For S/Es and C/Is, see under ceftriaxone)

*Alternatives*

**Cefuroxime,** 50-100mg/kg/day IV TID for 10-14 days for children

Dosage forms: Tablet, 125 mg, 250 mg; Injection, 250 mg, 500mg, 750 mg, 1.5g in vial (For S/Es and C/Is, see under ceftriaxone)

OR

**Clindamycin,** 300mg IV QID for 10-14 days for adults; 1mg/kg/day IV in 6 hours for 10-14 days for children

(For S/Es, C/Is and Dosage forms, see page 44, 45)

PLUS

**Gentamicin,** 2.0mg/kg IV loading dose, and then 1 mg/kg IV TID for 10-14 days

(For S/Es, C/Is and Dosage forms, see page 39)

*N.B.* IV antibiotics can be changed to comparable oral antibiotics after significant improvement is observed.

**Referral:** In severe and complicated cases refer to an ophthalmologist
ACUTE INFECTIOUS DACRYOADENITIS

It is an infection of the lacrimal gland. It is usually caused by bacteria (Staphylococcus aureus, Neisseria gonorrhea, streptococci) or virus (mumps, infectious mononucleosis, influenza, herpes zoster). Acute dacryoadenitis typically occurs in children and young adults. It manifests with unilateral pain, redness, erythema, warmth, tenderness, and swelling over the outer one third of the upper eyelid, often with tearing or discharge. It may be associated with hyperemia of the palpable lobe of the lacrimal gland.

**Diagnosis:** Complete blood cell count, blood culture, Gram’s stain and pus culture from any discharge

**Treatment**

**Non-drug treatment:** Incision and drainage if there is an abscess.

**Drug treatment**

**A. Bacterial or infectious (but unidentified) etiology**

1. **Mild-to-Moderate**

   **First line**

   Cloxacillin, 500mg P.O. QID for 7-14 days for adults;
   50-100mg/kg/day in 4 divided doses for 7-14 days for children
   (For S/Es, C/Is and Dosage forms, see page 39, 214)

   **Alternatives**

   Amoxicillin/clavulanate, 625 mg P.O. BID for 10-14 days for adults;
   20-40mg/kg/day P.O. TID for 10-14 days for children.
   (For S/Es, C/Is and Dosage forms, see page 52)

   **OR**

   Cefaclor, 250-500mg P.O. TID for 10-14 days for adults.
   (For S/Es, C/Is and Dosage forms, see page 246)

   **OR**

   Cephalexin, 250-500mg P.O. QID for 7-14 days for adults;
25-50mg/kg, P.O. in 4 divided doses for 7-14 days for children
(For S/Es, C/Is and Dosage forms, see page 204)

2. Moderate-to-severe:
Hospitalize and treat them with IV medications (see under acute dacryocystitis)
N.B. The antibiotic regimen should be adjusted according to the clinical response
and the result of culture and sensitivity. IV medications can be changed to
oral depending on the rate of improvement of the patient.

B. Viral (mumps, infectious mononucleosis)
Treatment
Non-drug treatment: Cold compresses to the area of swelling and tenderness

Drug treatment
  First line
  **Acetaminophen**, 650mg P.O. every 4-6 hours for adults
  (For S/Es, C/Is and Dosage forms, see under paracetamol)
  
  Alternative
  **Acetylsalicylic Acid**, 30-60mg/kg/day P.O. in 4-6 divided doses for
  children (For S/Es, C/Is and Dosage forms, see page 123, 126)

Referral: In severe and complicated cases refer to an ophthalmologist

ALLERGIC CONJUNCTIVITIS

1. Atopic Keratoconjunctivitis
Atopic Keratoconjunctivitis may occur in patients who have or had Atopic
Dermatitis. About one third of patients with atopic dermatitis develop one or more
manifestations of atopic keratoconjunctivitis. As a consequence of depressed cell
mediated immunity, patients are susceptible to herpes simplex virus keratitis,
and to colonization of the eyelids with *staphylococcus aureus*. Symptoms include;
itching, blepharospasm, photophobia, blurred vision, and copious mucous
discharge.
**Diagnosis:** Clinical

**Treatment**

**Non-drug treatment:** Avoidance of responsible allergens

**Drug treatment**

Treatment should be based on the severity of patient symptoms, and consists of one or more of the following:

- Cold compresses
- Topical vasoconstrictors
- Topical antihistamines
- Topical nonsteroidal anti-inflammatory medications
- Judicious and selective use of topical corticosteroids
- Artificial tears

**Topical vasoconstrictors**

*First line*

**Tetrahyrdazoline**, 1 drop 3-4 times per day for not more than one week.

*S/Es:* Conjunctival hyperemia, photosensitivity, hypersensitivity reactions

Dosage form: Eye drop, 0.05%

*Alternative*

**Oxymethazoline**, 1 drop 3-4 times per day for not more than one week.

*S/Es:* Conjunctival hyperemia, photosensitivity, hypersensitivity reactions

Dosage forms: Eye drop, 0.025%, 0.05%

*N.B.* Topical vasoconstrictors, alone or in combination with antihistamines, may provide symptomatic relief. But, their use for more than 5-7 consecutive days may predispose to rebound conjunctival hyperemia, tachyphlaxis, and compensatory chronic vascular dilatation.

**Topical vasoconstrictor-Antihistamine Combinations**

*First line*

**Naphazoline + Antazoline**, 1 drop 3-4 times per day

Dosage forms: Solution, 0.025%+0.5%.
Alternative

Naphazoline + Phenylephrine, 1 drop 3-4 times per day
Dosage form: Solution, 0.25% + 0.3%

Topical antihistamines

First line

Levocabastine, 1 drop 3-4 times per day
Dosage forms: Solution, 0.5%

Alternative

Olopatadine, 1 drop 3-4 times per day
Dosage form: Solution 0.1%

N.B. Oral antihistamines may provide symptomatic relief in some patients

Topical mast-cell stabilizers

First line

Cromolyn Sodium, 1 drop 3-4 times per day
Dosage forms: Solution 4%

Alternatives

Lodoxamide, 1 drop 3-4 times per day
Dosage form: Solution 0.1%

N.B. Topical mast-cell stabilizers may be useful for treatment of seasonal allergic conjunctivitis. They are, however, ineffective at the acute phase due to their slow onset of effect.

Topical non-steroidal anti-inflammatory agents

First line

Diclofenac, 1 drop 3-4 times per day
Dosage form: Solution, 0.1%
Alternatives

- **Flurbiprofen**, 1 drop 3-4 times per day
  
  **Dosage form**: Eye drop, 0.03%

OR

- **Ketorolac**, 1 drop 3-4 times per day
  
  **Dosage form**: Solution, 0.5%

OR

- **Suprofen**, 1 drop 3-4 times per day
  
  **Dosage form**: Solution, 1%

Topical corticosteroids

*First line*

- **Dexamethasone**, 1 drop every 2-4 hours per day depending on the severity of the disease and tapered every 5-7 days down to 1 drop every other day.
  
  *(For S/Es and C/ls, see page 319)*
  
  **Dosage form**: Eye drop, 0.1%

Alternatives

- **Prednisolone**, 1 drop every 2-4 hours per day depending on the severity of the disease and tapered every 5-7 days down to 1 drop every other day.
  
  *(For S/Es and C/ls, see page 91)*
  
  **Dosage forms**: Suspension (Eye drop), 0.25%, and 1%

OR

- **Dexamethasone Sodium Phosphate**, single strip of ointment applied 2-3 times daily
  
  **Dosage form**: Ointment 0.05%

OR

- **Fluoromethalone**, 1 drop every 2-4 hours per day depending on the severity of the disease and tapered every 5-7 days down to 1 drop every other day OR single strip of ointment applied 4-6 times daily
  
  **Dosage forms**: Suspension, 0.1%, 0.25%; Ointment 0.1%
**Combined Topical Corticosteroids-Antibiotic Ophthalmic Preparations**

*First line*

Dexamethasone + Gentamicin, 1 drop every 2-4 hours per day depending on the severity of the disease and tapered every 5-7 days down to 1 drop every other day.

*(For S/Es and C/Is, see page 39, 319)*

**Dosage form:** Eye drop, 0.1% + 0.3%

*Alternative*

Dexamethasone + Tobramicin, single strip of ointment applied 4-6 times daily

*(For S/Es and C/Is, see page 319)*

**Dosage forms:** Ointment 0.1% + 0.3%

**N.B.** Patients should be carefully evaluated for secondary infection and get treated accordingly.

**Referral:** In severe and complicated cases refer to an ophthalmologist

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**2. Hey Fever and Perennial Allergic Conjunctivitis**

Hey Fever (seasonal) and Perennial Allergic Conjunctivitis are type I IgE-mediated immediate hypersensitivity reactions. Patients with this condition often suffer from other atopic conditions, such as allergic rhinitis and asthma. Symptoms consist of itching, eyelid swelling, conjunctival hyperemia and chemosis, and mucoid discharge. Intense itching is a hallmark symptom, and attacks are usually short-lived and episodic.

**Diagnosis:** Generally clinical, conjunctival scraping to look characteristics of eosinophils or their granules

**Treatment:** Treatment should be directed to avoid exposure to allergen.

**Non-drug treatment**

*Cleaning of carpets, linens, and bedding to remove accumulated allergens such as animal dander and dust house mites.*

*Cold compresses*
Drug treatment

1. **Mild disease:** Topical antihistamines ± non-steroidal anti-inflammatory medications (See under Atopic Keratoconjunctivitis)

2. **Moderate to Severe disease:** Topical mast-cell stabilizers ± non-steroidal anti-inflammatory medications (See under Atopic Keratoconjunctivitis)

3. **Severe disease:** Steroids ± topical antihistamines ± non-steroidal anti-inflammatory medications ± mast-cell stabilizers (See under Atopic Keratoconjunctivitis)

3. Vernal Keratoconjunctivitis

Vernal keratoconjunctivitis is usually a seasonal recurring, bilateral inflammation of conjunctiva, predominantly occurring in male children who frequently but not invariably have personal or family history of atopy. It manifests with itching, blepharospasm, photophobia, blurred vision, and copious mucous discharge.

**Diagnosis:** Clinical

**Treatment**

Therapy should be based on the severity of the patient’s symptoms and of the ocular surface disease.

**Non-drug treatment**

* Climatotherapy such as the use of air-conditioning or relocation to cooler environment. *Ice packs and frequent face washing with cold water gives temporary relief.

**Drug treatment**

1. **Mild disease:** Topical antihistamines ± non-steroidal anti-inflammatory medications (See under Atopic Keratoconjunctivitis)

2. **Moderate to Severe disease:** Topical mast-cell stabilizers ± nonsteroidal Anti-inflammatory medications (See under Atopic Keratoconjunctivitis)

3. **Severe disease:** Steroids ± topical antihistamines ± non-steroidal anti-inflammatory medications ± mast-cell stabilizers (See under Atopic Keratoconjunctivitis)
N.B.

1. Corticosteroids should be reserved for exacerbations with moderate to severe discomfort and/or decreased visual acuity.
2. Corticosteroids should be discontinued between attacks.
3. The patient and family must be thoroughly informed about the potential risk of chronic steroid therapy.

Referral: In severe and complicated cases refer to an ophthalmologist

Bacterial Conjunctivitis

1. Conjunctivitis in Children and Adults

Acute purulent conjunctivitis is characterized by more or less generalized conjunctival hyperemia, edema, muco-purulent eye discharge, gumming of eye lashes and a varying degree of ocular discomfort. Visual acuity is not usually affected.

Diagnosis: Clinical, Gram stain, Culture

Treatment

Non-drug treatment: Frequent cleaning of the eyelids and warm compression

Drug treatment

Frequent topical instillation of antibiotic eye drops or ointments is useful.

First line

Chloramphenicol, 1 drop every 4-6 hours OR single strip of ointment applied 2-4 times per day for 10-15 days.

(For S/E and C/I, see page 23)

Dosage forms: Eye drops, 0.5%; Ointment, 1%

Alternatives

Tetracycline, single strip of ointment applied 2-4 times per day for 10-15 days. (For S/E and C/I, see page 19)

Dosage form: Eye Ointment, 1%

OR

Gentamicin, 1 drop every 4-6 hours per day for 10-15 days.

(For S/E, C/I and Dosage forms, see page 39)

OR

Tobramycin, 1 drop every 4-6 hours per day for 10-15 days.
2. Neonatal Conjunctivitis

Conjunctivitis in the newborn is commonly to the result of infection with *Neisseria gonorrhoeae* or *Chlamydia trachomatis*. The etiologic agent can sometimes be distinguished by the timing of infection: infection with gonococcus typically occurs on day 3 to 5, while infection with Chlamydia occurs between 5 to 14 days. Conjunctivitis in the newborn might have occurred from prophylactically administered silver nitrate drops; in this case the inflammation occurs within the first days of life. Gonococcal conjunctivitis (ophthalmic neonatorum) is a serious infection in neonates and, if untreated, it progresses to corneal ulceration, corneal perforation and endophthalmitis (deeper infection of the globe), leading to blindness.

**Diagnosis**

Characterized by rapid progressive copious purulent conjunctival discharge, marked conjunctival hyperemia and chemosis, and eyelid edema. Gram stain and culture of the exudates from eye discharge should be performed.

**Treatment**

**Non-drug treatment:** Saline irrigation of the conjunctiva

**Drug treatment**

Systemic as well as Topical drugs are used.

I. **Systemic antibiotics**

   **First line**

   **Penicillin G Sodium Crystalline**, 50,000 IU/kg QID for 10 days.
   (For S/Es, C/Is and Dosage forms, see under benzyl penicillin)

   **N.B.** Most gonococcal strains are now resistant to penicillin.

   **Alternatives**

   **Ceftriaxone**, 50 mg/kg to a maximum of 125 mg as a single IM injection
   (For S/Es, C/Is and Dosage forms, see page 17)
OR

**Cefotaxime**, 25mg/kg IV OR IM every 8-12 hours for 7 days.
(For S/Es, C/Is and Dosage forms, see page 17)

II. **Topical antibiotics**

*First line*

**Tetracycline**, single strip of ointment applied 2-3 times daily for 2 weeks
(For S/Es, C/Is and Dosage forms, see page 19)

OR

**Erythromycin**, single strip of ointment applied 2-3 times daily for 2 weeks
(For S/Es, C/Is and Dosage forms, see page 214, 315)

*Alternatives*

**Chloramphenicol**, 1-2 drops 3-4 times daily OR single strip of ointment applied 2-3 times daily
(For S/Es and C/Is, see page 23)

*Dosage forms:* Eye drops, 0.5%; eye ointment, 1%

OR

**Gentamicin**, 1-2 drops 4-6 times daily for 10-15 days
(For S/Es and C/Is, see page 39)

*Dosage form:* Solution (Eye Drop), 0.3%

**Prophylaxis of gonococcal conjunctivitis**

- Clean the newborn’s eye with 0.9% saline or clean water using sterile gauze
- Apply single strip of ointment into each eye any of the above antibiotic eye ointments

*Referral:* In severe and complicated cases refer to an ophthalmologist

**BLEPHARITIS**

Blepharitis is a general term for inflammation of the eyelids. It is one of the most common causes of external ocular irritation. There are two main types of blepharitis: *Seborrhoeic blepharitis* and *Staphylococcal blepharitis*. If it is associated with conjunctivitis, it is termed as *Blepharoconjunctivitis*. 

288
1. Seborrhoeic blepharitis

The inflammation is located predominantly at the anterior eyelid margin. One third of patients with seborrhoeic blepharitis have aqueous tear deficiency. Seborrhoeic blepharitis may occur alone or in combination with staphylococcal blepharitis. It is the milder form of blepharitis with symptoms like, chronic eyelid redness, burning, foreign body sensation, itching, a variable amount of oily or greasy crusting, eye discharge, and easily plicable eyelashes.

**Diagnosis:** Clinical symptoms and signs

**Treatment**

**Non-drug treatment**

Eyelid hygiene is the primary treatment in patients with blepharitis

- Use of warm compresses
- Expression of meibomian gland secretions
- Cleanliness of the eyelid margins to remove keratinized cells and debris with
  Baby shampoo, tea water, salt water or commercially available eyelid scrub.

**Drug treatment**

*First line*

**Oxytetracycline+Polymixin B+Hydrocortisone**, 1 drop 2-3 times a day for 2-4 weeks

(For S/Es and C/I's, see page 91)

Dosage form: Suspension, 0.977g + 1 million I.U + 0.5g

**Alternatives**

**Tetracycline**, single strip of ointment applied 2-3 times daily for 2-4 weeks

(For S/Es and C/I's, see page 19)

Dosage form: Eye ointment, 1%

OR

**Erythromycin**, single strip of ointment applied 2-3 times daily for 2-4 weeks

(For S/Es and C/I's, see page 214, 315)

Dosage form: Eye ointment, 0.5%
2. Staphylococcal blepharitis (ulcerative blepharitis)

The most common causes of blephritis are staphylococcal infections usually caused by staphylococcus aureus. It is more common in younger individuals. Symptoms include; irritation and burning to peak in the morning and improve as the day progresses. It has also foreign body sensation, itching, and crusting, particularly upon awakening. The following signs are most important findings during an examination:

- Hard, brittle fibrinous scales and hard, matted crusts surrounding individual cilia (eyelash) on the anterior eyelid margin
- Ulceration of anterior eyelid margin
- Injection and telangiectasis of anterior and posterior eyelid margin
- White lashes (Poliosis)
- Loss of eyelashes (madarosis)
- Trichiasis can be seen in varying degrees depending on the severity and duration of blepharitis

**Diagnosis:** Clinical symptoms and signs

**Treatment**

**Non-drug treatment:** See under seborrhoeic blepharitis

**Drug treatment**

1. **Topical**
   
   **First line**

   **Dexamethasone,** 1 drop 4-6 times a day for 3-6 weeks and tapered every 5-7 days

   *(For S/Es and C/Is and Dosage forms, see page 319)*

   **Alternatives**

   **Oxytetracycline+Polymixin B+Hydrocortisone,** 1 drop 2-3 times a day for 2-4 weeks

   *(For S/Es, C/Is and dosage forms, see page 91)*

   **OR**

   **Tetracycline,** single strip of ointment applied 2-3 times daily for 2-4 weeks

   *(For S/Es and C/Is, see page 19)*

   **Dosage form:** Eye ointment, 1%
OR

**Erythromycin**, single strip of ointment applied 2-3 times daily for 2-4 weeks

*(For S/Es and C/Is, see page 214, 315)*

**Dosage form:** Eye ointment, 0.5%

II. Systemic (for recurrent cases)

  *First line*

  **Tetracycline**, 250mg P.O. QID for 6 weeks, then tapered slowly

  *Alternative*

  **Doxycycline**, 100mg P.O. BID for 6 weeks, then tapered slowly

*(For S/Es and C/Is and Dosage forms see page 21)*

**N.B.** Topical and systemic medications should be given simultaneously.

**Referral:** In severe and complicated cases refer to an ophthalmologist

**CHEMICAL BURNS**

Chemical Burns can include **Alkaline chemicals** (e.g. lye, cements, plasters), **Acids**, **Solvents, Detergents, and Irritants**. Alkaline chemicals are more harmful than acids. The degree of chemical burn can be classified as mild, moderate or severe, and the symptoms and signs depend on the degree of the injury.

**Critical Signs:** Corneal epithelial defects, pronounced chemosis and perilimbal blanching, corneal edema and opacification, sometimes with little-to-no view of the anterior chamber, iris, or lens.

**Other Signs:** Focal area of conjunctival chemosis, hyperemia, and/or hemorrhage; mild eyelid edema; first, second or third degree burn of the periorbital skin.

**Diagnosis:** History and clinical examination

**Treatment:** Treatment must be instituted IMMEDIATELY, even before making vision test!!
Non-drug Emergent treatment

a. Copious irrigation of the eyes, preferably with saline or Ringer’s lactated solution, for at least 30 minutes. However, if non sterile water is the only available liquid, it should be used.
b. Pull down the lower eyelid and evert the upper eyelid, if possible, to irrigate the fornices.
c. Manual use of IV tubing connected to an irrigation solution facilitates the irrigation.
d. Five minutes after ceasing the 30 minutes irrigation to allow for equilibrium, litmus paper is touch the inferior conjunctival fornix (cul-de- sac) to measure the pH. If the pH is not neutral (i.e., 7) the irrigation should be continued until neutral pH is reached.

Drug treatment

1. Give any available pain medications
2. Apply any available antibiotic eye ointments and put pressure patch for 24 hours

N. B. Refer to an ophthalmologist immediately if the injury is severe. In mild cases, evaluate after 24 hours and refer the patient if the vision is still compromised.

External Hordeolum /STYE/

It is an acute small staphylococcal infection of an eyelash follicle and associated with glands of Zeis or Moll. Tender inflamed swelling in the lid margin may point anteriorly through the skin. More than one lesion may be present and occasionally minute abscesses may involve the entire lid margin. It can manifest with visible or palpable, well-defined nodule in the eyelid margin or painful and tender swelling of eyelid margin of short duration. In severe cases a mild preseptal cellulitis may be present.

Diagnosis: Clinical symptoms and signs

Treatment

Non-drug treatment

- Warm compresses; applied for 10 minutes twice daily for 2-4 weeks
- Epilation of the involved eyelashes
- Incision and curettage if it does not disappear with other treatments
**Drug treatment**
No treatment in most cases, styes frequently resolve spontaneously or discharge anteriorly. If it is not resolved spontaneously:

*First line*

Oxytetracycline + Polymixin B + Hydrocortisone, 1 drop 2-3 times a day for 2-4 weeks

**Dosage forms:** 0.977 gm + 1,000,000 I.U. + 0.5 gm. In 100 gm of oily Suspension (4 gm)

*Alternatives*

Tetracycline, single strip of ointment applied 2-3 times daily for 2-4 weeks *(For S/Es, C/Is and Dosage forms, see page 19)*

OR

Erythromycin, single strip of ointment applied 2-3 times daily for 2-4 weeks *(For S/Es, C/Is and Dosage forms, see page 214, 315)*

**PLUS (if associated with cellulitis)**

*First line*

Ampicillin, 50mg/kg P.O. in four divided doses for 7 days

*(For S/Es and C/Is and Dosage forms, see page 18)*

*Alternative*

Cloxacillin, 50mg/kg P.O. in four divided doses for 7 days

*(For S/Es and C/Is and Dosage forms, see page 39, 214)*

**INTERNAL HORDEOLUM**
Hordeolum is an inflammatory or infectious nodule that develops in the eyelid within the tarsal plate. Most frequently, it results from inspissations and secondary infection of sebaceous glands caused by staphylococcus. Its symptoms and signs include; eyelid lump, swelling, pain, tenderness, erythema, visible or palpable, well-defined subcutaneous nodule within the eyelid (tarsus)

**Diagnosis:** Clinical symptoms and signs

**Treatment**

**Non-drug treatment**
- Warm compresses: applied for 10 minutes twice daily for 2-4 weeks
- Incision and curettage if it does not disappear with other treatments
Drug treatment: See under “External hordeolum”

MEIBOMIAN CYST (CHALAZION)
It is a chronic lipogranulomatous inflammatory lesion caused by blockage of meibomian gland orifices and stagnation of sebaceous secretion. Patient with acne rosacea or seborhoeic dermatitis are at increased risk of chalazion formation which may be multiple or recurrent. If it is recurrent, one should think of sebaceous gland carcinoma. It is a painless visible or palpable, well-defined nodule in the eyelid (eyelid lump) within the tarsal plate. Eversion of the lid may show an associated polyplody granuloma if the lesion has ruptured through the tarsal conjunctiva.

Diagnosis: Clinical symptoms and signs

Treatment

Non-drug and drug treatment: See under “Internal hordeolum”.

N.B. If the chalazion is recurrent, refer the patient to an ophthalmologist for further management to rule out malignant lesion like Sebaceous Gland Carcinoma

MOLLUSCUM CONTAGIOSUM
Molluscum contagiosum is uncommon skin infection caused by poxvirus. It is a self-limited disease, but spontaneous resolution may take months to years. Extensive facial and eyelid molluscum lesions have been reported in immunocompromized patient. Complete resolution in these cases is often difficult. Molluscum contagiosum has a painless and raised skin lesions which are dome-shaped, usually multiple, umblicated, shiny nodule on the eyelid or eyelid margin. Follicular conjunctival reaction from toxic viral products and corneal pannus are serious signs.

Diagnosis: Clinical symptoms and signs

Treatment

Non-drug treatment: Shave excision, Expression, Cauterization, Cryotherapy or LASER

Drug treatment for follicular conjunctivitis

First line

Oxytetracycline + Polymixin B+Hydrocortisone, 1 drop 2-3 times a day for 2-4 weeks (Dosage forms, see page 262)
Alternatives

Tetracycline, single strip of ointment applied 2-3 times daily for 2-4 weeks
(For S/Es and C/Is and Dosage forms, see page 19)

OR

Erythromycin, single strip of ointment applied 2-3 times daily for 2-4 weeks (For S/Es and C/Is and Dosage forms, see page 214, 315)

Referral: In severe and complicated cases refer to an ophthalmologist

OPHTHALMIC ZOSTER (HERPES ZOSTER OPHTHALMICUS=HZO)

It is caused by Varicella-zoster virus from established latency in sensory neural ganglia after primary infection. Age is the most common predisposing factor; most patients are in their 60-90 years of age. It is generally common in immunocompromised patient. The ophthalmic division (V₁) of CN V is affected more often than the maxillary and mandibular division. It is usually unilateral. Ocular involvement is common with HZO, occurring in more than 70% of patients. It is most likely to appear with infection of the nasociliary branch of CNV₁. Symptoms include; pain and dysesthesia and manifests with the following signs in chronological order:

- Maculopapular rash in the forehead
- Development of vesicles, pustules and crusting ulceration
- In severe cases, periorbital edema due to secondary bacterial cellulitis.

Diagnosis: Clinical symptoms and signs

Treatment: Antiviral should be given within 48-72 hrs after rash, because the drug needs active viral replication

First line

Acyclovir, 800mg 5x/day for 7-10days for adults
(See page 215 for Children)
(For S/Es and C/Is and Dosage forms, see page 215)

Plus

Aspirin, 600mg every 4hours P.O. PRN
(For S/Es, C/Is and Dosage forms, see page 32)
OR

**Paracetamol**, 1gm every 4hours P.O. PRN  
*(For S/Es C/Is and Dosage forms, see page 53)*

**For the wound**: Clean the wound with Gentian Violet  
*(For dosage schedule, S/Es, C/Is and Dosage forms, see page 203)*

**N.B.** If the tip and side of the nose is infected, the eye is likely to be involved even if it looks normal. So treatment is indicated with the following medications.

**Atropine**, 1 drop BID OR single strip of ointment applied BID  
*(For S/Es and C/Is, see page 88)*

**Dosage forms**: Eye drop, 1%; Eye ointment, 1%

If eye is red and painful; it can be Corneal Ulcer

**Chloramphenicol**, 1-2 drops QID  
*(For S/Es C/Is and Dosage forms, see page 23)*

If there is no corneal ulcer;

**First line**

**Dexamethasone Sodium Phosphate**, 1 drop 4-6 times a day (taper it every 5-7 days)  
*(For S/Es, C/Is and Dosage forms, see page 319)*

**Alternative**

**Oxytetracycline+Polymixin B+Hydrocortisone**, 1 drop 3-4 times a day for 2-4 weeks and tapered every 5-7 days.  
*(For S/Es C/Is and Dosage forms, see page 91)*

**Post herpetic Neuralgia**

**Aspirin**, 600mg Q4hr P.O. PRN  
*(For S/Es C/Is and Dosage forms, see page 32)*

OR

**Paracetamol**, 1gm Q4hr PRN  
*(For S/Es C/Is and Dosage forms, see page 53)*
OR

Carbamazepine, 100gm P.O. per day, increase the full dose 300 to 400gm BID (For S/Es, C/Is and Dosage forms, see page 108)

Referral: In severe and complicated cases refer to an ophthalmologist

ORBITAL CELLULITIS

Orbital cellulitis implies active infection of the orbital soft tissue posterior to the orbital septum. In more than 90% of cases orbital cellulitis occurs as a secondary extension of acute or chronic bacterial sinusitis. Therefore, evaluation of the paranasal sinuses is essential in any patient with orbital cellulitis. Delay in treatment may result in progression of the infection an orbital apex syndrome or cavernous sinus thrombosis. Blindness, cranial nerve palsies, brain abscess, and even death can result and best avoided by aggressive management. Decreased vision and pupillary abnormalities suggest involvement of the orbital apex and demand immediate investigation and aggressive management. The symptoms include red eye, pain, blurred and double vision, fever and headache. The signs of orbital cellulitis includes; eyelid edema, erythema, warmth, tenderness, proptosis, conjunctival chemosis, restriction of ocular motility, pain upon movement of the globe, decreased vision and pupillary abnormality.

Diagnosis: Clinical and X-ray of the paranasal sinuses

Treatment: Admit the patient to hospital

Drug treatment

First line

Ceftriaxone, 1-2g IV BID for 14 days for adults; 40mg/kg/day IV in 2 divided doses for 14 days for children

(For S/Es C/Is and Dosage forms, see page 17)

PLUS

Vancomycin, 0.5-1g IV BID for 14 days for adults; 40mg/kg/day IV in 2-3 divided doses for 14 days for children.

(For S/Es C/Is and Dosage forms, see page 40)

OR
**Nafcillin**, 1-2g IV every 4 hours for 14 days for adults; 
150mg/kg/day IV in 6 divided doses for 14 days for children 
*(For S/Es C/Is and Dosage forms, see page 191)*

**Alternative**

**Clindamycin**, 300mg IV QID for 10-14 days for adults; 
1mg/kg/day IV QID in 4 divided doses for 10-14 days for children 
*(For S/Es C/Is and Dosage forms, see page 44)*

**Plus**

**Gentamicin**, 2.0mg/kg IV loading dose, then 1mg/kg IV TID for 10-14 days 
*(For S/Es C/Is and Dosage forms, see page 39)*

**N.B.** Consider adding **metronidazole** 15mg/kg IV load, then 7.5mg/kg IV QID for adults with chronic orbital cellulitis or when anaerobic infection is suspected to all the above drugs other than clindamycin. 
*(For S/Es C/Is and Dosage forms, see page 14)*

**Additional treatments**

- **Nasal decongestants** (See page 250)
- **Tetracycline or Chloramphenicol or Erythromycin** single strip ointments applied QID for corneal exposure if there is severe proptosis. 
  *(For S/Es, C/Is and Dosage forms, see pages 19, 180 and 214, respectively)*

**N.B.** When orbital cellulitis is consistently improving, the regiment can be changed to oral antibiotics to complete the 14 day course. Often used antibiotics include:

**First line**

**Amoxicillin/clavulanate**, 250-500mg P.O. TID for adults; 
20-40mg/kg/day P.O. TID for children 
*(For S/Es, C/Is and Dosage forms, see page 52)*

**Alternative**

**Cefaclor**, 250-500mg P.O. TID for adults; 
20-40mg/kg/day P.O. TID for children 
*(For S/Es C/Is and Dosage forms, see page 246)*

**Referral:** In severe and complicated cases, refer to an ophthalmologist
PRESEPTAL CELLULITIS

It is an inflammation and infection confined to the eyelids and periorbital structures anterior to the orbital septum. It usually results from inoculation following trauma or skin infection. Symptoms include; pain, tenderness, erythema, swelling/edema, warmth, and redness of eyelid, mild fever, and irritability.

The globe is not usually involved; papillary reaction, visual acuity, and ocular motility are not disturbed; pain upon eye movement and chemosis are absent. S. aureus and streptococci are the most common organisms, H. influenzae should, however, be considered in children. Preseptal cellulitis in infants and children under age 5 may be associated with bacteremia, septicemia, and meningitis. In such cases; hospitalization and intravenous antibiotics are indicated. Suspect anaerobes if a foul smelling discharge or necrosis is present or there is a history of animal or human bite. Consider viral if there is skin rash (herpes simplex or herpes zoster).

**Diagnosis:** Complete blood cell count, blood culture, Gram’s stain and pus culture.

**Treatment**

**Non-rug treatment**

- Incision and drainage if there is an abscess
- Warm compresses to the affected area TID PRN

**Drug treatment**

**A. Mild preseptal cellulitis**

*First line*

- Amoxicillin/clavulanate, 250-500mg P.O. TID for 10 days for adults; 20-40mg/kg/day P.O. TID for 10 days for children

(For S/Es C/Is and Dosage forms, see page 52)

*Alternatives*

- Sulfamethoxazole+trimethoprim, 160mg/800mg BID for 10 days for adults; 8mg/40mg/kg/day P.O. in 2 divided doses for 10 days for children.

(For S/Es C/Is and Dosage forms, see page 16)
OR

**Erythromycin**, 250-500mg P.O. QID for 10 days for adults; 30-50mg/kg/day P.O. 3-4 divided doses for 10 days for children

(For S/Es C/Is and Dosage forms, see page 214)

OR

**Cefaclor**, 250-500mg P.O. TID for 10 days for adults; 20-40mg/kg/day P.O. TID for 10 days for children

(For S/Es C/Is and Dosage forms, see page 246)

**B. Moderate-to-severe preseptal cellulitis**: Admit to the hospital for IV antibiotics

*First line*

**Ceftriaxone**, 1-2g IV BID for 10-14 days for adults;
40mg/kg/day IV in 2 divided doses for 10-14 days for children

(For S/Es, C/Is and Dosage forms, see page 17)

*Plus*

**Vancomycin**, 0.5-1g IV BID for 10-14 days for adults;
40mg/kg/day IV in 2-3 divided doses for 10-14 days for children.

(For S/Es C/Is and Dosage forms, see page 40)

*Alternative*

**Clindamycin**, 300mg IV QID for 10-14 days for adults;
1mg/kg/day IV QID for 10-14 days for children

(For S/Es C/Is and Dosage forms, see page 44)

*Plus*

**Gentamicin**, 2.0mg/kg IV loading dose, then1mg/kg IV TID for 10 -14 days

(For S/Es C/Is and Dosage forms, see page 39)

**N.B.** IV antibiotics can be changed to comparable oral antibiotics after significant improvement is observed.

**Referral**: In severe and complicated cases, refer to an ophthalmologist
TRACHOMA

Trachoma is a chronic keratoconjunctivitis caused by the organism *Chlamydia trachomatis* that primarily affects the superior and inferior tarsal conjunctiva and cornea. Has a non specific symptom like, foreign body sensation, redness, tearing and mucopurulent discharge. It is characterized by a progressive conjunctival follicular hyperplasia and scarring, entropion of the eyelid, trichiasis and corneal neovascularization and opacity. Trachoma is related to poor hygiene, and is a disease of poverty. It is the most important preventable disease and the most major cause of avoidable blindness in the world.

**Diagnosis**

Diagnosis is often made on the symptoms and typical physical signs. The World Health Organization (WHO) has introduced a simple severity grading system for trachoma based on the presence or absence of **five key signs**:

I. **Trachomatous Inflammation–Follicular (TF):** The presence of five or more follicles in the upper tarsal conjunctiva.

II. **Trachomatous Inflammation–Intense (TI):** Pronounced inflammatory thickening of the tarsal conjunctiva that obscures more than half of the deep tarsal vessels.

III. **Trachomatous Scarring (TS):** The presence of scarring in the tarsal conjunctiva.

IV. **Trachomatous Trichiasis (TT):** At least one eye lash rubs on the eye ball.

V. **Corneal opacity (CO):** Easily visible corneal opacity over the pupil.

**N.B.** *Chlamidia trachomatis* may be isolated from culture of the conjunctival scrub.

**Prevention and Treatment**

The World Health Organization (WHO) advocates **SAFE** strategy.

- **S** = Surgery for complications (TT & CO)
- **A** = Antibiotics for active (inflammatory) trachoma (TT & TI)
- **F** = Face washing, particularly in children
- **E** = Environmental improvement including provision of clean water
Drug treatment

1. Trachomatous Inflammation—Follicular (TF)

*First line*

Tetracycline, single strip of ointment applied BID for 6 weeks, OR as intermittent treatment BID for five consecutive days per month, OR QD for 10 consecutive days, each month for at least for six consecutive months.

*(For S/Es C/Is and Dosage forms, see page 19)*

*Alternative*

Erythromycin, single strip of ointment applied BID for 6 weeks

*(For S/Es C/Is and Dosage forms, see page 214)*

2. Trachomatous Inflammation—Intense (TI)

*Topical First line & Alternative (See under TF)*

PLUS

Tetracycline, 250mg P.O. QID for 3 weeks (only for children over 7 years of age and adults)

*(For S/Es, C/Is and Dosage forms, see page 19)*

OR

Doxycycline, 100mg P.O. QD for 3 weeks (only for children over 7 years of age and adults)

*(For S/Es, C/Is and Dosage forms, see page 21)*

OR

Erythromycin, 250mg P.O. QID for 3 weeks. For children of less than 25kg, 30mg/kg daily in 4 divided doses

*(For S/Es, C/I and Dosage forms, see page 214)*

OR

Sulfamethoxazole+trimethoprim, 160 + 800mg P.O. BID for 3 weeks.
For children of 6-12 years: half of the above dose. Children of < 6 years: mixture (syrup) as prescribed

*(For S/Es, C/Is and Dosage forms, see page 16)*
N.B. Azithromycin is given as a single dose of 20mg/kg. It represents long acting macrolides which has shown very promising effects in the treatment of trachoma in clinical research. It is still a very expensive drug.

S/Es: GI disturbances if absorbed

Dosage forms: Capsule, 250mg; Powder for Oral Suspension, 200mg/5ml

Referral: In severe and complicated cases, refer to an ophthalmologist

VITAMIN A DEFICIENCY (XEROPHTHALMIA)

Vitamin A is required for growth, health and proper functioning of surface tissues, including the epithelium of skin, mucus membranes, ocular tissues, particularly the cornea, conjunctiva and retina. Vitamin A is found naturally in dark-green leafy and yellow vegetables, tubers, and fruits; and occurs (preformed) in eggs, milk, liver, and fish.

Xerophthalmia is a term used to describe milder form of ocular changes resulting from Vitamin A deficiency. Xerosis means drying of the conjunctiva and corneal epithelium. Keratomalacia (softening and melting of the cornea) is the most severe form of Vitamin A deficiency. Children with corneal xerosis are likely to suffer from systemic illnesses, including diarrhea, pneumonia, and measles. The presence of keratomalacia indicates a poor prognosis for health and life; more than 50% of children with keratomalacia die because of associated poor nutritional status and susceptibility to disease. Patients with Vitamin A deficiency can not see adequately in dim light (night blindness or nyctalopia) and manifest with thinning and lightening of hair, weight loss, dry and scaling of skin.

Classification of Xerophthalmia

\( X_N \) - Night blindness
\( X_{1A} \) - Conjunctival xerosis
\( X_{1B} \) - Bitot's spots
\( X_2 \) - corneal xerosis
\( X_{3A} \) - Corneal ulceration/keratomalasia involving less than one third of the corneal surface
\( X_{3B} \) - Corneal ulceration/keratomalasia involving one third or more of the corneal surface
\( X_S \) - Corneal scars presumed secondary to xerophthalmia
**Xf - Xerophthalmic fundus**

**Diagnosis:** Nutritional history and clinical findings

**Treatment**

**Non-drug treatment and prevention**
- Dietary, economic and social factors
- Breast feeding up to the age of 2 years
- Adequate fat, protein in the diet.
- Nutritional: dark-green leafy vegetables, yellow vegetables, fruits, milk, eggs

**Drug treatment:** Vitamin A in different doses based on the objective of treatment

### I. Xerophthalmia Treatment Schedule for Children over one Year and under 6 Years Old

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately on diagnosis</td>
<td>200,000 IU vitamin A P.O.</td>
</tr>
<tr>
<td>Following day</td>
<td>200,000 IU vitamin A P.O.</td>
</tr>
<tr>
<td>Four weeks later</td>
<td>200,000 IU vitamin A P.O.</td>
</tr>
</tbody>
</table>

**N.B. If there is persistent vomiting or profuse diarrhea, 100,000 IU (water soluble) vitamin**

### II. Diseases-Targeted Prevention Schedule for Preschool Children at High Risk*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children over 1 year and under 6 years old</td>
<td>200,000 IU vitamin A P.O. at first contact with a health care worker for each episode of illness</td>
</tr>
<tr>
<td>Infants under 1 year old and children of any age who weigh less than 8 kg</td>
<td>100,000 IU vitamin A P.O. at first contact with a health care worker for each episode of illness</td>
</tr>
</tbody>
</table>

*Those presenting with measles, severe PEM, acute or prolonged diarrhea, acute lower respiratory infections.*
### III. Universal - Distribution Prevention Schedule for Preschool Children and Lactation Mothers

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Vitamin A Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children over 1 year and under 6 years</td>
<td>200,000 IU vitamin A P.O. every 3-4 months old who weigh 8 kg or more</td>
</tr>
<tr>
<td>Children over 1 year and under 6 years</td>
<td>200,000 IU vitamin A P.O. every 3-4 months old who weigh less than 8 kg</td>
</tr>
<tr>
<td>Infants</td>
<td>100,000 IU vitamin A P.O. at 6 months*</td>
</tr>
<tr>
<td>Lactating mothers</td>
<td>200,000 IU vitamin A P.O. at delivery or during the next 2 months; this will raise the concentration of vitamin A in the breast milk and help to protect the breast-fed infant</td>
</tr>
</tbody>
</table>

*Best treatment protocol:* 25,000IU orally at each of the three DPT visits, the polio immunization, and then at 9 months (measles immunization).

**Dosage forms:** Capsule, 25,000IU, 50,000IU, 100,000IU; tablet, 50,000IU, 100,000IU, 200,000IU; oral solution, 150,000IU/ml (concentrate) 50,000IU/ml; injection, 200,000IU/ml

**Referral:** In severe and complicated cases refer to an ophthalmologist.
CHAPTER VII

EAR, NOSE AND THROAT PROBLEMS

I. EAR PROBLEMS

Acute otitis media
Acute tubal occlusion
Acute vestibular paralysis
Bacterial and viral diffuse otitis externa
Barotrauma
Chronic otitis media
Foreign bodies in the ear
Idiopathic facial paralysis
Masoiditis
Meniere’s disease
Nonspecific inflammation of the external ear
Herpes zoster oticus (specific forms)
Temporal bone fracture

II. NOSE AND NASAL SINUSES PROBLEMS

Acute rhinitis
Acute rhinosinusitis
Allergic rhinitis
Atrophic rhinitis and ozena
Chronic sinusitis
Epistaxis
Foreign bodies in the nose

III. MOUTH and PHARYNX PROBLEMS

Acute tonsillitis
Peritonsilar abscess

IV. LARYNX and HYPOPHARYNX PROBLEMS

Acute epiglottitis
Acute laryngitis
Croup or larngotracheitis

V. SALIVARY GLAND PROBLEMS

Mumps
Sialadenitis of the paratoid and submandibular glands
I. EAR PROBLEMS

Acute otitis media

Acute otitis media is an inflammation which usually affects not only the mucosa of the middle ear, but also that of the entire pneumatic system. The infection is 90% monomicrobial. The infecting organisms are: Streptococci (in adults), Pneumococci (in children), Hemophilus Influenzae, Staphylococci and Coli forms. A viral infection may prepare the way for secondary bacterial infection.

The younger the child, the more severe the generalized symptoms are, and the more discrete the local signs are. The gastrointestinal symptoms are the most pressing symptoms occasionally. Every Attack of acute otitis media is accompanied by mastoiditis.

Diagnosis: Otoscopy shows hyperemia, moist infiltration and opacity of the surface of tympanic membrane.

Treatment

Drug treatment

First line

- **Amoxicillin**, 500mg P.O. TID for 10 days for adults; 250 mg P.O. TID for 10 days for children above 6 years of age; 125mg/5ml, 250mg/5ml P.O. TID for 10 days for children under 6 years of age.

(For S/Es, C/Is and dosage forms, see page 18)

Alternatives

- **Ampicillin**, Adults: 250–500mg P.O. QID for 10 days. Children: 50–100mg/kg P.O. QID OR 100-200mg/kg IV QID for 10 days

(For S/Es, C/Is and dosage forms, see page 18)

OR

- **Sulfamethoxazole+trimethoprim**, Adults; 160+800mg. P.O. BID for 10 days. Children 6 12 years of age; 80+400mg P.O. BID for 10 days

(For S/Es, C/Is and Dosage forms, see page 16)
Amoxicillin/Clavulanate, 375mg P.O. TID for 10 days OR 625mg P.O. BID for 10 days for adults 312mg/5ml suspension P.O. TID for 10 days OR 156mg/5ml suspension P.O. TID for 10 days for children
(For S/Es, C/Is and dosage forms, see page 52)

Erythromycin, Adults; 250mg to 500mg P.O. QID. Children; 30-50mg/kg P.O. QID OR 15-20mg/kg IV Q 4 to 6hours.
(For S/Es, C/Is and dosage forms, see page 214)

For pain:
Paracetamol, 30-40mg/kg in 4-6 divided doses in 24hrs.
(For S/Es, C/Is and dosage forms, see page 53)

N.B. Paracentesis should be carried out early if the tympanic membrane does not perforate spontaneously. Antrotomy should be carried out early if it is indicated on clinical ground

**ACUTE TUBAL OCCLUSION**

Acute tubal occlusion is a feeling of pressure in the ear accompanied by stabbing pain, deafness and a crackling noise on swallowing which occurs during rhinopharyngitis.

**Diagnosis:** Otoscopy shows a retracted tympanic membrane and injection of the handle of the malleus and the vessels of the tympanic membrane.

**Treatment**
Xylometazoline hydrochloride, 2-3 drops of 1% solution 3-4 times a day for adults and children over 6 years of age; 1-2 drops of 0.5% solution in each nostril for infants and small children up to 6 years of age

*S/Es:* Hypertension, rebound effect after discontinuation.

*P/C:* Never use for longer than 5 days.

**Dosage forms:** Solution (nasal drop), 0.05%, 0.1%
PLUS

**Chlorpheneramine**, 4mg 3-4 times a day (maximum 24mg/day) for adults and children age 12 or older. 2mg 3-4 times a day (maximum dosage 12mg/day) for children age 6-12 years. 1mg 3-4 times a day (maximum dosage 4mg/day) for children age 2-5 years.

*S/Es:* drowsiness, dry mouth, fatigue, dizziness

**Dosage forms:** Tablet, 5mg, 10mg; syrup, 2mg/5ml

**OR**

**Cetrizine**, 10mg QD for adults and children above 12 years; 5-10mg QD for children below 12 years.

*S/Es:* Drowsiness, headache, dry mouth, fatigue, dizziness and gastrointestinal discomfort.

*C/Is:* Patients with a history of hypersensitivity to it.

**Dosage forms:** Oral solution, 1mg/ml; Tablets, 5mg, 10mg

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**ACUTE VESTIBULAR PARALYSIS (VESTIBULAR NEURONITIS)**

Acute vestibular paralysis is largely unexplained. The disease may be caused by disturbance of the microcirculation due to infection, an autoimmune disease or metabolic disorder. The common symptoms include Rotary Dizziness, Ataxia, Nausea & Vomiting. The Dizziness could persist for days or week.

**Treatment**

**Acute phase**

**Diazepam**, 5-20mg IV rapidly then possible to titrate the dosage in the IV fluid by observing its effect, then maintenance dose 2.5-10mg P.O. depending on the severity for a short period to avoid addiction.

(For *S/Es, C/Is and dosage forms*, see page 59)
PLUS

Meclizine hydrochloride, 12.5 – 25mg P.O. QD OR 50mg/day in divided doses.
Dosage forms: Tablet, 12.5 mg, 25 mg
(for S/Es and C/Is, see under diphenhydramine)

OR

Promethazine, 25mg 1-3 times P.O. QD
(For S/Es, C/Is and Dosage forms, see page 43)

OR

Dimenhydrinate, 50 - 100mg P.O. QID as needed for adults and Teenagers;
12.5 – 25mg 6–8 hours as needed for children 2-6 years of age; 25 – 50mg every 6 – 8 hours as needed for children 6-12 years of age.
S/Es: Sore throat and fever; unusual bleeding or bruising; unusual tiredness or weakness.
C/Is: History of allergic reaction to antihistamines, enlarged prostate, Urinary tract blockage, glaucoma and history of heart rhythm problems, pregnancy and breast feeding mother.
Dosage form: Tablet, 50 mg

PLUS

Vitamin B1 + B6 + B12, 1 tab P.O. BID
S/Es: Excessive doses can cause nerve damage and aggravate existing acne.
C/Is: Psoriasis, anti-Parkinson’s drug therapy.
Dosage form: Tablet,
N.B. Not recommended for children.

If there is objective evidence of bacterial infection:

First line

Amoxicillin, 500 mg P.O. TID for 10 days.
(For S/Es, C/Is and Dosage forms, see page 18)

Alternative

Amoxicillin/Clavulanate, 375mg P.O. TID OR 625mg P.O. BID for 10 days
(For S/Es, C/Is and Dosage forms, see page 52)

OR

Sulfamethoxazole+trimethoprim,
(For dosage schedule, S/Es, C/Is and Dosage forms, see page 16)
**Bacterial and viral diffuse otitis externa**

Bacterial and viral diffuse otitis externa is a condition where there is complete obstruction of the external auditory meatus with an accompanying retroauricular lymphoadenitis especially in infants and young children.

**Diagnosis:** Fever, generalized illness, regional lymphadenitis and pain upon pulling on the auricle of the tragus.

**Treatment**

**Non-drug treatment:** Ear pack with 70-90% pure alcohol

**Drug treatment**

*First line*

Oxytetracycline hydrochloride + polymyxin B sulphate + hydrocortizone acetate, 2 drops 2-3 times daily.

(For S/Es, C/Is and Dosage forms, see page 91)

**Alternatives**

Cloxacillin, Adults; 500mg P.O. QID for 10 days. Children; 50-100mg/Kg/day P.O. divided into 4 doses for 10 days.

(For S/Es, C/Is and Dosage forms, see page 39)

**OR**

Amoxicillin, Adults; 250-500mg P.O. TID for 10 days.
Children; 50-100mg/kg P.O. TID for 10 days

(For S/Es, C/Is and Dosage forms, see page 18)

**OR**

Sulfamethoxazole+trimtethoprim ,

(For dosage schedule, S/Es, C/Is and Dosage forms, see page 16)

**OR**

Erythromycin, Adults; 250-500mg P.O. QID. Children; 30-50mg /kg P.O. QID OR 15-20mg/kg IV every 4 - 6hrs.

(For S/Es, C/Is and Dosage forms, see page 214, 315)
BAROTRAUMA

Barotrauma is sudden changes in air pressure, producing an absolute or relative reduction of pressure in the middle ear cause bleeding into the middle ear mucosa and into the tympanic membrane even rapture of the tympanic and round window membrane.

**Diagnosis:** History and otoscope findings

**Drug Treatment**

*First line*

- Xylometazoline hydrochloride, 2 drops 2 – 3 times QD
  (For S/Es, C/Is and Dosage forms, see page 277)

*PLUS*

- Paracetamol, 500mg P.O. PRN.
  (For S/Es, C/Is and Dosage forms, see page 53)

CHRONIC OTITIS MEDIA

Chronic otitis media is a chronic recurrent aural discharge of mucoid, purulent, odorless exudates with reduced hearing.

**Diagnosis:** The otoscope findings include a central defect of the tympanic membrane.

**Treatment**

*Non-drug treatment*

Conservative measures to dry up the middle ear. Clean the external meatus periodically with 3% H₂O₂; it may be irrigated with saline at body temperature.

Pus is taken for culture and sensitivity test and appropriate systemic antibiotics are given according to the culture result. Patient should be treated as early as possible by tympanoplasty.

FOREIGN BODIES IN THE EAR

The majority of patients with foreign bodies in the ear are children.

**Diagnosis**
Foreign bodies in the ear are diagnosed by careful otoscopy. In children, a careful history should be taken to establish the nature of the foreign body.

**Treatment**

**Non-drug treatment**

First attempt should be irrigation of the suspected ear with water. If the patient is known or suspected to have a perforation of the tympanic membrane, the ear should not be irrigated. Blind attempts at extraction without otoscopic control, or attempts at extraction under vision with unsuitable instruments and unsatisfactory anesthesia are negligent method of treatment.

Removal of foreign bodies from the meatus should therefore only be carried out by a specialist, apart from the simplest cases.

**Drug treatment:** Patient should be kept on antibiotic if there is sign of infection on the ear canal or purulent discharge.

*First line*

- **Amoxicillin**, 500mg P.O. TID for 10 days for adults; 250mg P.O. TID for 10 days for children above 6 years of age; 125mg/5ml OR 250mg/5ml P.O. TID 10 days for children under 6 years of age.
  
  *(For S/Es, C/Is and Dosage forms, see page 18)*

  OR

- **Amoxicillin/ clavulanate**, 375mg P.O. TID for 10 days or 625mg P.O. BID 10 days for adults; 156mg/5ml P.O. TID OR 312mg/5ml P.O. TID for 10 days for children. *(For S/Es, C/Is and Dosage forms, see page 52)*

  OR

- **Cloxacillin**, 500mg P.O. QID for 10 days for adults; 50-100mg/kg/day P.O. divided into 4 doses for 10 days for children.
  
  *(For S/Es, C/Is and Dosage forms, see page 39, 214)*

*Alternatives*

- **Oxytetracycline hydrochloride + Polymyxin B Sulphate + Hydrocortizone acetate**, 2 drops 2-3 times daily
  
  *(For S/Es, C/Is and Dosage forms, see page 91)*

  OR

- **Chloramphenicol**, 2-3 drops 2-4 times daily
  
  *(For S/Es, C/Is and Dosage forms, see page 23)*
N.B. **Foreign bodies that can not be removed by irrigation should be removed manually, using general anesthesia in small children.**

**Ears with vegetables foreign bodies should not be irrigated, since this may cause the vegetable matter to swell. Crushing the insect foreign bodies is to be avoided.**

**IDIOPATHIC FACIAL PARALYSIS (Bell’s palsy)**

Idiopathic facial paralysis may be a disturbance of the micro-circulation leading to a serous inflammation with the formation of edema. The cause is not known. A viral infection may also be responsible.

**Treatment**

Patients should receive both prednisone and acyclovir together.

**Prednisone**

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(For S/Es, C/Is and Dosage forms, see page 33)

PLUS

Acyclovir, 200 – 400 mg 5 times daily

(For S/Es, C/Is and Dosage forms, see page 215)

**N.B.** The patient should be seen on the fifth day or sixth day after onset of paralysis.

If paralysis is incomplete, Prednisone can be tapered during the next 5 days,
and Acyclovir can be discontinued. If any question about severity or progression arises, the full dose of Prednisone and Acyclovir should be continued for 7 – 10 days, and the Prednisone should then be tapered to zero beginning at day 10.

**MASTOIDITIS**

Mastoiditis is the most frequent complications of middle ear inflammation. It is an extension of the infection from the middle ear cavity to the pneumatic system of the temporal bone.

**Diagnosis:** Aural discharge, tenderness to pressure over the mastoid and retroauricular swelling with a protruding ear.

**Treatment:** A mastoiditis in which the inflammation is no longer confined to the mucosa but has extended to the bone should be treated by surgery.

**MENIERE’S DISEASE**

Meniere’s disease is a disease caused by a disturbance of the quantitative relation between the volume of the perilymph and endolymph. The typical attack begins acutely and consists of the three symptoms namely; Tinnitus, deafness and vertigo followed by nausea, vomiting and other autonomic symptoms.

**Diagnosis**

Episodic vertigo, unilateral tinnitus, unilateral deafness and fluctuating hearing loss.

**Treatment**

*First line*

**Meclizine**, 25-100mg/day in divided doses.

(For **S/Es, C/Is** and **Dosage forms**, see page 279)

*Alternative*

**Dimenhydrinate**, Adults; 50-100mg P.O. OR IM OR IV every 4 hours. Children age 12 and older; 25-50mg P.O. every 6-8 hours. Children age 6-12; 50 mg IM for acute attack, 25-50mg TID. For maintenance dose.

**Dosage forms**, Tablet, 50 mg

(For **S/Es** and **C/Is**, see under diphenhydramine)
**Cyclizine hydrochloride**, 50mg P.O. OR IM every 4-6 hours PRN

**Dosage forms**: Tablet 50 mg

(for S/Es and CIs, see under diphenhydramine)

**NONSPECIFIC INFLAMATION OF THE EXTERNAL EAR**

The external auditory meatus is swollen and usually filled with fetid debris which can form a nidus of infection for gram negative bacteria and anaerobes. The cartilaginous part of the meatus is painful; the tympanic membrane is intact but may be difficult to assess because of the accumulation of debris.

**Diagnosis**

The inflammation is localized to the auricle, external auditory meatus and the regional lymph nodes. Retroauriular region are tender to pressure pain, on pressure on the tragus strongly suggests otitis externa.

**Treatment**

**Non-drug treatment**

External auditory canal meatus is cleaned manually under visualization or irrigation with water at 37°C, normal saline 37°C OR clean with 3% H2O2 repeatedly.

**Drug treatment**

*First line*

Oxytetracycline hydrochloride + polymyxin B sulphate + hydrocortizone acetate, 2 drops 2-3 times daily.

(For S/Es, C/Is and Dosage forms, see page 91)

PLUS

Chloramphenicol, 2 – 3 drops 2 to 4 times daily.

(For S/Es and C/Is see page 23)

Dosage forms: Solution (Ear Drop), 1%, 2% and 5%

OR

Gentamicin; 1 – 2 drops 3 to 4 times daily

(For S/Es, C/Is and Dosage forms, see page 39)

In severe cases:-

**Drug treatment**
First line

Amoxicillin, 500mg P.O. TID for ten days for adults; 250 mg P.O. TID for ten days for children above 6 years of age; 125mg/5ml, 250mg/5ml P.O. TID for ten days for children under 6 years of age.
(For S/Es, C/Is and Dosage forms, see page 18)

Alternatives

Amoxicillin/Clavulanate, Adults; 375mg P.O. TID for ten days or 625mg P.O. BID for ten days. Children; 156mg/5ml P.O. TID 7 – 10 days or 312mg/5ml P.O. BID 7 to 10 days
(For S/Es, C/Is and Dosage forms, see page 52)

OR

Ciprofloxacin, Adults; 500mg P.O. BID for 10 days
Dosage forms: Tablets (as hydrochloride ), 500 mg intravenous infusion (as lactate), 2mg/in 50 ml, and 100ml bottle
(For S/ES and C/Is see under Levofloxacin)

OR

Sulfamethoxazole+trimethoprim
(For dosage schedule, S/Es, C/Is and Dosage forms, see page 16)

SPECIFIC FORMS (Herpes zoster oticus)

Herpes zoster oticus is characterized by multiple herpetic vesicles arranged in groups on the auricle, the external auditory meatus and occasionally the tympanic membrane. In severe cases, disorders of hearing and balance and facial paralysis may occur.

Diagnosis

Diagnosis is made on the basis of the following findings: Inspection and otoscopy show vesicles in the meatus or the tympanic membrane, association with severe pain, some time facial pares on the sick side.

Treatment

Drug treatment

First line

Acyclovir, 200mg. P.O. 5 times a day for 7 days OR 5mg/kg body weight IV TID for 7 days.
(For dosage schedule, S/Es, C/Is and Dosage forms, see page 215)
N.B. Broad spectrum antibiotics, such as tetracycline and amoxicillin respectively) might be needed to avoid secondary infections.

PLUS (If patient complains of neuralgia)

Prednisolone, 15 – 30mg/day

(For S/Es, C/Is and Dosage forms, see page 91)

TEMPORAL BONE FRACTURE

Temporal bone fracture is usually caused by the effect of external violence. The course of the fracture may run either along the pyramidal axis (a longitudinal fracture) extending into the middle ear or across the pyramidal axis (transversal fracture) extending into the body labyrinth and internal auditory meatus.

Diagnosis: Diagnosis is based on otoscopic, functional findings and radiography.

Treatment

Non-drug treatment

The patient should be closely supervised with regular monitoring of vital signs and neurological state.

NB: Danger of Otogenic Meningitis prophylactic antibiotics (see under meningitis) in high doses should be given.

Drug treatment

First line

Chloramphenicol, Adults; 500mg – 1g IV QID for 10 – 15 days

(For S/Es, C/Is and Dosage forms, see page 23)

Alternative

Benzyl Penicillin, 3 - 4 million IV every 3 hours for 10 – 15 days.

(For S/Es, C/Is and Dosage forms, see page 38)

PLUS

Gentamicin. 3-4mg/kg IM OR IV TID for adults. 2-2.5mg/kg IM OR IV TID for children. 2.5mg/kg IM OR IV infusion TID for infants; 2.5mg/kg IV BID for neonate under age 1 week

(For S/Es, C/Is and Dosage forms, see page 39)
II. NOSE AND NASAL SINUSES PROBLEMS

ACUTE RHINITIS

Acute rhinitis is an allergic condition of the nasal cavity whose symptoms are not uniform. The general symptoms include chills and feeling of cold alternating with a feeling of heat, headache fatigue, loss of appetite, possibly sub-febrile or high temperature.

Diagnosis: The nasal mucosa is deep red in color, swollen and secretes profusely.

Treatment

Non-drug treatment

- Steam inhalations
- Infrared lamps treatment
- Bed rest

Drug treatment

First line

Chlorpheneramine, 4mg P.O. TID for adults; 2mg P.O. 2-3 times daily for children.

Dosage forms: Tablet, 2mg, 6mg, syrup, 2mg/5ml

(S/Es and C/Is, see under diphenhydramine)

OR

Cetrizine Hydrochloride, 10mg P.O. QD for adults and children above 12 years; 5-10mg P.O. QD for Children below 12 years.

(For S/Es, C/Is and Dosage forms, see page 225)

PLUS

Xylomethazoline, 2-3 drops of 1% solution 3-4 times a day for adults and over 6 years of age; 1-2 drops of 0.5% daily in each nostril for infants and small children up to 6 years of age.

Dosage forms: solution (nose drop), 0.05, 0.1%

ACUTE RHINOSINUSITIS

Acute sinusitis arises as a complication of viral rhinitis. It is also possible that the disease begins as a viral sinusitis. The infection is always bacterial by the time the patient consults a doctor. The most common bacteria that cause sinusitis are Streptococcus pneumoniae and Hemophilus influenzae. Clinical presentation varies
with the specific sinus involved. In general, it includes a purulent nasal discharge with blockage, feeling of fullness or pain over the face, and frontal headache. The affected sinus may be tender and swollen.

**Diagnosis**
Anterior and posterior rhinoscopy, radiography, sensitivity to tapping over the check.

**Treatment**

*First line*

Amoxicillin, Adults; 250 - 500mg (depending on the severity) P.O. TID for 10 days.

(For S/Es, C/Is and Dosage forms, see page 18)

*Alternative*

Amoxicillin + Clavulanate, Adults; 375mg P.O. TID for 10 days OR 625mg P.O. BID for 10 days (depending on the severity).

Children; 156mg/5ml or 312mg/5ml P.O. TID

(For S/Es, C/Is and Dosage forms, see page 52)

OR

Sulfamethoxazole+trimethoprim

(For Dosage schedule, S/Es, C/Is and Dosage forms, see page 16)

OR

Erythromycin, Adults; 250-500mg P.O. QID. Children 30-50mg/kg P.O. QID

(For S/Es, C/Is and Dosage forms, see page 214)

**ALLERGIC RHINITIS**

The most common form of allergic rhinitis is hay fever. Other allergens may also be responsible. The shock organ is usually the nasal mucosa but it may also be the conjunctiva or other mucous membranes. The disease is often hereditary.

**Diagnosis**

The diagnosis is made from the typical history, cytology of the nasal secretions and intracutaneous prick and patch test.
Treatment

Causal: Specific desensitization, based on allergen test, should be carried out, and continued for several years thereafter.

Drug treatment

First line

Xylometazoline, 2 - 3 drops of 1% 2 - 3 times daily into each nostril.
For infants and small children; 0.5% 1 - 2 drops 1 – 2 times a day into each nostril.
(For S/Es, C/Is and Dosage forms, see page 288)

PLUS

Cetrizine, Adult and children above 12 years of age; 10mg P.O. QD.
Children below 12 years of age; 5 – 10 mg P.O. QD
(For S/Es, C/Is and Dosage forms, see page 225)

OR

Loratadine (Claritine):
Body weight >30kg - 10mg P.O. QD
Body weight <30kg –5mg P.O. QD
(For S/Es, C/Is and Dosage forms, see page 225)

OR

Dexchlorpheniramine maleate, 6mg P.O. BID for adults and children 12 years or older; 1mg P.O. 3-4 times a day for children 6-12 years of age; 0.5mg P.O. 3 - 4 times a day for children 2-6 years of age
S/Es: dry mouth, drowsiness
Dosage forms: Tablet, 2mg, 4mg, 6mg; Syrup, 2mg/5ml

Alternative

Beclomethasone, 2–4 inhalations TID OR QID for adults; 1- 2 inhalation TID OR QID maximum of 10 inhalation for children age 6-12 years
S/Es: Flushing, skin rash, dry mouth, hoarseness, irritation of the tongue or throat, impaired sense of taste and bloody mucus.
C/Is: Patients with acute status asthmatics and in patients who are hypersensitive to any component of the preparation.
Dosage forms: Oral inhalation (Aerosol), 50mcg/dose, 100mcg/dose
ATROPHIC RHINITIS

Atrophic rhinitis (Ozena) is mostly accompanied by a foul smell from the nose. The disease occurs in both sexes more often in young girls.

**Diagnosis**

They contain gluey, dry greenish–yellow secretions and crusts lining the entire nasal cavity.

**Treatment**

**Non-drug treatment**

The nasal cavity is cleaned by douching several times a day with diluted salt water.

CHRONIC SINUSITIS

**Recurrent acute sinusitis:** Three or more episodes in 6 months or 4 or more episodes in one year.

**Diagnosis:** Radiological

**Non-drug Treatment:** Repeated lavage of the sinus with normal saline.

**Drug treatment:** See under acute sinusitis

**N.B.** Operation should be advised if the disease has not resolved after repeated lavages.

EPISTAXIS

Epistaxis is estimated to occur in 60% of persons worldwide during their lifetime and approximately 6% of those seek medical treatment. Epistaxis may be a life-threatening condition which is extremely difficult to treat, whose causes may not be remediable, and which may lead to death. More than 90% of episodes of epistaxis occur along the anterior nasal septum at a site called **Kiesselbach’s area.** Its vascular supply moves from the external and internal carotid artery.

**Diagnosis:** Clinical

**Treatment**

**Non-drug treatment**

Most anterior nose-bleeds are self-limited and do not require medical treatment. They can be controlled by punching the anterior aspect of the nose for 15 minutes.
The patient should relax and the head position can be either forward or backward and the patient should avoid swallowing or aspirating any blood that may drain into the pharynx.

Posterior packing for the posterior nasal bleeding using: Inflatable balloons OR Foley catheter OR cotton gauze introduced through the mouth and then retracted up into the nasopharynx (but care must be taken to avoid trauma to the ala).

**Drug treatment**

*First line*

Topical vasoconstrictor; Oxymetazoline spray 0.05%

OR

Chemical cautery, Silver nitrate 5-10% solution OR Sodium bicarbonate 5% OR Trichloroacetic acid 40 – 70%.

*Alternatively*

Anterior nasal packing, gauze coated with petroleum jelly or absorbable materials like Gelfoam and oxidized cellulose.

PLUS

Topical antibiotics; Tetracycline 3% ointment.

OR

Chloramphenicol 1% ointment.

**Oral antibiotic**

Amoxicillin, 250 – 500mg, caps P.O. TID 10 days for adults; 125mg/5ml – 250mg/5ml P.O. TID 10 days for children.

(For **S/Es, C/Is** and **Dosage forms**, see page 18)
OR

**Ciprofloxacin:** 500mg P.O. BID for 10 days.
(For **S/Es, C/Is** and **Dosage forms**, see page 286)

OR

**Amoxicillin/Clavulanate:** 375mg P.O. TID for 10 days or 625mg P.O. BID for 10 days for adults; 156mg/5ml P.O. TID OR 312mg/5ml P.O. TID for 10 days for children.
(For **S/Es, C/Is** and **Dosage forms**, see page 52)

**N.B.** When conservative measures fail to stop the bleeding, embolization or surgical ligation of the offending vessels is needed.

**Referral:** In severe and complicated cases, refer to an ENT specialist

**FOREIGN BODIES IN THE NOSE**

Foreign bodies in the nose are usually found in children and may be retained for a very long time. It includes **coins, metal fragments, peas, etc.**

**Symptoms**
These include unilateral nasal obstruction, a worsening chronic purulent rhinitis or sinusitis, unilateral fetid secretion and formation of rhinolith due to deposition of calcium around the foreign body.

**Diagnosis**
This is based on anterior rhinoscopy and radiology. A foreign body is often an incidental finding. Unilateral chronic purulent rhinorrhea in a small child should suggest the diagnosis of a foreign body, and the child should be examined by a specialist.

**Treatment**
The foreign body is removed instrumentally, at times under a short general anesthesia since long-standing foreign bodies are often firmly fixed and provoke brisk bleeding when they are mobilized.

**Referral:** In severe and complicated cases, refer to an ENT specialist
III. MOUTH AND PHARYNX PROBLEMS

ACUTE TONSILLITIS

Acute tonsillitis is an acute inflammation of the lymphoepithelial tissue of the faucial isthmus, usually due to Group A streptococcus or viruses. Sore throat and pain on swallowing are the characteristic features. Most patients will also have headache, malaise and fever. Tonsillitis may lead to the development of Rheumatic fever or post-streptococcal glomerulonephritis depending on the specific serotype of the streptococcus.

**Diagnosis:** Often clinical. Throat culture may help to establish the specific etiology.

**Drug Treatment**

Symptomatic:

- **Paracetamol,** 500 mg P.O. 1-2 tablets QID on PRN basis.

  *(For S/Es, C/Is and Dosage forms, see page 53)*

A. **Viral:** Only symptomatic therapy

B. **Bacterial:**

  **First Line**

  - **Amoxicillin**

    *(For Dosage schedule, S/Es, C/Is and Dosage forms, see page 18)*

  **Alternative**

  - **Ampicillin,** Adults; 250-500mg P.O. QID for adults;

    Children 6-12 years old; 50 -100mg/kg P.O. TID for 10 days

    Children below 6 years old; 100 – 200mg/kg IV TID in divided doses.

    *(For S/Es, C/Is and Dosage forms, see page 18)*

  OR

  - **Amoxicillin + Clavulanate,** Adults; 375mg P.O. TID for 10 days OR

    625mg P.O. BID for 10 days. Children; 156mg/5ml P.O. BID for 10 days OR 312mg/5ml P.O. TID for 10 days

    *(For S/Es, C/Is and Dosage forms, see page 52)*
OR

**Procaine penicillin**, 800 IU IM QD for 5 – 7 days.
(For S/Es, C/Is and Dosage forms, see page 212)

OR

**Benzathine Penicillin**, 1,2-2,4mill Units IM once.

**N.B.** Known Valvular Heart Disease and rheumatic fever such treatment of Benzathine Penicillin should be continuing for prolonged period.
(For S/Es, C/Is and Dosage forms, see page 348)

OR

**Clindamycin**, 150 - 450mg P.O. QID OR 300mg IM OR IV QIDOR TID for adults. 20mg/kg/day P.O. divided in 3-4doses for children. In severe Infections: 20mg/kg/24hr. IM OR IV into 4 doses

S/Es: Severe colitis, allergic reactions, hepatic impairment.

C/Is: Hypersensitivity to this drug and to lincomycin, hepatic impairment renal impairment and asthma.

**Dosage forms**: Capsule, 75mg, 150mg; injection, 150mg/ml in ampoule; oral solution, 15mg/ml

**PERITONSILLAR ABSCESS**

This is a complication during and after tonsillitis where the inflammation spreads from the tonsillar parenchyma to the surrounding tissue and forms an abscess.

**Symptoms**

Pain which is severe that the patient often refuses to eat, the head is held over to the diseased side, and rapid head movements are avoided. The patient has sialorrhea and oral fetor, swelling of the regional lymph nodes, increase fever with high temperatures of 39– 40 celsius and the general condition deteriorates rapidly.

**Diagnosis**

This is made on the clinical picture of swelling, redness, and protrusion of the tonsil, the faucial arch, the palate and the uvula. There is marked tenderness of the tonsillar area.
**Treatment**

**Conservative**

*First Line*

- **Amoxicillin**, 250 - 500mg P.O. TID for 7 – 10 days for adults; 125mg/5ml, 250mg/5ml P.O. TID for 7 – 10 days for children

  OR

- **Ampicillin**, 250-500mg P.O. QID in divided doses for 7 – 10 days for adults; 50 -100mg/kg P.O. TID for 7 – 10 days QID OR 100 – 200 mg/kg IV in divided doses TID for 7 – 10 days for children.

  OR

- **Amoxicillin – Clavulanate**, 375mg PO TID for 10 days OR 625mg PO BID for 10 days OR 156mg/5ml PO TID for 10 days OR 312mg/5ml PO TID for 10 days

  OR

- **Procaine penicillin**, 800 IU IM QD for 10 days

**Surgical**; Drainage of the abscess followed by tonsillectomy.

**N.B.** An incision should not be made until the abscess is ripe, i.e., that fluctuation can be shown or is probe.

**IV. LARYNX and HYPOPHARYNX PROBLEMS**

**ACUTE EPIGLOTTITIS**

Epiglottitis, more appropriately termed *supraglottitis*, is an acute infectious process that is usually caused by *Haemophilus influenzae* type B. The Disease is much more rare than croup. It occurs especially in infants aged 2 to 4 years. There is a slight male predominance. Onset is acute.

**Diagnosis**

Laryngoscopy or examination with a tongue depressor shows a thick, swollen red epiglottic rim.
Treatment

First line

Amoxicillin

(For Dosage schedule, S/Es, C/Is and Dosage forms, see page 18)

PLUS

Hydrocortisone, 100-500mg IM OR IV, then 50-100mg as indicated.
Children: 0.16-1mg/kg IM OR IV QD OR BID

(For S/Es, C/Is and Dosage forms, see page 91)

OR

Prednisolone, 20-30mg IM OR IV BID

(For S/Es, C/Is and Dosage forms, see page 91)

N.B. In children the first line of management is airway control.

ACUTE LARYNGITIS

Acute laryngitis is an inflammation strictly localized to the vocal cords, usually of viral origin.

Diagnosis

Hoarseness of voice and dry cough.

Laryngoscopy shows red and swollen vocal cords

N.B. Since viral infections are often followed by secondary bacterial infections, treatment with antibiotic is indicated

Treatment

Non-drug treatment: Voice rest

Drug treatment

First line

Amoxicillin

(For Dosage schedule, S/Es, C/Is and Dosage forms, see page 18)

PLUS

Prednisolone, 40-60mg (based on severity) P.O. QD, the dose is reduced by 5mg every 5 days.

(For S/Es, C/Is and Dosage forms, see page 91)

Alternative

Ampicillin. Adults; 250 – 500mg P.O. QID for ten days.
Children; 50 – 100mg/kg P.O. QID OR 100 – 200mg/kg IV TID
(For S/Es, C/Is and Dosage forms, see page 18)

OR

**Sulfamethoxazole+trimethoprim**, 
(For Dosage schedule, S/Es, C/Is and Dosage forms, see page 16)

OR

**Amoxicillin + Clavulanate**, Adults; 375mg P.O. TID for ten days OR 625mg P.O. BID for ten days. Children; 156mg/5ml P.O. TID OR 312mg/5ml P.O. BID for ten days. 
(For S/Es, C/Is and Dosage forms, see page 52)

OR

**Clindamycin, 150 -450mg** P.O. QID OR **300mg** IM OR IV TID 20mg/kg/24hr P.O. TID OR QID 
(For S/Es, C/Is and Dosage forms, see page 44)

PLUS

**Prednisolone, 40-60mg** (based on severity) P.O. QD, the dose is reduced by 5mg every 5 days 
(For S/Es, C/Is and Dosage forms, see page 91)

**CROUP or LARYNGOTRACHEITIS**

Croup can be defined as a sub acute viral illness characterized by fever, “barking” cough, cyanosis, stridor and a moderate fever. Parainfluenza viruses 1 and 2 and influenza A are the most common causes. It most frequently occurs in male infants aged 1-3 years and usually lasts 3- 7 days.

**Treatment**

**None drug treatment:** Humidification of the air and Inhalation of oxygen.

When severe respiratory obstruction occurs, naso-tracheal intubations or tracheotomy is necessary.
Drug treatment

Chloramphenicol, 50 to 100mg/kg P.O. OR IV QID in divided doses.

PLUS

Ampicillin, 250 – 500mg P.O. QID in divided doses OR 50 – 100mg/kg P.O. QID OR 100 – 200mg/kg IV TID in divided doses.

SALIVARY GLAND PROBLEMS

MUMPS (EPIDEMIC PAROTITIS)

Mumps is a contagious disease caused by a filterable virus. The parotid glands are the salivary glands most commonly involved with mumps, but the sublingual and submandibular glands may also be affected. In 75-80% of cases both glands are involved.

Diagnosis

The diagnosis is usually made on a clinical basis, but direct demonstration of the virus is only possible in the early phase of the disease.

Treatment: Since it is viral, only symptomatic treatment.

Drug treatment

For pain:

Paracetamol, 500mg P.O. PRN for adults; 30 - 40mg/kg/24 hr. divided into 4 – 6 doses for children.

(For S/Es, C/Is and Dosage forms, see page 53)

N.B. Anti-inflammatory drugs should begin if necessary. One of the following drugs are used: diclofenac, indomethacine and ibuprofen.

For dosage regimens, S/Es, C/Is and dosage forms, (see pages 251, 110, and 124 respectively)

SIALADENITIS OF THE PARATOID AND SUBMANDIBULAR GLANDS

Three major salivary glands empty into the oral cavity. The paratoid and submandibular glands produce most of the saliva. Infections or inflammatory diseases that affect the salivary glands frequently occur when a predisposing anatomic or physiologic decrease in the function of the gland exists, although
occasionally they may attack a previous healthy gland. The infection’s portal of entry may be by retrograde extension through the ductal system or by lymphatic spread to interaglandular lymph nodes, or it may on occasion be blood borne.

**Sialadenitis of the parotid and submandibular glands:** Reduction of salivary flow is an important prerequisite for bacterial infection ascending the duct. The gland suddenly becomes swollen and tender. The overlying skin may be red and fluctuation may be felt if there is suppuration.

**Diagnosis**

The history shows a previous disease or operation. The mass is palpated, pain and swelling of the involved gland. Purulent secretions can be expressed from the orifice of the duct.

**Treatment**

*First line*

- **Cloxacillin,** Adults; 500mg P.O. QID for 7 – 10 days
- Children; 50 – 100mg /kg/day. P.O. divided in 4 doses for 7 – 10 days.

(For **S/Es, C/Is** and **Dosage forms,** see page 39, 214)

*Alternative*

- **Clindamycin,** 150 to 450mg P.O. QID OR 300mg IM OR IV QID OR TID 20mg/kg/day. P.O. divided in 3–4 doses. In severe infections 20mg/kg/day. IM OR IV QID.

(For **S/Es, C/Is** and **Dosage forms,** see page 44)

OR

- **Cephalaxin,** 50mg-1gm for adults; 6-12 mg/kg P.O. QID maximum 25mg/kg QID for children.

(For **S/Es, C/Is** and **Dosage forms,** see page 204)
CHAPTER VIII

OBSTETRICS AND GYNACOLOGICAL DISORDERS

I. COMMON OBSTETRIC DISORDERS

- Hypertensive disorders in pregnancy
- Nausea and vomiting of pregnancy
- Pain during labour and delivery
- Premature rupture of membrane
- Preterm labour
- Prolonged pregnancy and prolonged labour

II. COMMON MEDICAL DISORDERS IN PREGNANCY

- Anemia in pregnancy
- Cardiac disease in pregnancy
- Deep Vein Thrombosis/ Thromboembolism(DVT/TE)
- Diabetes mellitus in pregnancy
- Thyroid disease in pregnancy

III. INFECTIONS IN OBSTETRICS AND GYNECOLOGY

- HIV/AIDS in pregnancy
- Malaria in pregnancy
- Muco-purulent Cervicitis
- Pelvic inflammatory diseases(PID)
- Post-abortal and puerperal sepsis
- Puerperal mastitis
- Syphilis in pregnancy
- Urinary tract infection (UTI) in pregnancy
- Vulvovaginal candidiasis

IV. Hormonal Contraception

V. Gynecologic endocrinology and infertility

- Dysfunctional uterine bleeding
- Dysmenorrhea
- Infertility (male and female)
- Premenstrual syndrome

VI. Sexual assault
I. COMMON OBSTETRICS DISORDERS

HYPERTENSIVE DISORDERS IN PREGNANCY
Hypertension is a common medical problem that complicates pregnancy. It is also one of the three major causes of maternal death. It may be manifested as chronic hypertension, chronic hypertension with superimposed pre-eclampsia, pregnancy induced hypertension, pre-eclampsia or eclampsia. The cause of this disease entity is not well defined.

Diagnosis

- Clinical: Increase BP ≥ 140mmHg (systolic) and 90mmHg (diastolic) during pregnancy. The presence of other clinical signs and symptoms of hypertension in pregnancy depends on the severity of the disease.
- Laboratory: Presence of significant proteinuria greater than 300mg/24hours urine specimen or, less accurately, more than 1+ protein (equivalent to approximately 100mg/dl) on dipstick sampling of random urine specimen. Proteinuria is usually late manifestation of preeclampsia that follows the hypertension and correlates with glomerular lesions in the kidneys. Proteinuria is usually variable and should be carefully interpreted because it can be influenced by factors like contamination of the urine specimen with vaginal secretions, blood, or bacteria; urine specific gravity, pH, exercise; and posture.

Classes:

I. Pregnancy induced hypertension (PIH)
Pregnancy induced hypertension is defined as a rise in BP ≥ 140/90 mmHg after the 20th week of gestation measured twice at least six hours apart or a single measurement of diastolic BP > 110mmHg, except in GTD and multiple pregnancy when this can be diagnosed before 20th weeks of pregnancy. There are different types of PIH.
a) Gestational hypertension:
This is diagnosed when the systolic BP is raised to 140mmHg and the
diastolic BP to 90mmHg or more after the 20th week of gestation
without significant proteinuria.

b) Preeclampsia
Preeclampsia is part of PIH which is defined as a BP> 140/90mmHg in
the presence of significant proteinuria of > 300 mg/ 24 hours urine
specimen or, less accurately, more than 1+ protein (equivalent to
approximately 100mg/dl) on dipstick in at least two randomly collected
urine specimen at least 6 hours apart after the 20th week of gestation.
Preeclampsia may be categorized as mild or severe, primarily on the
basis of degree of hypertension or proteinuria and involvement of other
organ systems.

Mild pre-eclampsia
The mild form of PIH is diagnosed when the diastolic blood pressure is
between 90 and 110mmHg without signs of severity.

Severe pre-eclampsia
In the presence of any one of the following clinical manifestations,
severe preeclampsia can be diagnosed:
• Diastolic BP ≥ 110 mmHg and the systolic ≥160mmHg measured
twice at least six hours apart or a single measurement of
≥120mmHg
• Proteinuria > 3gm/24 hours or 3+ in randomly collected urine
• Abnormal liver/ renal function tests
• Hyperbiliirubinemia, Hemolytic anemia, Thrombocytopenia(<100,000/µl
• DIC
• Headache, visual disturbance and right upper abdominal pain
• Oliguria (<400ml in 24hours or 30ml/hour)
• Intrauterine growth restriction (IUGR)
• Cardiac decompensation, Pulmonary edema, cyanosis
• Exaggerated Deep Tendon Reflexes(DTR)
c) Eclampsia
Eclampsia is the occurrence of convulsions in woman who meets the diagnostic criteria for preeclampsia. Eclampsia is more severe than preeclampsia. Any convulsion occurring during pregnancy is eclampsia unless proven otherwise.

II. Chronic hypertension
This is a hypertension existing before pregnancy or diagnosed before the 20th week of gestation, except in GTD and multiple pregnancy, or persists indefinitely after delivery. Women with mild hypertension may have normal BP during the mid-trimester and many of these women show greater decrease in their BP during pregnancy than normotensive women. However, in some pregnant women the BP may become severe and develop superimposed preeclampsia, which is defined as an exacerbation of the BP, i.e., an increment of the systolic BP by 30 mmHg and diastolic BP by 15 mmHg over the baseline with development significant proteinuria.

Treatment

**Treatment objectives**

- Control of BP by administering potent anti-hypertensive drugs, to keep the diastolic BP below 100 mmHg.
- Prevent convulsion.
- Monitor maternal and fetal condition frequently for worsening of disease condition and plan treatment accordingly.
- Delivery of the fetus and placenta on the appropriate time, which is the definitive treatment for PIH.

A. Mild pre-eclampsia
Most patients are asymptomatic and can be managed conservatively. Such patients are not candidates for urgent delivery, if the fetus is preterm or the cervix is unfavorable for induction.
The goals of therapy in this category of preeclampsia are to monitor maternal and fetal conditions while allowing time for the fetus to mature and the cervix to ripen.

Non drug treatment

- Bed rest at home in the lateral decubitus position. They rarely require admission unless they develop any sign and symptom of pre-eclampsia.
- Frequent evaluation of fetal well being by fetal movement recording, Biophysical profile
- Maternal well being (BP measurement four times per day, assessment of LFT, RFT, Hematocrit, proteinuria, visual disturbances, epigastric pain etc)
- Advise patient to immediately report whenever they develop symptoms of severity such as headache, epigastric pain, blurring of vision etc
- Plan termination of pregnancy at term. Most authorities recommend pregnancy to be terminated between 37-38 weeks of gestation.
- If the disease progresses to severe range, manage as severe case.

Drug treatment: Magnesium sulphate, as well as anti-hypertensive medications are rarely required for patients on conservative management.

B. Severe pre-eclampsia

Delivery is the appropriate treatment for mothers with severe pre-eclampsia; otherwise it may pose significant risks to the mother and fetus. The prime objectives of treatment of severe pre-eclampsia are to forestall convulsions, prevent intracranial bleeding and other vital organ damage and deliver a healthy fetus. Meticulous measurement of input and output is important part of the management.

Control of Hypertension

Drug treatment: The ideal drug for this clinical scenario is one that reduces the BP in a controlled manner, avoiding precipitous reduction that may compromise placental perfusion. The goal is to lower the BP to a mildly hypertensive level (diastolic BP between 90-100mmHg).
**First line**

**Methyldopa,** 250-1000mg. P.O. 3-4 times /day.

**S/Es:** dry mouth, water and salt retention, and drowsiness, drug fever, hepatitis.

**C/I:** active hepatic disease

**Dosage forms:** tablet, 250 mg, and 500 mg

**Alternatives**

**Hydralazine,** 5 -10mg intravenous every 20 minutes whenever the diastolic BP > 110 mmHg. Hydralazine has duration of action of several hours, adequate control of severe hypertension often achieved after one or two intravenous treatment.

**S/Es:** nausea, headache, weakness, palpitation, flushing, aggravation of angina, anxiety, restlessness, hyperreflexia.

**C/Is:** porphyria, aortic stenosis, lupus erythematosis renal failure

**Dosage forms:** injection, 20mg/ml in 1ml ampoule

**OR**

**Labetolol,** 20-50mg intravenously is a useful second line drug for women whose hypertension is refractory to hydralazine. It causes severe and long-lasting fetal and neonatal bradycardia.

**S/Es:** fetal and neonatal bradycardia

**P/C:** may cause sudden death

**Dosage forms:** Tablet, 50 mg, 100 mg, 200 mg, 400mg. injection, 5mg/ml

**OR**

**Nifedipine,** 10 mg sublingual whenever the diastolic BP > 110 mmHg.

(For S/Es, C/Is and Dosage forms: see page 118)

**Prevention of convulsion**

**Drug treatment**

**First line**

**Magnesium Sulphate:** A loading dose of 4 gm as 20% solution IV over 10-15 minutes followed by 10 gm as 50% IM injection divided on two sides of the buttock, followed by maintenance dose of 5 gm every 4 hours as 50% concentration over 2 minutes, 2 gm IV as 50% solution over 2 minutes if convulsion recurs. Reduce the maintenance dose by half if there are signs of renal derangement during labour and for the first 24 hours postpartum.
S/E: colice
C/I: insignificant
**Dosage forms:** Injection, 10%, 20%, 50% in 20ml
**Toxic S/S:** decreased respiratory rate, heart rate, oliguria, & depressed deep tendon reflexes (DTR)

**Management of Magnesium toxicity:** If DTRs are depressed discontinue MgSO₄ and monitor the patient closely.

**Treatment:** Calcium gluconate (If Respiratory rate below 12/min), 1 gm as 10% in 10 ml ampoule IV over 2 minutes.

**S/Es of Calcium gluconate:** bradycardia, cardiac arrest, extra-vascular leakage may cause local necrosis.

**Dosage forms of Calcium gluconate:** syrup, 4mg/15ml, injection, 10% solution, 10ml

**Alternative**

**Diazepam,** 30 IU/ 1000 ml of D/W or D/S 20 drops / minutes and increase the drops as needed depending on the patients sedation status.

**S/Es:** drowsiness, fatigue, hypotension, paradoxical excitement

**C/I:** acute pulmonary insufficiency

**Dosage forms:** Injection, 10mg/ml in 2ml ampoule, Syrup, 2mg/5ml, Tablet, 2mg, 5mg, 10mg

**N.B.** Continuous infusion is unnecessary because the half life of the drug is 18hours. When the maternal dose exceeds 30mg neonatal side-effects become prominent that include low Apgar score, respiratory depression, poor feeding and hypothermia.

OR

**Phenytoin,** 5mg/kg/day, P.O in single or divided doses. Maximum dose is 400mg/day. The usual maintenance dose is 200-300mg/day.

**S/Es:** Gum hyperplasia, hirsutism, lymphadenopathy, facial coarsening, ataxia, incoordination, and confusion

**P/C:** Pregnancy, liver dysfunction, and lactation.

**Dosage forms:** Tablet, 50mg, 100mg; capsule, 50mg, 100mg; suspension 30 mg/5ml; powder for injection (sodium) 250 mg in vial.
OR

Phenobarbital, 60-180mg/day P.O in divided doses

S/Es: Sedation, skin rash, decreased libido, confusion, ataxia

C/I: acute intermittent porphyria

P/C: impaired renal or hepatic function, during pregnancy and lactation, in the elderly.

Dosage forms: Tablet, 15mg, 30mg, 100mg; elixir, 20mg/5ml; injection (sodium), 25mg/ml, 100mg/ml,

N.B. For most women with preeclampsia, the vaginal route is preferable as long as there are no contraindications.

C. Eclampsia:

Treatment objectives:

- Keep the maternal airway open
- Control convulsion: Control the acute fit and prevent further recurrence
- Control extreme hypertension
- Expedite delivery

Non-drug treatment:

- Turn patient on her side to minimize aspiration
- Apply mouth gag to prevent tongue injury
- Establish airway and administer adequate oxygen

Drug treatment: The same as for severe preeclampsia (see above). In addition broad spectrum antibiotics should be given.

NAUSEA AND VOMITING IN PREGNANCY

Nausea and vomiting are common complaints in the first trimester of pregnancy affecting about 50% of pregnant mothers, and is considered by many as diagnosis of pregnancy. The symptoms are severe in multiple gestations and gestational trophoblastic neoplasm. Protracted vomiting
associated with dehydration, starvation, weight loss, electrolyte disturbances, acidosis and ketonuria is known as hyperemesis gravidarum. The cause is not exactly known. If not treated appropriately, protracted vomiting may cause Mallory-Weiss oesophageal tear, neulogical dysfunction specifically Wernicke’s encephalopathy due to vitamin B₁ deficiency, Korsakoff’s psychosis and central pontine myelinolysis, retinal hemorrhage and Mendelson’s syndrome.

**Diagnosis**

Clinical: Excessive vomiting, sign of dehydration, deranged vital signs etc

Rule out medical causes like hyperthyroidism, food poisoning, Diabetes etc.

Laboratory: - Ketonuria, Elevated AST and SGOT. Screen for UTI, GTD, & Multiple gestation

**Treatment**

**Treatment objectives:**

- Adequate fluid, electrolyte and calorie replacement
- Arrest the vomiting with potent anti-emetics
- Identify obstetrics conditions that are associated with hyperemesis gravidarum
- Rule out other medical or surgical causes

**Non-drug treatment**

- For uncomplicated nausea and vomiting of pregnancy, give reassurance.
- Advice on small, high calorie frequent feeding
- Emotional support.
- Remove a stressful home environment
- Advice, temporary withdrawal of oral nutrition and fluid
Drug treatment

Hyperemesis gravidarum requires admission for in-patient care.

- Re-hydrate with N/S, Ringers lactate, D/W, D/S eight hourly
- Calorie replacement: Add 40% Glucose 2 vials (40 ml) in each bag.
- Add Vit. B complex 2 ampoules in each bag

Control vomiting:

First line

**Chlorpromazine**, 12.5 - 25 mg I.M. BID until vomiting is controlled and then P.O.

**S/Es:** bone marrow suppression, drowsiness, apathy, alteration in liver function, cutaneous reactions, occasionally tardive dyskinesia.

**C/Is:** bone marrow depression, coma caused by CNS depressants.

**Dosage forms:** Tablet, 25mg, 50mg, 100mg; drop, 25mg/ml in 10ml bottle, 40mg/ml in 10ml and 30ml bottles; syrup, 25mg/5ml; injection, 25mg/ml in 1ml and 2ml ampoules, 50mg/ml in 2ml ampoule.

Alternatives

**Promethazine**, 25 mg IM/IV BID, followed by 25 mg P.O BID.

**S/Es:** drowsiness, sedation, headache, blurring of vision GI disturbance

**P/C:** Close monitoring of the patient is required during the first few days of therapy.

**Dosage forms:** Elixir, 5mg/5ml; injection, 25mg/ml 1ml and 2 ml ampoules; Suppository, 25mg, 50mg; tablet, 10mg, 25mg, Tablet, 10 mg, 25 mg.

OR

**Metoclopromide**, 10 mg IM BID.

**S/Es:** drowsiness, fatigue, dizziness, weakness

**C/Is:** epilepsy, pheochromocytoma, and mechanical bowel obstruction, concomitant administration of atropine like drugs.

**S/P:** concomitant administration of phenothiazines.

**Dosage forms:** tablet, 10mg; syrup, 5mg/5ml; injection, 5mg/ml in 2ml ampoule; drop, 0.2mg/drop.
OR

**Pyridoxine hydrochloride**, 20mg/day orally

**S/Es:** Rare

**Dosage forms:** Injection, 50mg/ml in 2ml ampoule. 150mg/ml; Tablet, 5mg, 10mg, 100mg, 300mg

**PAIN DURING LABOUR AND DELIVERY**

When giving analgesia and anesthesia to pregnant mothers, the safety of the mother and fetus should be a constant concern of the health care provider. Virtually all analgesic and anesthetic drugs administer during pregnancy pass the placenta in different proportion; thus, a balance must be sought between pain relief for the mother and safety of the fetus.

**Non-drug treatment**

- Hypnosis, attention focusing and distraction
- Maternal movement and change of position: When the mother moves she alters the relationships between gravity, uterine contractions, the fetus and her pelvis.
- Counter pressure: Steady and strong force applied to a spot on the lower back during contraction or pressure on the side of each hip.
- Hot compresses applied to the lower abdomen
- Immersion in warm water during labour but not in birth

**Drug treatment**

1. Analgesics
   
   A) Opioids
First line

**Pethidine**, 50-100mg IV or IM QID to TID.

**S/Es:** Maternal: orthostatic hypotension, nausea, vomiting, dizziness, and delayed stomach emptying, respiratory depression.

Fetal: respiratory depression, low Apgar score

**Dosage forms:** Tablet, 50mg; injection, 50mg/ml in 1 and 2 ml ampoule

Alternatives

**Morphine**, 10-15mg IM, TID

**S/Es:** Respiratory depression, withdrawal syndrome

**Dosage forms:** Capsule (m/r), 20mg, 50mg, 100mg, 200mg; Tablet, 5mg, 10mg, 15mg, 20mg, 30mg; injection, 10mg/ml, 20mg/ml in 1ml ampoule

OR

**Pentazocine**, 30mg IM/IV

**Dosage forms:** Tablet, 50mg; injection. 30mg/ml in 1 ml ampoule

II. Local Anaesthetics

The complete relief of pain in obstetrics can be accomplished by blocking the sympathetic pathways of eleventh and twelfth thoracic nerves and the parasympathetic and sensory fibers of the sacral nerves.

**Epidural block:** is a more effective form of pain relief than alternative forms of analgesia.

First line

**Bupivacaine**, 3-5mg of 0.75% in 8.25% dextrose.

**S/Es:** cardiototoxicity in case of inadvertent IV administration.

**Dosage forms:** Injection, 0.25%, 0.5% in 10ml as amouple

Alternative

**Lidocaine (Xylocaine),** 1-2% concentration IM, 5-10ml

**S/Es:** fetal bradycardia, inadvertent IV administration of the local anaesthetics lead to cardiac arrest, hypotension, high spinal block with respiratory paralysis, headache, fetal bradycardia.

**Dosage forms:** Injection, 0.5%, 1%, 2%, 5%
**PREMATURE RUPTURE OF MEMBRANES (PROM)**

Premature rupture of membranes is rupture of the fetal membranes after the 28th week of gestation and before onset of labor. It includes preterm PROM (before the gestational age of 37 weeks) and term PROM (after the 37th week of gestation). The exact cause of PROM is not known. The incidence of PROM in preterm and term pregnancies is approximately 8% and 2%, respectively.

The amniotic fluid surrounding the fetus is important for the development of fetal lung and limb, heat exchange, and protection of the umbilical cord and infant from compression. In addition, the amniotic fluid has bacteriostatic chemicals. Whenever the membranes rupture, there will be leakage of fluid, hence these protective mechanisms may be compromised. In addition, if a rent is created a portal of entry will be established for bacteria to access the amniotic fluid from the vagina. Finally, rupture of membrane often leads to onset of labor. Thirty-five percent of preterm neonates result from preterm PROM.

**Diagnosis**

**Clinical:** Sterile speculum examination reveals leakage of clear or greenish fluid through the cervical os. If immediate delivery is not planned, vaginal digital examination is not advisable.

**Laboratory**

- Nitrazine paper test
- Fetal products (squamous cells, fat, lanugo hair, fibronectin, AFP, Prolactin)
- Ferning test (Arborization)
- Nitrazine paper change (yellow to dark blue) but care should be taken that blood, semen, alkaline urine and vaginal infections can give false positive results.
- Vaginal Swab culture and sensitivity for group B streptococcus

**Classes of PROM:**

- **Pre-term PROM:** Rupture of membrane before 37th week of gestation
- **Term PROM:** Rupture of membrane after 37th week of gestation
- **Prolonged PROM:** Rupture of membranes for more than 12 hours
**Treatment**

Treatment depends on the gestational age, presence of infection, condition of the fetus and spontaneous healing of the membrane.

**Treatment objective:**

- Prevent or early detect for sign of chorioamnionitis by clinical means (uterine tenderness, malodorous amniotic fluid, fever, maternal and fetal tachycardia) and laboratory (increase WBC, c-reactive protein)
- Prolong pregnancy until fetal maturity is assured, i.e., until 34 weeks and above.

a) **Pre-term PROM**

I. **Preterm PROM without chorioamnionitis:**

   **Non drug treatment:**
   
   - Admit
   - Bed rest and IV hydration
   - Avoid vaginal examination,
   - Avoid coitus
   - Closely follow for any indicator of intramniotic infection.

   **Drug treatment**

   *First line*

   **Ampicillin**, 2 gm IV QID for 48 hours followed by 500 mg P.O. QID or 7-10 days.

   **S/Es:** hypersensitivity reactions
   **C/Is:** Known hypersensitivity reactions to penicillins or cephalosporins

   **Dosage forms:** drop, 100 mg/ml; capsule, 250 mg, 500 mg; injection, 250 mg, 500 mg, 1 mg in vial; oral suspension, 125 mg/ml, 250 mg/ml.

   Alternate
**Erythromycin**, 500 mg IV QID for 48 hours followed by Erythromycin 500 mg P.O. QID for 7-10 days.

**S/Es:** nausea, vomiting, abdominal discomfort, diarrhea (antibiotic-associated colitis), rash and other allergic reactions, cholestatic jaundice

**C/Is:** Liver disease.

**Dosage forms:** Capsule, 250 mg; tablet (stearate), 250 mg, 500 mg; oral suspension, 125 mg/5 ml, 200 mg/ml, 250 mg/5 ml; Injection, 50 mg/ml in 2 ml ampoule.

### II. Pre-term/Term PROM with chorioamnionitis

- Admit to the labor ward and facilitate delivery as feasible
- Use ampicillin, chloramphenicol or gentamicin and terminate pregnancy.

**First line**

**Ampicillin**, 2 gm IV QID for 48 hours followed by 500 mg P.O. QID or 7-10 days.

**S/Es:** hypersensitivity reactions

**C/Is:** Known hypersensitivity reactions to penicillins or cephalosporins

**Dosage forms:** Drop, 100 mg/ml; capsule, 250 mg, 500 mg; injection, 250mg, 500mg, 1mg in vial; oral suspension, 125 mg/ml, 250 mg/ml.

**Alternatives**

**Chloramphenicol,** 500-1000mg intravenously QID

**S/Es:** bone marrow depression, grey baby syndrome.

**C/Is:** impaired hepatic function, bone marrow depression.

**D/Is:** Inhibits hepatic metabolism of several drugs like phenytoin and warfarin.

**Dosage forms:** capsule, 250 mg; injection 1g in vial; oral suspension, 125 mg/5ml.

**OR**

**Gentamicin,** 80mg intravenously TID

**S/Es:** ototoxicity, nephrotoxicity

**C/Is:** myastenia gravis

**Dosage forms:** Injection, 40mg/ml, 40mg/2ml
III. Term PROM with no evidence of chorioamnionitis:

- Admit to the labor ward & follow for evidence of infection
- if labour does not start spontaneously after the latency period, induce labour with oxytocin.

(For dosage schedule, S/Es, C/Is and dosage forms, see page 358)

IV. Prolonged PROM:

- **Ampicillin**, 2 gm I.V. QID during labor until she delivers, then 500 mg QID for 7 days.
- **S/Es**: hypersensitivity reactions
- **C/Is**: If there is known history of hypersensitivity reactions to penicillins or cephalosporins
- **Dosage forms**: drop, 100 mg/ml; capsule, 250 mg, 500 mg; injection, 250mg, 500mg, 1mg in vial; oral suspension, 125 mg/ml, 250 mg/ml.

**PRETERM LABOUR**

Preterm labor can be defined as regular uterine contractions that cause progressive dilatation of the cervix after 20th weeks of gestation and before 37 completed weeks. Approximately 8-10% of all pregnancies end in preterm labour. Prematurity is one of the major causes of perinatal mortality and morbidity.

The etiology of preterm labor is multifactorial that includes; multiple gestation, infection like UTI, febrile illness, abdominal surgery, uterine anomalies, APH( placenta previa and abruptio placentae), low socio economic status.

**Diagnosis**

Clinical: Regular rhythmic uterine contraction leading to progressive cervical dilatation and effacement. Vaginal examination should not be done. Cervical dilatation and effacement may be diagnosed by cervical or vaginal ultrasound.

**Treatment**

When the diagnosis of preterm labour is made, the medical team should attempt to determine the cause and whether further continuation of the pregnancy will be
beneficial or harmful to the mother. The choice of treatment depends on the answer
to these questions and maturity of the fetus. Once fetal maturity is assured there is
no benefit by conservative management and pregnancy should be terminated
through the safest route. But if the fetus is premature, conservative management
should be attempted. The following are the treatment objectives:
  - Prevent intrauterine infection
  - Prolonged pregnancy until fetal maturity is achieved

**Non-drug treatment**
Bed rest, oral hydration, especially with nutritive calories, such as fruits juices, milk
etc.

**Drug Treatment**

*First line*

**Ritodrine**, 150mg diluted in 500ml of normal saline or ringer lactate solutions,
yielding a 0.3mg/ml or 300µg/ml concentration. It should be started with 50-
100µg/min (0.05 to 0.1mg/min) and increase to 200mg until one of the
following events ensues:
  - Uterine contraction stop
  - Intolerable side effects develop
  - A maximum dose of 350µg/min (0.35mg/min) is reached.

The dose that makes the uterine contraction cease is maintained for 12-24
hours. Then the IV medication is tapered off, and the patient is put on oral
therapy for 30minutes before stopping the infusion. The initial oral dosage is
10mg every 2-4 hours for 24hours and then 10-20mg every 4-6hours. The
maximum oral dose during the 24hours is 120mg.

**S/Es:** Slight hypotension, wide pulse pressure, lighted headedness, tremor and
flushed feelings, restlessness, anxiety, nausea and vomiting, maternal and fetal
tachycardia, transient hyperglycemia, hypokalemia, decrease hematocrit

Intolerable S/Es include:
  - Maternal tachycardia greater than 140/min
  - Drop in BP to less than 90/60mmHg
  - Chest pain or tightness which could be symptoms of pulmonary edema
  - Cardiac dysrhythmias
**P/Cs:** in cardiovascular diseases  
**Dosage forms:** Injection, 10mg/ml in 5ml ampoule

**Alternative**

**Terbutaline**, 5mg diluted in 500ml normal saline or ringer lactate solution. It is usually started at 2.5-20µg/min and increased to 5µg/min every 10 minutes until one of the following occurs:

- Uterine contractions cease
- Intolerable side effects develop
- A maximum dose of 80µg/min is reached.

The patient is usually maintained on a dose that is effective for her for 12-24 hours after the contraction ceases. The medication is then tapered off, and the patient is started on subcutaneous injections of 0.25mg every 4 hours or oral 5mg every 6-8 hours or 2.5mg every 4 hours.

**S/Es:** Same as those of ritodrine  
**P/C:** Same as those of ritodrine

**OR**

**Magnesium Sulphate:** (For dosage schedule, S/E and dosage forms See on page 306)

**OR**

**Indomethacin**, 50mg orally or rectal followed by a maintenance oral dose of 25mg for 24-48 hours. If contraction recurs, a second course can be given.

**S/Es:** GI disturbances, headache, dizziness; GI ulceration and bleeding; CNS disturbances; thrombocytopenia; hyperglycemia; blurred vision.  
**C/Is:** epilepsy, parkinsonism, psychiatric disturbances.  
**Dosage forms:** Capsule, 25mg, 50mg, 75mg; Suppository, 100mg; Syrup, 25mg/5ml  
**P/C:** Suppositories may cause rectal irritation and bleeding; do not use in proctitis and haemorrhoids.

**OR**

**Ibuprofen**, 600 mg P.O. QID.  
**S/Es:** gastritis, gastrointestinal bleeding
C/Is: active peptic ulcer disease
Dosage forms: capsule, 300 mg; Tablet, 200mg, 400mg; syrup, 25 mg/5ml.
N.B. In addition, oligohydramnios, premature closure of the ductus arteriosus, and neonatal pulmonary hypertension have been noted if prostaglandin inhibitors are used longer than 48 hours. The risk of transient obstruction of the ductus arteriosus increases with increasing gestational age.

OR

Nifidipine, 10-20mg orally or sublingually every 3-8 hours.
S/Es: flushing, oedema of ankle, headache, gingival hypertrophy
C/Is: unstable angina, hypotension
D/Is: Cimetidine may enhance its anti-hypertensive effect
Dosage forms: Tablet, 10 mg, 20 mg; capsule, 5 mg, 10 mg, 20 mg

PLUS

Steroid therapy for stimulation of surfactant production to be given 28-34 weeks of gestation

First line

Bethamethasone, two doses of 12mg 24 hours apart. At 48 hours following the first dose, the full effect on maturing the surfactant has been obtained. If patient does not deliver within one week, the treatment should be repeated if the fetus is less than 34 weeks of gestation.
S/Es: hyperglycemia, psychiatric reactions, gastrointestinal disturbance, infections, osteoporosis, central obesity, hirsutism
C/Is: herpes simplex infection of the eye, epilepsy, peptic ulcer, psychic instability, thromboembolic disorders,
P/C: in hypertension, diabetes mellitus, liver cirrhosis, epilepsy, osteoporosis
Dosage forms: Tablet, 0.5mg

Alternative

Dexamethasone; 6mg orally for two doses six hours apart for two doses.
(For S/Es, C/Is, and P/C are same as those of bethametasone)
Dosage forms: Injection, 4mg/ml, 25mg/ml, 50mg/ml; Tablet, 0.5mg, 0.75mg, 1mg, 2mg
PROLONGED PREGNANCY AND PROLONGED LABOUR

The terms Prolonged and Post-term pregnancy which are synonymously used, is defined as one that exceeds 42 weeks (294 days), from the last menstrual period. The incidence of post-term pregnancy averages 4-5%. Post-term pregnancy may be complicated by fetal postmaturity, macrosomia, oligohydramnios, placental insufficiency due to placenta aging. Management of post pregnancy can take to forms; either expectant management with fetal surveillance or elective induction of labour. **Induction of labour** is any attempt to initiate uterine contractions before the spontaneous onset of labour to facilitate the expulsion of concepts product. Prolonged labour has been variously defined from one exceeding 24 hours to one exceeding 12 hours of established labour, when labour is actively managed. One of the causes of prolonged labour is insufficient uterine contraction in terms of its frequency, duration and strength. The treatment of prolonged labour due to inefficient uterine action is, augmentation of labour using oxytocics. **Augmentation** is any attempt to stimulate uterine contractions during the course of to facilitate the expulsion. But cephalopelvic disproportion should be excluded before augmentation.

**Criteria for induction:** The listed below are not inclusive;
- Previous scar on the uterus (C/S, myomectomy etc)
- Fetopelvic disproportion
- Non re-assuring FHB pattern
- Placenta previa

**Pre-requisites for induction:**
- Favourable cervix
- No contraindication
- Empty bladder

**Non-drug treatment:**
- Breast stimulation:
- Amniotomy (Artificial rupture of membrane)
- Stripping of membrane (Digital separation of the membranes from the lower uterine segment)
- Mechanical methods: Insertion of Laminaria or Foley catheter into the cervical canal.
Drug treatment:

**Oxytocin:** It is administered intravenously in different ways ranging from simple manually adjusted, gravity-fed systems, through mechanically or electronically controlled infusion pump, to fully automated closed-loop feedback systems.

**Dosage schedule:**

*Low dose regimen: For primigravida,* 5 units in 1000 ml N/S to run at 20 drops/min (2 mU/min), double the drop every 20 minutes until adequate contraction is achieved to maximum of 120 drops/minute, if adequate contraction could not be achieved with the maximum dose add 5 units to the same bag and start the drop from 40/minute, if there is no adequate contraction with this dose add 5 units more to the same bag to a maximum dosage of 64 mU/min.

*For Multiigravida:* Use half of the dose for primigravida women.

*High dose regimen:* start with 6 mU/min and increase the dosage by 6 mU/min every 15 minutes until adequate contraction is achieved to maximum of 64 mU/min for primigravida and 32 mU/min for multigravida.

**S/Es:**

- **Maternal:** Uterine hyperstimulation, i.e., contraction more than six in 10 minutes lasting longer than 90 seconds without a period of relaxations and resting pressure of above 20 mmHg. The hyperstimulation can cause uterine rupture and fetal distress. It has ADH like effect that may lead to water intoxication and electrolyte imbalance. Oxytocin causes relaxation of the vascular smooth muscles resulting in hypotension and tachycardia, pulmonary edema. With prolonged use it may increase the blood pressure.

- **Fetal:** Fetal distress, low apgar score, hyperbilirubinemia, hyponatremia

  **Dosage forms:** Injection, 1 unit/ml, 5 unit/ml, 10 unit/ml

  **Prostaglandins:** Vaginal or cervical applications of PGs (E2, F2α and E1) are widely used for cervical ripening. They are administered intra-vaginal and intra-cervical.

  **Dosage:** PGE2 3 mg into the posterior fornix six hour apart for 2 doses followed by oxytocin 12 hours later.
Advantages:

- Enhanced cervical ripening
- Decreased need for oxytocin for induction
- Decrease oxytocin induction time
- Decreased C/S rate related to failed induction

S/Es:

- Uterine hyperstimulation leading to hypertonic uterine contraction and uterine rupture.
- Fetal heart beat anomalies, low apgar score
- Fever, nausea, vomiting, diarrhea

Dosage forms: Suppository (vaginal), 20mg; tablet (vaginal), 3mg

II. COMMON MEDICAL DISORDERS IN PREGNANCY

ANEMIA IN PREGNANCY

Anemia secondary to iron deficiency is the commonest medical disorder in pregnant women, particularly in the developing countries. The other varieties of anemia are rare in this part of the world. Anemia is one of the major indirect causes of maternal death.

Anemia in pregnancy is defined as when the Hemoglobin (Hgb) level is below 11 gm/dl in the first and third trimesters and below 10.5 gm/dl in the second trimester of gestation. The causes of anemia are the same as in non-pregnant period. Iron demand is increased by a factor of 4-5 times during pregnancy.

Diagnosis

Clinical: Nonspecific symptoms like weakness, dizziness, palpitation, shortness of breath. Physical examination may reveal significant pallor of the conjunctiva and other parts of the body.

Laboratory: Hgb < 11 gm%/dl, peripheral RBC morphology, bone marrow aspiration, stool examination for hookworm infestation, blood film for malaria.
Treatment

The treatment depends on the severity of anemia and the underlying medical and obstetric condition of the mother.

Treatment Objectives:

- Correct the anemia as urgently as possible before the patient goes to labour.
- Identify the cause of anemia like hookworm infestation, malaria etc.

A. Mild to moderate anemia

Non drug treatment:

- Iron rich diet
- Avoid frequent childbirth
- Minimize hemorrhage during pregnancy & childbirth
- Prevent and early treatment of malaria
- Treat hookworm infection

Drug treatment:

*First line*

Ferrous sulphate, 300mg P.O TID with food.
(For S/Es,C/Isl and dosage forms, see page 80)

PLUS

Folic acid,(For dosage, S/Es,C/Isl and dosage forms, see page 82)

B. Severe anemia: Requires admission and blood transfusion in the presence of complications.

Referral: If the anemia is severe (Hgb <7gm/dl) patients should be referred.

CARDIAC DISEASE IN PREGNANCY

The commonest causes of cardiac disease in pregnancy are secondary to rheumatic heart disease followed by the congenital ones, in the ratio of 10:1 respectively. Due to the increase in cardiac output during pregnancy, patients with underlying cardiac disease can decompensate easily, particularly near 28 weeks of gestation, during labour and immediate post partum period. On the other hand, due to these
hemodynamic changes, normal pregnant patients may report signs and symptoms that mimic cardiac disease; hence, differentiation of normal from abnormal makes it difficult. The severity of heart disease is assessed according to the classification of New York Heart Association (NYHA), which by enlarge depends on the response of the heart to physical activities not the extent of the cardiac lesion.

- Class I: Asymptomatic at all degrees of activity: uncompromised
- Class II: Symptomatic with ordinary activities: Slightly compromised
- Class III: Symptomatic minimal exertion: Markedly compromised
- Class IV: Symptomatic at rest; incapacitated.

**Diagnosis**

Clinical: Symptoms and signs of cardiac disease.

Laboratory: ECG, Echocardiography, CXR etc

**Treatment:** The cardiologist, obstetrician and pediatrician should work as team in the treatment of these patients.

- Objective of treatment:
- Avoid aggravating factors
- Prevent or early detection of cardiac decompensation

**Non-drug treatment**

- Bed rest and limitation of activities
- Reduce cardiac work load: Restrict fluid intake, reduce tachycardia, correct anemia
- Avoid supine position in late pregnancy
- Apply elastic stocking to the lower leg to prevent pooling of blood
- Assist vaginal delivery by instruments
- Put patient in propped up position.
Drug treatment

A. Antepartum

First line

Furosemide, 40mg QD of BID.

S/Es: hyponatraemia, hypokalemia, hypomagnesaemia alkalosis

C/Is: precomatose states associated with liver cirrhosis, renal failure with anuria

Dosage forms: tablet, 40mg, 80mg; injection, 10mg/ml in 2ml ampoule

Alternative

Propranolol, 40mg TID

(For S/Es, C/Is, and dosage forms see on page 60).

B. During labour

- Reduce labour pain by regional block or narcotics
- O2: 5-6L/min through nasal catheter
- Broad spectrum antibiotics to prevent SBE

C. Post partum

The first one hour is critical because of the remobilization of the fluid into the vascular bed. Ergometrine should be avoided especially if the lesion is tight mitral stenosis or an AV shunt, because it may precipitate pulmonary edema.

Referral: Patients with cardiac disease in pregnancy should be referred.

DEEP VEIN THROMBOSIS/THROMBOEMBOLISM (DVT/TE)

There are three factors which can influence the formation of thrombus within the vascular tree, namely, the condition of the blood vessel wall, blood flow and constituents of the blood. All these factors may be altered in pregnancy to predispose towards thrombus formation. That is why pregnancy is said to be thrombogenic. It is not surprising that venous TE is a potential risk of complication of pregnancy and puerperium, because the incidence of TE is five times higher than non-pregnant patients. Venous TE can manifest in three forms: Superficial thrombophlebitis, deep
vein thrombosis and pulmonary embolism. These forms represent spectrum of
diseases as one form may progress to the next.

**Diagnosis**

Clinical: **Superficial thrombophlebitis:** Hot, red and tender area in relation to a
superficial vein

**DVT:** Clinical presentation vary, from severe pain and edematous white leg (phlegmasia alba dolens) to being symptomatic, manifesting with pulmonary embolism.

**Pulmonary embolism:** Acute chest pain, breathlessness, cyanosis, and hemoptysis may be accompanied by hypotension and collapse.

**Investigations:** Ascending phlebography, isotope venography, Doppler ultrasound, radioactive iodine test which is contraindicated in pregnancy, impedance plethysmography.

**Treatment**

**Treatment objectives**

- Liquefaction of the already formed thrombus
- Prevent further propagation of thrombus
- Prevent pulmonary embolism
- Prevent recurrence of thrombosis

**Drug treatment**

**Heparin,** IV in the order of 5,000-10,000IU, followed by 1000-1600IU/hour, and should be administered in saline through an infusion pump.

**S/Es:** bleeding, allergy, reversible alopecia, osteoporosis, thrombocytopenia, paradoxical thromboembolism.

**C/Is:** hypersensitivity to the drug, active bleeding, hemophilia, thromboembolism, purpura, severe hypertension, intracranial hemorrhage, infective endocarditis, & during or after neuro surgical procedures.

**Dosage forms:** Injection, 1000 IU/ml, 5000 U/ml in 5 ml ampoules; 5000 IU/ml, 12,500 IU/ml, in 1ml ampoules; 24000 USP IU/5 ml
Followed by

**Warfarin**, 2.5-5mg/day, excluding the first trimester up to the 36 weeks of pregnancy.

**S/Es:** Readily crosses the placenta and lowers the Vit K-dependent clotting factors. There is a risk of embrophy if used in the first trimester. The commonly reported abnormality is *chondrodysplasia punctata*. Due to repeated small bleeding there could be **microcephaly**.

Breast feeding is not contraindicated.

**C/Is:** Bleeding, pregnancy (first trimester and during perpartum period)

**Dosage forms:** tablet, 2mg, 5mg, 10mg.

**DIABETES MELLITUS COMPLICATING PREGNANCY**

Diabetes is one of the most common medical problems that complicates pregnancy. Diabetes in pregnancy can be gestational or pre-gestational. Women with pre-gestational diabetes need to have preconception counseling to achieve good glycemic control at the time of conception and organogenesis to avoid congenital abnormality. Women with gestational diabetes mellitus become normoglycemic immediately, but significant of them can become diabetic if followed for long period of time.

Diabetes in pregnancy if not well controlled may cause many obstetric and non-obstetric complications that include; macrosomia, polyhydramnios, congenital anomalies, maternal hyper or hypoglucemia depending on the gestational age, UTI, hypertension, exacerbation of retinopathy etc.

**A. Gestational Diabetes Mellitus (GDM)** is a carbohydrate intolerance of variable severity with onset or first recognized during pregnancy.

**Diagnosis**

- **Clinical:** Identifications of risks that are mentioned below and symptoms of polyuria, polydipsia and polyphagia etc
- **Laboratory**

  Screening by administering 50gm glucose load and determine the blood glucose level one hour later. If the value is more than 140mg/dl, the woman needs Oral Glucose Tolerance Test (OGTT), which is a confirmatory test.
According to the American Association of Diabetes women with the following risk factors should be screened between the gestational age of 24-28 weeks.

- Family history of DM in the first sibling (mother, father, sister or brother)
- Obese (BMI > 27)
- Mothers above the age of 25 years
- Race (Being black)

Previously, in addition to the above mentioned risk factors, the following were included as a screening criteria; previous delivery of macrosomic fetus (>4kg), previous pregnancy complicated by GDM, unexplained fetal losses, persistent glucosuria, but if the screening is based on these criteria, 50% of pregnant women prone to be diabetic can be missed.

**OGTT procedures:** The woman should fast for 10 hours before the test. During the test she should remain inactive. Blood should be drawn to determine the fasting level, and then she will drink 100gm glucose. Repeat blood samples for glucose values should be obtained at 1, 2 and 3 hours. The upper limit of normal are shown in the table below. If any of the two or more results are above the upper limit of normal GBM can be diagnosed, but if one value is abnormal the test should be repeated in one month time. If OGTT is intolerable due to nausea and vomiting, intravenous glucose tolerance test (IGTT) using 25gm glucose load, i.e, 50ml of 50% glucose can be used.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Fasting</th>
<th>1st hour</th>
<th>2nd hour</th>
<th>3rd hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole blood</td>
<td>90</td>
<td>165</td>
<td>145</td>
<td>125</td>
</tr>
<tr>
<td>Plasma</td>
<td>105</td>
<td>190</td>
<td>165</td>
<td>145</td>
</tr>
</tbody>
</table>

**Treatment**

- To maintain good glycemic control.
- Prevent maternal and fetal complications.
- Minimize long term complication of diabetes,
**Non-Drug treatment**

1. **Diet:** Most women with GDM can be managed with diet alone.
   - Three meals and three snacks per day
   - Diet with 40-50% carbohydrate, 20% protein and 30-40% fat content.
   - 10% of calorie at breakfast, 30% at lunch and dinner and 30% at snack.

2. **Exercise:**
   - Walking or exercise using the upper part of the body is recommended
   - Maintain the fasting plasma glucose level to be < 105 mg/dl and the two hours post-prandial < 120 mg/dl

**Drug treatment**

**Insulin,** 0.5 units/kg in the first half of pregnancy and increase the dosage to 0.7 units/kg in the second half. This is the average dosage otherwise the dose requirement may vary from individual to individual. By split injection 2/3\(^{rd}\) in the morning (as 2/3\(^{rd}\) long-acting and 1/3\(^{rd}\) short-acting) and 1/3\(^{rd}\) in the evening (as ½ long-acting and ½ short-acting) good blood glucose control could be achieved. Combination of 1/3\(^{rd}\) short and 2/3\(^{rd}\) intermediate acting insulin is used to maintain the FBS to 60-90 mg/dl 1-hour post-prandial values at < 120 mg/dl.

**S/Es:** hypoglycemia, lipohypertrophy

**C/Is:** hypoglycemia

**Dosage forms:** injection, insulin zinc suspension / insulin lente (HPB), 40 unit/ml, 100 unit/ml in 10 ml vial.

**N.B.** Oral hypoglycemic agents are contraindicated during pregnancy, they cross the placenta and can cause prolonged neonatal hypoglycemia. In addition, they increase the rate of congenital anomalies.

**Follow up:**
- Fasting blood glucose and 1-hour postprandial every 2-3 weeks
- HgbA\(_{1c}\) once per month

**Delivery:**
- Unless there are other obstetric contraindications, induction of labour and vaginal delivery is the preferred route of delivery.
• If the blood glucose control is satisfactory with diet and exercise, follow the pregnancy until term with close fetal surveillance until spontaneous onset of labor. But if the blood glucose control is unsatisfactory, plan delivery after ascertaining the lung maturity using shake test, laminar bodies count etc.

• Intra-partum / Intra-operative Glycemic management:
  1. Withhold the AM insulin injection for planned delivery
  2. Start IV infusion with 5% D/W at 100 ml/hr
  3. Start Insulin infusion with regular insulin at 0.5units/hour
  4. Monitor maternal glucose levels hourly and adjust insulin infusion
  5. Closely follow the fetal heartbeat

Post-partum management: The need for insulin declines in post-partum period, therefore adjust the dose based on sliding scale.

B. Insulin dependent Diabetes Mellitus

Many serious problems can ensue in women with insulin dependent diabetes during pregnancy. These complications are dependent on the presence of vascular problems which in turn are dependent on the duration of the diabetes. Based on this concept the White’s classification (classes A-F) is used to predict outcome, though, the predictive value of this classification is less precise in modern management. UTI is common and frequent urinalysis and culture should be done. If hypertension combines with diabetes it is an ominous sign. Therefore, the BP should be closely monitored.

Diagnosis: Same as those for GDM

Drug Treatment

The following are frequently occurring problems that need special attention during pregnancy:

Insulin:

Adjustment of dosage: Maternal hypoglycemia occurs in the first half of the pregnancy. Hence, the insulin should be slightly decreased from the pre-pregnancy dosage. Whereas on the second half of pregnancy the insulin resistance increases, typically between weeks 20-30, and the dosage of insulin should be adjusted accordingly. Sometimes, a decrease need to insulin
may arise towards late pregnancy which implies the placenta is failing to function, meaning the insulin resistance is disappearing. This is an ominous sign. (For S/Es, C/Is and Dosage forms; see page 101)

Referral: Preferably, all pregnant mothers should be managed in health institutions where there is an internist.

THYROID DISEASE IN PREGNANCY

The thyroid gland produces T4 and T3 hormones in the ratio of 5:1. T3, is produced by peripheral conversion of T4 in a larger proportion. To produce this hormone the thyroid gland requires enough iodine. More than 95% of these hormones are found attached to thyroid binding globulin (TBG) in the circulation. The production of these hormones is controlled by TSH which is secreted by the anterior pituitary and this in turn is controlled by the negative feedback and TRH from the hypothalamus. The main function of the thyroid hormones (T3 and T4) are; energy production, stimulation of protein synthesis and facilitate growth in children.

During pregnancy there is moderate enlargement of the thyroid gland due its hyper-function. The TBG is markedly increases, almost doubles by the 12th week, proportionally, the T4 and T3 level also increases and the free concentration of free hormone in the circulation is changed. There are different types of thyroid disorders in pregnancy:

A. Hypothyroidism:

The main cause of hypothyroidism is iodine deficiency. Severe hypothyroidism leads to an increased conversion of estradiol to estriol which interferes with hypothalamic feedback and causes anovulation. Some patients my develop hyperprolactinemia to cause amenorrhea and some of them with less severe disease may suffer from menorrhagia. Abortion and still birth rate are high.

Diagnosis

Clinical: Fatigue, hair loss, dry skin, excessive weight gain despite poor appetite, cold intolerance, muscle ache, stiffness, pain or tingling in the median nerve distribution due to carpal tunnel syndromes, low pulse rate, etc.

Laboratory: T4, T3 and TSH determination.
Treatment
Thyroxin (T4) 0.1mg every morning for one week and adjust the replacement dose to 2µg/Kg. Breast feeding is not contraindicated. Dosage should be reduced in the postpartum period.
S/Es: Tachycardia, irritation, hyperglycemia,
C/Is: cardiac disease
Dosage form: Tablet, 0.05mg, 0.1mg

B. Hyperthyroidism
Hyperthyroidism also causes anovulation and amenorrhea. In 95% of the cases thyrotoxicosis is due to Grave’s disease but few could be due to solitary toxic adenoma or multinodular goiter or associated with obstetric conditions such as gestational trophoblastic neoplasia. Fetal hyperthyroidism is one of the complications which may lead to neonatal hyperthyroidism, IUGR, intrauterine death etc.

Diagnosis
Clinical: Family history of autoimmune thyroid disease, failure to gain weight despite good appetite, presence of exophthalmos or lid lag, persistent tachycardia, heat intolerance etc.
Laboratory: Increase T4, T3 and FTI. It is preferable to determine free T4 and T3. Low TSH, Ultrasound to rule out GTD.

Treatment
First line
Propylthiouracil, 150mg TID for 4-5 weeks. The dose is then progressively lowered to maintenance dose of 150mg per day.
S/Es: agranulocytosis, allergy, arthralgia, hepatitis, drug fever
C/I: Liver damage
Dosage form: Tablet 25 mg, 100mg
N.B. Radioactive iodine should not be given to pregnant women
Alternative

**Carbimazole**, 15mg TID for 4-5 weeks. The dose is then progressively lowered to maintenance dose of 15mg per day.

**S/Es and C/Is:** Same as for those of Propylthiouracil

**Dosage form:** Tablet 5mg

C. Thyroid crisis (storm)

Thyroid crisis is a rapid worsening of thyrotoxicosis brought about by stress such as infection, labour and surgery. This scenario is common in women whose thyrotoxicosis is not well controlled, but it can occur also in well treated women.

**Diagnosis**

Clinical: Fever, tachycardia, extreme nervousness, restlessness and psychosis, eventually may lapse in to coma.

Laboratory: Markedly elevated free T3, T4

**Treatment**

**Non-drug treatment:**

- Reduce fever by tepid sponging or covering in wet sheet or electric fun.
- Prevent aspiration

**First line**

**Propyluracil**, 1000mg orally initially, followed by 200mg QID.

(For **S/Es, C/Is** and **dosage forms**, see pages 142)

**N.B.**

- Administration of either of the antityroid drugs is followed by administration of sodium or potassium iodide, 500mg TID by infusion or orally QID to inhibit the release of thyroid hormone and Dexamethasone 2mg every QID for the first day to decrease the peripheral conversion of T4 to T3.
- If the patient develops heart failure; **Propranolol**, 0.5mg IV initial dose followed as necessary by 0.5mg/min up to a maximum of 5mg, orally in a dose of 80mg three times per day.

(For **S/Es, C/Is** and **dosage forms** see page 60)
• **Chlorpromazine**, 25-50mg orally or intravenously 6-8hourly is administered to reduce fever.
  (For **S/E**, **C/I** and **d**osage **f**orms see page 59)

• **Aspirin** should not be used for fever as it displaces thyroid hormones from TBG and thus increases the free hormones in the circulation.

**D. Postpartum thyroiditis:**

It is well recognized fact that 10-20% of women develop some form of thyroid dysfunction in the postpartum period due to autoimmune diseases. Three quarter develop hyperthyroidism and the rest hypothyroidism between 1-3months postpartum period. Most of those who develop hyperthyroidism go into remission within 2-3months but 30% will enter into hypothyroid phase.

**Diagnosis**

  - Clinical: Fatigue and palpitation, 50% will have goiter.
  - Laboratory: Fine needle aspiration- lymphocytic thyroiditis is the common finding.

**Treatment**

  - **Hyperthyroid phase**: Anti-thyroid drugs are not indicated.
  - **Hypothyroid phase**: Most of the time it is self limiting, but if symptoms are severe and prolonged, treatment with T4 is warranted.

**III. INFECTIONS IN OBSTETRICS AND GYNECOLOGY**

**HIV/AIDS IN PREGNANCY**

In the last 20-25 years HIV/AIDS has become an indirect major killer of mothers in pregnancy and delivery. The majority of HIV/AIDS women (77%) lives in Sub-Saharan Africa, and constitutes 57% of the adult HIV positive population. In Ethiopia, the average prevalence rate in adults is 2.1 % (7.7% urban and 0.9% rural), among these 59% are female. The HIV prevalence in pregnant women is 7.7% and about 15,000 children are born with HIV every year. This is as a result of mother to child transmission (MTCT) during pregnancy (5-10%) and labour and delivery (10-15%). Quite significant number could be infected through breast feeding (5-20%).
Pregnancy by itself does not affect the course of the disease, but HIV may increase the risk of premature deliveries, small for date uterus and the rate of still birth. Factors that influence MTCT include: maternal viral load, nutritional status of the mother, presence of concomitant parasitic infection like malaria, severe immunodeficiency, advanced HIV/AIDS stage, presence of PROM and injury to the fetus and birth canal during labour and delivery. To reduce the rate of MTCT of HIV/AIDS, the Ethiopian government has adopted the four pronged approaches in its PMTCT strategies, namely: primary prevention, prevention of unintended pregnancy, prevention of HIV transmission from infected women to their infants, and treatment, care and support of HIV infected women, their infants and their families.

**Diagnosis**

**Clinical:** Symptoms suggestive of opportunistic infections/malignancies or direct effects of HIV. History of seropositivity, history of HAART and other HIV/AIDS related illnesses, duration of illness, status of partner, WHO staging, any medication given for HIV-related illnesses since the beginning of pregnancy.

**Laboratory:**
- Serologic test for HIV after counseling. If she is HIV positive CD4 count, viral load, baseline tests such as CBC, RFT, LFT tests.
- Test for syphilis (VDRL), Hgb,
- Test for opportunistic infections like TB

**Prevention:**
- **HIV women who intend to get pregnant:** The following general health measures should be taken:
  - Adequate nutrition that includes: high calories and food staff rich in iron, micronutrient supplementation such as iron, zinc and folic acid at least for three months prior to getting pregnant.
  - Prevention of malaria infection.
  - Prevention and treatment of STIs.
  - Prophylaxis and treatment of opportunistic infections.
  - Avoid pregnancy for at least six months following recovery from TB and other opportunistic infections.
o Administer ART for eligible women, if not already on treatment and ARVs for PMTCT for those who are not eligible for ART.

- **During antenatal care (ANC):** Advocate the benefits of VCT and persuade every pregnant woman to be tested. If the pregnant woman turns out to be positive apply the primary preventive measures that include; early and appropriate treatment of STI, education about safer sex practice during pregnancy and lactation.

- **Intrapartum care: Labour and delivery:** These include, avoiding invasive procedures, application of infection prevention and performing elective C/S on selected patients.

- **Post partum care:** Avoiding breast feeding or exclusive breast feeding.

**PMTCT clinical scenarios and ARV regimens:**

**Scenario 1. Women who become pregnant while on ARV treatment:**

- **Women on EFV**
  o Consider possible teratogenicity in 1\(^{st}\) trimester
  o Stop EFV and start NVP if in the 1\(^{st}\) Trimester
  o Continue EFV if already in 2nd or 3rd trimester
  o Discuss with ARV trained physician
  o If co-infected with TB, consider other options (e.g. triple NRTI) but not PI based as first line

- **Women on d4T/3TC/NVP OR AZT/3TC/ NVP**
  o Continue treatment
  o ALT monthly when indicated

- **Women on AZT/DDI/LPV/r**
  o Continue treatment
  o Full blood count monthly
  o Monitor sugar levels as appropriate
  o In the presence of severe Anaemia (Hgb<7 gm/dl)→ switch to D4T from AZT.
Scenario 2: Pregnant women eligible for ART

WHO Guidelines – screen for ART Eligibility

<table>
<thead>
<tr>
<th>WHO Clinical Staging</th>
<th>CD4 not available</th>
<th>CD4 available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do not treat</td>
<td>Treat if CD4 &lt; 200</td>
</tr>
<tr>
<td>2</td>
<td>Do not treat</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Treat</td>
<td>Treat if CD4 &lt; 350</td>
</tr>
<tr>
<td>4</td>
<td>Treat</td>
<td>Treat at any CD4</td>
</tr>
</tbody>
</table>

a. Pregnant women who present with CD4 <350 /mm³, with WHO stage III, IV disease or CD4<200/mm³ and stage I,II disease.

Start first-line treatment:

- AZT 300 mg every 12 hours
- 3TC 150 mg every 12 hours
- NVP 200 mg daily for 2 weeks, then 200 mg every 12 hours

b. Pregnant women with early stage HIV, or not requiring ARV therapy

according to protocol: Follow national protocol mentioned above.

Scenario 3: Pregnant women not eligible for ART but require prophylaxis

a. Women presenting in pregnancy where ART is available

Mother: AZT 300mg BID starting at 28 weeks of pregnancy or as soon as thereafter, NVP+AZT/3TC during labour (NVP 200mg single dose, AZT 600 mg at onset of labor and 3TC 150 mg every 12 hours until delivery) and AZT/3TC( AZT 300 mg BID and 3TC 150mg BID) for 7 days in the postpartum period.
Infant: NVP (single dose 2mg/kg) + AZT (4mg/kg/day) for 7 days. If mother has less than 4 weeks on AZT before labour, then AZT should be extended to 4 weeks.

b. Women presenting during pregnancy in facilities without ART services
   Mother: NVP 200mg at the onset of labour
   Infant: NVP 2mg/kg within 72 hours

Scenario 4: Pregnant women presenting in labor
   a. Women presenting in labor who have not received antenatal prophylaxis; where ART is available
      Mother: Intrapartum: NVP + AZT/3TC, in the postpartum period AZT/3TC for 7 days
      Infant: NVP and AZT for 4 weeks
   b. Women presenting in labor who have not received antenatal prophylaxis; where ART not available
      Mother: NVP 200mg at the onset of labour
      Infant: NVP 2mg/kg within 72 hours

Scenario 5 - Woman and child presenting post-partum
   Women who present after giving birth without previous ART:
   Mother: Before contemplating to give drug; evaluate for ART eligibility
   Infant: NVP 2mg/kg within 72 hours
   (For S/E, C/Is and dosage forms of different ARVs, see under HIV/AIDS)

MALARIA IN PREGNANCY
Malaria is a public health problem worldwide. More than 23 million pregnant women live in malaria endemic area and few of them have access to medical care, particularly in Sub-Saharan Africa. As a result malaria is becoming one of the major indirect causes of maternal death along with HIV/AIDS. Pregnant women, particularly in the second and third trimesters are more likely to develop severe malaria than other adults, often complicated by pulmonary edema and hypoglycemia. Maternal mortality is 50% high than in the non-pregnant period. The commonest complications
are; maternal anemia, spontaneous abortion, still birth, premature labours, and low birth weight.

**Diagnosis**

- **Clinical**: Fever, chillness, rigor, anemia, headache, joint pain etc
- **Laboratory**: Blood film (thin and thick), Rapid Diagnostic test (RDT)

**Prevention of malaria in high transmission areas**

**Intermittent preventive treatment (IPT)**: In high transmission area, despite the adverse effects on fetal growth, malaria is usually asymptomatic in pregnant women and hence IPT minimizes the effect of malaria in the pregnancy.

*First line*

**Sulfadoxin pyrimethamine (SP)**. 500+25mg, three doses to be given after quickening (first fetal movement) at least one month apart. Pregnant women with the following condition would benefit from this IPT regimen:

- Pregnant women in their first and second trimester
- HIV positive
- Who are 10-24 years old
- Have an explained anemia during pregnancy
- Live in low malaria transmission area
- Migrated from low malaria transmission area

**C/Is**: SP should not be given to pregnant women whose gestational age is less than 16 weeks (4 months).

**Dosage forms**: sulfadoxine(500mg)-pyrimethamine(25mg) 3 tablets orally as a single dose.

**PELVIC INFLAMMATORY DISEASES (PID)**

Pelvic inflammatory disease refers to infection of the genital tract above the internal cervical os. The common manifestations include fever, lower abdominal tenderness, cervical excitation tenderness, adnexal tenderness and abnormal vaginal discharge. It is caused by polymicrobial organisms such as *gonoccocus, chlamydia trachomatis, Mycoplasma hominis* and other intestinal and vaginal normal flora.
Diagnosis

Clinical: Fever, lower abdominal tenderness, and cervical excitation tenderness, adnexal tenderness and abnormal vaginal discharge.
Laboratory: leucocytosis with neutrophilia and raised ESR
Culture and sensitivity of blood, pus, or vaginal discharge
Vaginal/Swab: evidence of cervicitis
Ultrasonography: Evidence of inflammatory collection
Laparascopy: visualization of hyperemic tubes, purulent discharge
Laparatomy: Abscess collection or inflammation of the pelvic organs

Treatment

1. Acute PID

Out patient treatment

First line

Ceftriaxone, 250 mg IM single dose (For S/Es, C/Is and dosage forms, see page 17)

PLUS

Doxycycline, 100 mg P.O. BID. (For S/Es, C/Is and dosage forms, see page 21)

PLUS

Metronidazole, 500mg P.O. QID for a week. (For S/Es, C/Is and dosage forms, see page 14)

Alternative

Crystalline penicillin 3-4 million IU, QID

PLUS

Gentamicin, 80mg IV TID (For S/Es, C/Is and Dosage forms, see page 316)

PLUS

Metronidazole, 500mg TID (For S/Es, C/Is and Dosage forms, see page 14)

OR

Chloramphenicol, 500mg-1gm IV QID (For S/Es, C/Is and Dosage forms, See page 23)
Inpatient treatment

Admission criteria include:

- Parity, age, pregnancy, HIV, history of infertility and the facility

They require hospitalization and administration of IV medication until 48 hours after the fever has subsided, then to be administered as orally or IM medication for 10-14 days.

First line

- **Ampicillin**, 500 – 1000 mg I.V. QID, followed by 500 mg orally QID
  (For S/Es, C/Is and Dosage forms, see page 18)

PLUS

- **Gentamicin**, 80 mg i.v. TID followed by IM. injection of similar dose
  (For S/Es, C/Is and Dosage forms, see page 316)

PLUS

- **Chloramphenicol**: 500-1000mg intravenously QID

OR

- **Metronidazole**, 500 mg IV TID followed by 500 mg P.O.TID
  (For S/Es, C/Is and Dosage forms: see page 315 and 14, respectively)

Alternative

- **Ceftriaxone**, 1 g/day, IV
  (For S/Es, C/Is, and Dosage forms, see page 17)

PLUS

- **Gentamicin**, 80 mg, TID IM
  (For S/Es, C/I, and Dosage forms, see page 316)

PLUS

- **Metronidazole**, 500mg TID P.O.
  (For S/Es, C/Is and Dosage forms: see page 14)

OR

- **Clindamycin**, 450 – 600 mg, TID IV
  (For S/Es, C/Is, and Dosage forms, see page 44)

AND/OR

- **Doxycycline**, 100 mg P.O. BID until 48 hours after the fever has subsided
  (For S/Es, C/Is and Dosage forms, see page 21)
**Surgical treatment**

The possible surgical management include, laparotomy and drainage of abscess, salpingo-oopherectomy, Colpotomy, Hysterectomy with or without salpingo-oopherectomy.

**POST ABORTAL/ PUERPERAL SEPSIS**

Post abortal/ puerperal sepsis is a kind of infection, which complicates abortion/delivery. It is caused by a number of microorganisms including gram positive, gram negative and anaerobes.

**Diagnosis**

Clinical: History of abortion or delivery with evidence of sepsis

Laboratory: Anemia, leucocytosis with neutrophilia, positive blood culture, pus culture,

Ultrasound: Evidence of retained products of conception, or evidence of abscess collection as tubo-ovarian complex, pelvic abscess or generalized peritonitis

**Treatment:** Require hospitalization. Treatment includes IV antibiotics until 48 hours after the fever has subsided followed by IM / PO dose for 10-14 days, Anti pyretics and analgesics should be as required.

*First line*

Ampicillin, 1 gm IV QID

(For S/Es, C/Is and dosage forms see page 18)

*PLUS*

Chloramphenicol, 1 gm IV QID

(For S/Es, C/Is and dosage forms, see pages 23)

OR
Metronidazole, 500 mg IV QID.
(For S/Es, C/Is and dosage forms, see page 14)

OR

Clindamycin, 600 mg IV QID.
(For S/Es, C/Is and dosage forms, see page 44)

PLUS

Gentamicin, 80 mg IV TID until 48 hours after the fever has subsided
(For S/Es, C/Is and Dosage forms, see page 316)

Followed by

Ampicillin, 500 mg P.O. QID.
(For S/Es, C/Is and dosage forms, see page 18)

PLUS

Gentamicin, 80 mg IV TID for 10 – 14 days.
(For S/Es, C/Is and dosage forms, see page 316)

PLUS

Chloramphenicol, 500 mg P.O. QID.
(For S/Es, C/Is and dosage forms, see page 23, 315)

OR
Metronidazole, 500 mg P.O. TID.
(For S/Es, C/Is and dosage forms, see page 14)

Alternatives

Ceftriaxone 1gm IV QD. For 7-10 days
(For S/Es, C/Is and dosage forms, see page 17)

PLUS

Clindamycin, 450 mg IV QID.
(For S/Es, C/Is and dosage forms, see page 44)

OR

Metronidazole, 500 mg P.O. TID.
(For S/Es, C/Is and dosage forms, see page 14)

PLUS

Gentamicin, 80mg IV TID.
(For S/Es, C/Is and dosage forms, see page 316)

Surgical treatment

- Evacuation of the uterus.
- Laparatomy and drainage of abscess.
- Salpigo-opherectomy and/or hysterectomy depending on the clinical situation.

Additional treatment: Heparin 2500-5000 may be given in selected cases to prevent DIC (For dosage schedule, S/Es, C/Is and dosage forms, see pages 129, 327)
PUERPERAL MASTITIS

Puerperal mastitis is breast inflammation that develops during the first month after delivery. Puerperal mastitis is a commonly encountered infection, hence early diagnosis and prompt management minimizes the impact on the mother and infant. Despite appropriate management, abscess formation occurs in 4-10% of cases. It is commonly caused by *Staph. Aureus* in some cases *Staph. Epidemidis*.

**Diagnosis**

Clinical: Fever, chills, flu like symptoms, breast pain with warm, erythematous indurated, engorged and tender breast (one or both breasts) and ± axillary lymphadenopathy ± Fluctuating breast mass.

Laboratory: *Leucocytosis with left shift*, Gram stain and culture of the pus from the breast abscess if any

**Treatment**

*Non-Drug Treatment:*

- Suction
- Breast-feeding of the healthy breast

If the symptom is mainly local:

*Drug treatment*

**Cloxacillin** 500 mg P.O. TID for 7-10 days

(For *S/Es, C/Is*, see page 39)

If there is evidence of Sepsis

a. **Drug treatment:**

Patients require hospitalization

**Cloxacillin**, 500 mg IV QID until the fever and clinical symptoms subside, and continue with oral Cloxacillin for 7-10 days,

(For *S/Es, C/Is* and dosage forms, see page 39, 214)

b. **Surgical treatment**

Drainage of breast abscess

**NB:** Don’t wait until fluctuation, if there is induration, tap and confirm the diagnosis.
**URINARY TRACT INFECTION IN PREGNANCY**

There are different types of urinary tract problems that need special attention during pregnancy. These include asymptomatic bacteriuria, cystitis and pyelonephritis. *E.coli* is the most common cause of urinary tract infection in pregnancy. Urinary tract infection is common in women with diabetes.

**Asymptomatic bacteriuria:** Half of the women with asymptomatic bacteriuria become symptomatic later in pregnancy, for this reason treatment should be instituted.

**Diagnosis**

- **Laboratory:**
  - Urine analysis,
  - Urine culture: Growth of bacteria $10^5$ organisms/ml of urine

**Treatment**

**Drug treatment**

The treatment would be rational if the choice of antibiotics is based on culture and sensitivity result.

*First line*

- **Amoxicillin**, 500 mg P.O. TID for three days

  *(For S/Es, C/Is and Dosage forms, see page 18)*

*Alternatives*

- **Nitrofurantoin**, 100 mg P.O. QID for three days.
  
  *S/Es*: Hemolytic anemia in the newborn.
  
  *C/Is*: late pregnancy, GI Disturbance.

  **Dosage forms**: Capsule (macrocrystals), 50mg, 100mg; tablets 50mg, 100mg.

*OR*

- **Trimetoprim sulphasemethoxazole** 480mg BID for three days.

  *(For S/Es, C/Is and Dosage forms, see under Sulphasemethoxazole Trimetoprim)*

**Symptomatic bacteriuria:** About 11-15% of women develop symptoms of UTI in pregnancy. However, 3.2% of them could be symptomatic with sterile urine.
**Lower UTI (cystitis and urethritis)**

The symptoms are often difficult to distinguish from those due the pregnancy itself. Features that may indicate true infection include hematuria, dysuria, urethral discharge and suprapubic discomfort

**Treatment:**

Treatment is the same as asymptomatic bacteruria but for 7 days

**Upper UTI: PYELONEPHRITIS**

Acute pyelonephritis is a serious medical problem in pregnancy which requires admission and aggressive management. Acute pyelonephritis could lead to complications like miscarriage, IUGR, preterm labour, IUFD and sepsis. The incidence increases with gestational age; 90% of the case occur in the second and third trimesters of pregnancy.

**Diagnosis**

Clinical: The most common manifestations include headache, fever, chills, nausea and/or vomiting, flank pain and dysuria.

Laboratory:

- Urine analysis showing bacteruria and pyuria,
- Gram stain and urine culture of midstream urine or urine obtained by through catheterization.
- leucocytosis with neutrophilia
- Blood culture

**Treatment**

Admit for parenteral medication.

**Drug treatment:**

**First line**

Ampicillin, 2gm IV QID until 48 hours after the fever subsided and then 500 mg PO for 10-14 days (For $S/Es$, $C/Is$ and Dosage forms, see page 314)

**PLUS**

Gentamicin, 80 mg IV TID until 48 hours after the fever subsided and then IM for 10-14 days (For $S/Es$, $C/Is$ and Dosage forms, see page 316)
Alternatives

Cephotaxime, 500 mg-1 gm IV BID until 48 hours after the fever subsided and then continue with IM

S/Es: granulocytopenia, GI disturbance, and Positive coomb’s test

C/Is: hypersensitivity reaction

Dosage forms: 0.5g, 1g in vial

Referal: If there is no satisfactory response to the initial antibiotics treatment; refer patient to urologist for further investigation.

SYPHILIS IN PREGNANCY

Syphilis is a common sexually transmitted disease, which can cause significant intrauterine infection leading to abortion, pre-term birth, perinatal death and congenital anomalies. It is caused by Treponema pallidum. Routine screening is done at booking and at the third trimester of pregnancy, because it can infect the fetus at any point in the gestation. Previously, it was believed that congenital infection is not possible before 16 weeks of gestation because of the protective effect of the Langerhans cell layer of the placenta. However, it is now known that the spirochete can transgress the placenta during the first trimester. The risk of fetal infection is proportional to the degree of spirochetemia in the mother. Hence nearly, all fetuses are at risk of infection during maternal primary and secondary syphilis.

Diagnosis

- Clinical: Most mothers are asymptomatic.
- Laboratory:
  Microscopy: -by dark field examination or direct immuno-fluorescent Microscopy.
  Serology
  i. specific treponemal tests such as TPHA or FTA-Ab
  ii. nonspecific treponemal tests
     a. the Venereal Disease Research Laboratory (VRDL) test
     b. the Rapid Plasma Reagin (RPR) test
Treatment

First line

Pregnant women with syphilis must be treated with penicillin, since no other medication effectively crosses the placenta to treat the fetus, even if allergic to penicillin must be desensitized and treated.

**Benzathine penicillin**, 2.4 Mil IU IM (1.2 Mil in each buttock) weekly for three consecutive weeks. Treat the partner similarly (For S/Es and C/Is, see under benzyl penicillin)

**Dosage forms**: Injection, 0.6, 1.2, 2.4 million IU in vial

Alternatives

**Erythromycin**, 500 mg P.O. QID for 14 days, but may not prevent congenital infection.

(For S/Es, C/Is and Dosage forms, see page 214, 315)

N.B Advise patients treated in second half of pregnancy about Jarisch-Herxheimer reaction, which can precipitate premature labor and fetal distress.

**VAGINAL DISCHARGE SYNDROMES**

**1. BACTERIAL VAGINOSIS (BV)**

Bacterial vaginosis (BV) is a clinical syndrome characterized by the presence of malodorous vaginal discharge, with or without vaginal pruritus. Usually there is no external genital irritation or dysuria. The discharge is generally a homogeneous, non-viscous, milky white fluid which smoothly coats the vaginal mucosa and cervix. Imbalance of the normal vaginal flora is thought to play a role in the aetiology of BV, resulting in overgrowth of gardnerella, anaerobes, or genital Mycoplasmas. The absence of Hydrogen peroxide-producing Lactobacillus in the vagina appears to correlate with development of BV. BV may cause adverse pregnancy outcomes like PROM, chorioamnionitis, preterm labour, premature birth, post-partum endometritis, post-caesarean wound infection)
Diagnosis

Vaginal secretions characterized by at least 3 of the following:

1. Amine ("fishy") odor before or after addition of 10% KOH solution.
2. PH ≥ 4.5 (unreliable if blood present)
3. Homogeneous, smooth, non-inflammatory discharge
4. Presence of clue cells (epithelial cells coated with bacteria) on microscopic examination.

Treatment

First line

Metronidazole, 500 mg P.O. BID for 7 days Or 2g P.O. single dose
(For S/Es, C/Is and dosage forms, see page 14)

Alternative

Metronidazole 0.75% gel 5gm intravaginally QD for 5 days
(For S/Es, C/Is and dosage forms, see page 14)
Clindamycin 2% cream 5 gm intra-vaginally QHS OR 300 mg P.O. BID for 7 days

OR

100mg intra-vaginally QHS for 3 days
(For S/Es, C/Is and dosage forms, see page 44)

In Pregnancy

Metronidazole, 250 mg P.O. TID for 7 days;
(For S/Es, C/Is and dosage forms, see page 14)

OR

Clindamycin, 300 mg P.O. BID for 7 days.
(For S/Es, C/Is and dosage forms, see page 44)

P/C: Avoid alcohol during treatment with oral metronidazole and for 24 hours thereafter, due to possible disulfiram-type creation. Clindamycin cream is oil based, and may weaken latex condoms.

Sex Partners

Routine treatment of male partners(s) with metronidazole does not prevent recurrence of Bacterial vaginosis. For recurrent BV without evidence of other STD, recommend use of condoms, and avoid douching.
2. MUCOPURULENT CERVICITIS

Mucopurulent cervicitis (MPC) has been called the female counterpart of urethritis in males. It can be caused by infection with N. gonorrhoeae or C. trachomatis, although most cases test negative for both gonorrhea and chlamydia. The syndrome is characterized by mucopurulent cervical discharge and a cervical inflammatory response (friability, edema, ectopy, increased numbers of polymorphonuclear leukocytes (PMNs). Patients with MPC may note vaginal discharge, dyspareunia, postcoital or intermenstrual bleeding, or other non-specific symptoms.

Diagnosis

1. Clinical MPC by the presence of criterion (a) below and at least one other criterion (b, c or d).
   a. Endocervical Gram-stained smear with a monolayer of ≥ 15 PMNs/1000 X (oil immersion) field, (in a specimen obtained from the endocervix with a swab to wipe the cervix free of vaginal epithelial cells or menstrual blood, and in the absence of primary herpes, trichomoniasis, or candidiasis)
   b. Purulent endocervical discharge; or positive “swab test” (yellow or green color on endocervical swab).
   c. Hypertrophic or edematous cervical ectopy.
   d. Endocervical bleeding induced by gentle swabbing.
2. Laboratory tests for gonorrhea and Chlamydia.
3. Exclude presence of GNID on cervical Gram-stained smear.
4. Consider other potential causes of cervical inflammation
   a. Herpes cervicitis
   b. Trichomoniasis (ectocervicitis)
   c. Presence of IUD, ectopy, oral contraceptives and menses may be associated with PMNs in endocervical smears.

Treatment

First line

Doxycycline 100 mg P.O. BID for 7 days
(For S/Es, C/Is and dosage forms, see page 21)

Alternatives

Erythromycin base, 500 mg P.O. QID for 7 days
(For S/Es, C/Is and dosage forms, see page 214, 315)
Azithromycin, 1.0 gm P.O. single dose
(For S/Es, C/Is and dosage forms, see page 272)

Ofloxacin, 500 mg P.O. BID for 7 days
(For S/Es, C/Is and dosage forms, see page Levofloxacin.)

Levofloxacin, 500 mg P.O. QD for 7 days

N.B. If gonococcal infection is likely on clinical or epidemiological grounds, precede treatment with a single dose gonorrhea regimen.

Sex Partners
1. All current sex partners should receive full STD evaluation. It is probably most important to evaluate those partners within the past 30 days of diagnosis or onset of symptoms.
2. If NGU or gonorrhea present; treat accordingly.
3. If no urethritis is documented in the partners, it is generally safe to defer treatment pending results of tests for gonorrhea and Chlamydia. However, empiric therapy at the time of initial examination may be indicated if follow-up cannot be assured.

3. TRICHOMONAL VAGINITIS

Trichomoniasis is a parasitic infection caused by Trichomonas vaginalis. Trichocomial vaginitis is characterized by the development of profuse, purulent malodorous vaginal discharge (occasionally foamy). Cervical petechiae are commonly seen (“strawberry cervix”). External dysuria and genital irritation are sometimes present. As in BV, the vaginal pH in trichomoniasis is generally ≥ 4.5. Trichomonas vaginalis may be linked to adverse pregnancy outcomes such as PROM, premature birth, low birth weight.

Diagnosis
Clinical:
Laboratory: Demonstration of motile trichomonads on saline wet mount of vaginal exudates
Treatment

*First line*

**Metronidazole**, 500 mg P.O. BID for 7 days OR 2g P.O. single dose

(For S/Es, C/Is and dosage forms, see page 14)

In Pregnancy

**Metronidazole**, 2gm P.O single dose regimen.

(For S/Es, C/Is and dosage forms, see page 14)

**N.B.**

- Advise sexual abstention until symptoms improve and partner(s) treated
- Avoid alcohol during treatment with oral metronidazole and for 24 hours thereafter, due to possible disulfiram-type reaction.
- Treatment failure (persistence or recurrence despite sexual abstension, or after intercourse only with a treated partner), metronidazole 500 mg po bid for 7 days.
- Repeated treatment failure: metronidazole 2.0 gm P.O. QD for 3 to 5 days.
- Metronidazole gel is not effective for the treatment of T-vaginalis.
- Consider metronidazole resistance if patient is persistently infested after multiple treatment courses.
- Tinidazole appears to be effective against metronidazole resistant T. Vaginalis: dose is 2 gm once P.O.

**Sex Partners**

1. Routine STD exam.
2. Metronidazole 2.0 gm po, single dose for all partners.
3. Abstain from sexual contact until 7 days after therapy is initiated.
4. VULVO-VAGINAL CANDIDIASIS

Vulvo vaginal candidiasis is a common cause of pruritic vaginal discharge. The main manifestations include pruritis vulvae, whitish curd like vaginal discharge, vulval irritation, dyspareunia, and splash (external) dysuria. It is commonly caused by Candida albicans.

Diagnosis

Clinical: 
Laboratory: KOH test, Culture

Treatment

First line

Nystatin, 100,000 IU per vaginum, QD for 14 days. 
(For S/Es and C/Is and dosage forms, see page 203)

Alternatively

Clotrimazole, 100mg bid to be inserted in vagina for three days OR 
200mg/day for 03 days. OR 100 mg/day for 6 days or OR 1% cream-5 gm 
10-14 days. (For S/Es, C/Is and dosage forms, see page 109)

OR

Miconazole, 200 mg/day to be inserted in vagina for three days OR 
100mg/day for 7 days OR 2% cream 5 gm intra-vaginal for 7 days. 
(For S/Es, C/Is and dosage forms, see page 202)

Chronic Vulvo Vaginal Candidiasis: -

First line

Ketaconazole, 400 mg /day OR 200 mg BID for 5-10 days. Then 100 mg 
/day for 6 months as prophylaxis. 
(For S/Es, C/Is and dosage forms, see page 181)

Alternative

Fluconazole, 150 mg P.O. single dose, then 100 mg ketoconazole /day for 
6 months prophylaxis. 
(For S/Es, C/Is and dosage forms, see page 42)
Sex Partners

Examination and treatment usually not necessary. However treatment with an imidazole cream (e.g., miconazole, clotrimazole) may be indicated in some cases of recurrent infection, or if the partner has penile candidiasis (Balanitis).

IV. Hormonal contraceptives

Contraceptives include different kinds of methods used to prevent the occurrence of pregnancy. The variety of contraceptive methods includes, Natural methods, barrier methods, intrauterine contraceptive devices, hormonal and permanent surgical methods. Hormonal contraceptives are one of the most effective methods that are prescribed to a client based on informed choice.

1. Combined Oral Contraceptives (COC):

A group of contraceptive medications composed of synthetic estrogens & progesterone in different doses; 20 mcg or 50 mcg of estrogen and 0.15 -1 mg of progesterone in each tablet. They act primarily by inhibiting ovulation, and also by making the cervical mucus less favourable to sperm penetration and rendering the endometrium more atrophic.

First line

Levonorgesterol+ethynylestradiol and iron, in mg/day starting from the first day of menses

S/Es: Gastrointestinal disturbance, loss of libido, weight gain etc.

C/Is: Pregnancy, cardiac illness, thrombo-embolic conditions, genital tract malignancies, Hepatic dysfunction, Migraine headaches.

D/Is: Care should be taken while prescribing anticonvulsants, hypnotics, antibiotics and antacids to women using COC, since these drugs may reduce the effectiveness of COC. Combined Oral Contraceptives (COC) may also reduce the effectiveness of drugs like anti-convulsants, anti-coagulants, anti-depressants, steroids, sedatives and hypoglycemic agents.

Dosage forms: levonorgesterol+ethynylestradiol and iron: Tablet, 0.15mg + 0.03mg; 0.25mg + 0.05mg; 0.5mg + 0.05mg; 0.3mg + 0.03mg
Alternative

**Norethindrone + ethinylestradiol**, 0.5mg + 0.035mg /day starting from the first day of menses
For S/Es, C/Is and D/Is, see under Levonorgesterol+ethinylestradiol and iron, page 354)

**Dosage forms**: Norethindrone + ethinylestradiol: Tablet, 0.5mg + 0.035mg

OR

**Norethindrone + mestranol**, 1mg + 0.05mg /day starting from the first day of menses
For S/Es, C/Is and D/Is, see under Levonorgesterol+ethinylestradiol and iron, page 354)

**Dosage forms**: Norethindrone + mestranol: Tablet, 1mg + 0.05mg

2. **Progesterone Only Contraceptives (POP)**

This is indicated whenever there is contraindication for estrogen as in lactating mothers, Diabetics and Hypertensive patients. However, it is less effective compared with COC.

**Lynestrenol**, 0.5 mg/day

**S/Es**: Irregular vaginal bleeding, headache, mood changes, weight changes, Acne, functional ovarian cysts

**C/Is**: Pregnancy, Genital malignancies, cardiovascular diseases, hepatic disease

**Dosage form**: Tablet, 0.5mg,

**Injectables**

**Medroxyprogesterone acetate**, 150 mg deep IM injection within the first 5 days of the cycle to be repeated every three months.

**S/Es**: As indicated for the POPs. There is also a delay in return of fertility

**Dosage forms**: injection (aqueous suspension), 150 mg/ml in 1 ml vial
Implants
Levonorgesterel in six silastic capsules implanted in the left upper arm under local anesthesia, Effective up to five years.
S/Es: As indicated for the POPs.
Dosage forms: Levonorgesterel 36 mg/implant capsule of 6 implants
Levonorgesterel 75 mg/ implant of two Implants

3. Emergency contraception (EC):
Contraception aimed at preventing pregnancy after unplanned sexual exposure in a woman who is not on regular contraception. EC cannot be used as a regular method of contraception.

First line
- **COC with 50 microgram of estrogen** 2 tabs BID with 72 hours of unplanned sexual exposure for 2 doses.
- **OR**
- **COC with 35 microgram of estrogen** 4 tabs BID within 72 hours unplanned sexual exposure for two doses
S/Es: Nausea and vomiting, menstrual disturbance
C/Is: As in COC, POP

Alternative:
- **IUD**: This would be effective if inserted within five days of unplanned exposure, after ruling out the existence of infection.

V. COMMON GYNECOLOGIC AND ENDOCRINE DISORDERS

**EVACUATION OF THE UTERUS**
Evacuation of the uterus is medically indicated in situations like incomplete, inevitable, missed abortion, congenital anomalies not compatible with life, gestetional trophoblastic neoplasias, retained product of conceptus and medical diseases that threatens the life of the mother, otherwise termination of pregnancy is prohibited by law in Ethiopia, Evacuation of the uterus is safe to the mother if it is performed in the first trimester of pregnancy under-sterile condition by an experienced health care provider.
Diagnosis
Clinical: Proper history and thorough physical examination will help to reach at the diagnosis.

Treatment methods

1. Manual Vacuum Aspiration or Electrical Vacuum Aspiration:
   - It is safe until the 12th week of gestation
   - Analgesia/Anesthesia: Paracervical block, Narcotic analgesia are needed
   - Prophylactic antibiotics; Ampicillin 1gm I.V. 30 min before the start of procedure should be given and then 6 hourly for 24 hours
   - Contraceptive option: COC, Injectable, Implants, IUD or Barrier method can be used
   - Follow-up: Patients should be seen after one week of the procedure, then after depending on the clinical condition of the patient.

2. Dilatation and curettage: (E and C)
   - It is safe only up to 12 weeks of gestation
   - Analgesia/Anesthesia: General anesthesia, narcotic analgesics, paracervical block should be given.
   - Prophylactic antibiotics, Contraception and follow-up is the same as after MVA

3. Laminaria: Natural or synthetic can be used

4. Medical induction
   First line
   - Oxytocin dosage forms: Gastrointestinal disturbance
   - C/Is: uterus hypertonicity, risk of uterine rupture
   - Dosage forms: Injection, 1 unit/ml, 5 unit/ml, 10 units/ml

N.B. This is a preferred method if the gestational age is > 14 weeks
Before inducing with oxytocin, insert PGE₂ 3mg at 12 and 6 O'clock the night before the planned termination. (For dosage schedule, S/Es, precautions and dosage forms refer to induction and augmentation section.)
Alternative

**Misoprostol**, 10-25 mg 12 and 6 O’clock the night before the planned termination.

S/Es: Similar to other PGs

P/C: before use like scared uterus

Dosage forms: Tablet, 200mcg, 400mcg, 800mcg

N.B. Insert an inflated Foley catheter in the cervix, or condom catheter method.

If the conceptus material is not completely expelled, supplement with Evacuation & Curettage (E&C).

P/C:

- Don’t rupture the membranes until the cervix is well dilated
- Avoid frequent vaginal examination.
- Administer analgesics and broad spectrum antibiotics as required
- Provide contraceptives and follow-up appointment on discharge

5. **Hysterectomy**: If induction with pitocin fails

6. **Hysterectomy**: If there is any additional indication.

**DYSFUNCTIONAL UTERINE BLEEDING (DUB)**

Dysfunctional uterine bleeding is defined as an abnormal uterine bleeding with no obvious organic cause. It could be ovulatory or anovulatory cycle. The Anovulatory variety is the commonest type (greater than 80%), usually occurring in postmenarchal and premenopausal periods. It is characteristically acyclic, unpredictable as to the onset of bleeding, and variable in the duration and amount of bleeding which sometimes the terms metrorrhagia or menometrorrhagia have been used to describe this syndrome. Whereas, Ovulatory DUB is usually associated with premenstrual symptoms such as breast tenderness, dysmenorrheal, and weight gain and regular periodicity. Usually, it is caused by organic lesions, although a dysfunction of the corpus luteum or atrophic endometrium may be the causes.
**Diagnosis**
Clinical: Is made by excluding all other obvious causes of abnormal uterine bleedings. Laboratory: HCT, CBC, coagulation profile, pregnancy test, U/S, HSG, endometrial sample etc.

**Anovulatory DUB**

**Treatment:** The treatment depends on the age of the patient, her desire for contraception or fertility, and the severity and chronicity of the bleeding. The objectives of the treatment are:
- a. To control active bleeding
- b. To prevent recurrences, restoration of normal cycle
- c. To induce ovulation in patients desiring to conceive.

**Drug treatment**

**a. Control of active bleeding:**

**First line**
Norethisterone, 5 mg QID P.O. for 2-3 days followed by 5 mg P.O. QD for ten days with or without Medoxyprogesterone, 10-25 mg QID, P.O. until bleeding stops (For **S/Es** and **precautions**, see page 356)

**Dosage forms:** Tablet, 5mg

**OR**
High dose of conjugated estrogens 25 mg IV every 2 to 4 hours for 24 hours, 10 mg /day p.o. in 4 divided doses for 10 days or until the bleeding is stopped

then oral estrogen 10 mg/day for 21-25 days.

(For **S/E, C/I** and **dosage forms** see under Norethisterone)

**Medoxyprogesterone** 10- mg/day P.O. in the last 7-10 days

**Alternative**
High dose of Combined Oral Contraceptive pills (COC) 3-4 tablets /day until the bleeding is controlled and then the standard dose of the COC one tablet/day for 21 days.

**b. Restoration of the cycle:**

- Combined oral contraceptive pills for 3-4 months.
- Norethisterone 5mg/day from day 14-24 each month for three months.
N.B. Surgical: MVA, Dilatation and curettage, endometrial ablation, Hysterectomy. The different surgical methods are relevant if there is suspicion of endometrial pathology, like women in peri-menopausal period.

c. If fertility is desired, ovulation induction using clomiphene citrate is one modality of treatment.

Ovulatory dysfunctional uterine bleeding

Ovulatory dysfunctional uterine bleeding is commonly diagnosed by the presence of clinical evidence of ovulation and is confirmed by hormone analysis and/or endometrial biopsy. It is usually due to follicular or luteal phase defect.

Diagnosis

Clinical: Evidences of ovulation like increase basal body temperature (BBT), stretching of cervical mucus, etc

Laboratory: Hormone assay

Treatment

1. Drug Treatment: Before embarking on treatment, organic causes should be ruled out beyond shadow of doubt.

First line

Prostaglandin inhibitors or NSAID: Drugs are given through the bleeding or the first three days of the bleeding.

Ibuprofen, 400 mg 3 times /day or Indomethacin , 25-50mg PO TID

(For S/Es, C/Is and Dosage forms, see page 124, and 110, respectively)

Alternative:

Danazol , 200-400 mg daily for 12 weeks

S/Es: nausea, dizziness, menstrual disturbance, and emotional instability

C/Is: pregnancy, lactation, genital tumors, cardiac, renal, or hepatic dysfunction

Dosage forms: capsule 100, 200-mg tabs

2. Surgical treatment: These methods are appropriate if there clinical suspicion of endometrial pathology

- Manual (Electrical) Vacuum Aspiration,
- Dilatation & Curettage,
- Endometrial ablation,
- Hysterectomy
DYSMENORRHOEA

Dysmenorrhea is excessive pain during menses. It occurs in about 50% of menstruating women. It may be primary or secondary. Primary Dysmenorrhea is believed to be due to increased endometrial prostaglandin production, whereas secondary dysmenorrhea is due to outflow obstruction, pelvic tumors, infections, endometriosis etc. Dysmenorrhea in the first few years following menarche is usually primary but the secondary characteristically occurs many years after menarche.

Diagnosis:
Clinical: The pain of primary dysmenorrheal usually begins a few hours prior to or just after the onset of menstrual flow and may last as long as 48-72 hours. Thorough pelvic assessment is important to rule out organic causes.
Laboratory: vaginal smear, Ultrasound etc

Treatment:
Primary dysmenorrhea

Non Drug treatment: Reassurance

Drug treatment:
First line
Prostaglandin inhibitors (NSAID): Ibuprophen, 400 mg, P.O. TID
(For S/Es, C/Is, D/ls and Dosage forms, see page 124)

OR
Acetylsalicylic acid, 600 mg, P.O. TID for 2-3 days
(For S/Es, C/Is and Dosage forms, see page 123)

N.B. The drugs have to be administered prior to the onset of menses or at the onset of pain every 6 to 8 hours for the first few days of menses. This modality of treatment should continue for 4-6 months before declaring treatment failure.

Alternative
Monophasic Combined oral contraceptive pills; if contraception is also needed (For S/E, C/I and Dosage forms, see on page 354)
Secondary dysmenorrhoea

It is cyclic pain in association with underlying pelvic pathology. The pain is often begins 1-2 weeks prior to the onset of menses and persists until a few days after cessation of bleeding.

Treatment: Unlike primary dysmenorrhea, Nonsteroidal anti-inflammatory drugs and oral contraceptive little role to play. The underlying cause should be treated. The most common cause is endometriosis.

INFERTILITY (MALE AND FEMALE)

Infertility is defined as one year of unprotected intercourse without pregnancy. It could be primary or secondary. The major causes of infertility in female could be fallopian tube occlusion or anovulation. In male abnormalities of the semen in terms of volume, count, morphology, and motility could be the causes.

Diagnosis

Clinical: history of STD, features of endocrinopathy
Laboratory and other diagnostic means: CBC, FBS, vaginal smear, hormone profile, HSG, ultrasound, sperm analysis

Treatment

Non-drug treatment

- Overweight or underweight women should normalize their weight
- Stress should be alleviated

Drug treatment

Clomiphene citrate, Starting dose 50mg/day for five days starting from the 5th day of the menstrual cycle, and if no ovulation increase the dosage by 50mg/da up to 200mg/day over three to four treatment cycles.
S/Es: ovarian enlargement, abdominal bloating or pain, vasomotor flushes, nausea, vomiting, irritability, fatigue, headache, mastagia, allergic dermatitis, diarrhea, weight gain, urinary frequency, constipation, reversible hair loss, multiple pregnancy,
C/Is: pregnancy, liver disease, undiagnosed genital tract and breast diseases, history of hypersensitivity, ovarian failure

Dosage forms: Tablet, 50mg
NB: hCG, 5000-10,000IU IM 5 days after the last clomiphene tablets may enhance ovulation

PREMENSTRUAL SYNDROME (PMS)
This syndrome manifests by menstrual symptoms like mood disturbances, mastalgia, headache, bloating in the luteal phase of the menstrual cycle. There is no specific universally accepted definition for PMS, but most agree the following points must be present to diagnose PMS: 1) Symptom complex 2) Symptoms must exclusively occur during the luteal phase of ovulatory cycle, 3) The symptoms must be severe enough that the person’s life is disrupted.

Diagnosis: Clinical

Treatment:
Non-drug treatment:
- Reassurance
- Exercise
- Alteration of diet (avoidance of salt, vitamins, carbohydrate enriched meal etc)

Drug treatment:
- Ovulation suppression
  - Combined Oral contraceptive (COC) (For S/Es, C/Is and dosage forms, see page 354)
  - Medroxyprogesterone acetate, 5-10mg or Norethindrone acetate 5mg/day (For S/Es, C/Is and dosage forms, see page 355)
- Danazol, 200mg QD (For S/Es, C/Is and dosage forms, see page 360)
- Spironolactone, 25mg QID from day 18-26 of the menstrual cycle. (For S/Es, C/Is and dosage forms, see page 113)
  NSAIDs: Ibuprophen 400 mg, P.O. TID (For S/Es, C/Is, D/Is and Dosage forms, see page 124)

NB: When the psychological symptoms of PMS predominate, specific anxiolytic or anti-depressive therapy is indicated.
IV. SEXUAL ASSAULT

Sexual assault is defined as any sexual act performed on another person without consent. Physician evaluating the victim of sexual assault should aim at provide adequate medical care and collect evidences. Rape is the most common reported sexual assault.

Diagnosis

- Clinical: History and physical examination
- Laboratory: Identification of spermatozoa from specimen over the genitalia or high vaginal swab.

General Principles of Management:

- Medical or surgical treatment of acute injury.
- Screen for STI, HIV, Hepatitis virus B infection and pregnancy at initial visit, repeat screening for HIV, HbsAg at three and six months.
- Prevention of STI.
- Prevention of Pregnancy
- Rehabilitation
- Medical recording should be meticulous and management approach should be multidisciplinary

Treatment

1. Treatment of infection such as gonococcal, trichomonas and chlamydial

   Ceftriaxone, 125 mg IM in single dose
   (For S/Es, C/ls and dosage forms, 17)

   PLUS

   Metronidazole, 2 gm orally in single dose,
   (For S/Es, C/ls and dosage forms, see page 14)
**PLUS**

**Doxycycline**, 100 mg P.O. BID for 7 days  
(For **S/Es, C/Is** and **dosage forms**, 21)

**In Child Abuse**

**Ceftriaxone**, 125-250 mg IM  
(For **S/Es, C/Is** and **dosage forms**, 17)

**OR**

**Erythromycin**, 500mg P.O. TID  
(For **S/Es, C/Is** and **dosage forms**, see pages 214, 315)

**2. Prevention of Pregnancy:** Provide emergency contraception, within 72 hours after exposure

- **Combined oral contraceptive pills with 50-mcg estrogens**, two tabs 12 hours apart for two doses. (For **S/Es, C/Is** and **dosage forms**, see page 354)
- **Combined oral contraceptive pills with 30-mcg estrogen**, four tabs 12 hours apart for two doses. (For **S/Es, C/Is** and **dosage forms**, see page 354)

**IUD** insertion up to 5 days following exposure

**N.B.** Screen for infection and pregnancy before inserting IUD

**Rehabilitation**

Counseling and psychological support.
CHAPTER IX

EMERGENCY CONDITIONS

Animal bites
   Rabies
   Snake bites
Burns
Drowning
Hypoglycemia
Poisoning
   Barbiturates
   Carbon monoxide
   Pesticides
Sepsis
Shock
Stroke
UGI Bleeding
EMERGENCY CONDITIONS

ANIMAL BITES

- Dog bites are the most common kind of animal bite, followed by cat bites; other bites are from snakes and rarely humans.
- Infected dog and cat bites are usually characterized by a localized cellulitis and pain at the site of injury.
- Infections from dog and cat wound bites are predominantly due to *Pasteurella multocida* and *Staphylococcus aureus*.

**Diagnosis:** Clinical

**History:**

- Type of animal and its status (i.e., health, rabies vaccination, behavior)
- Time and location of event.
- Circumstances surrounding the bite (i.e., provoked or defensive bite versus unprovoked).
- Whereabouts of the animal (i.e., is it observable in quarantine?)
- Pre-hospital treatment.

**Physical:** Check for

- Distal neurovascular status.
- Tendon or tendon sheath involvement.
- Bone injury, particularly of the skull in infants and young children.
- Joint space violation.
- Visceral injury.
- Foreign bodies (e.g., teeth) in the wound.

**Principles of Management**

**Pre-hospital Care**

- Rinse wounds with sterile solution, if possible, and cover.
- Encourage patient to seek prompt care.
Hospital Management

- Carefully inspect wounds to identify deep injury and devitalized tissue.
- Debridement is an effective means of preventing infection.
- Irrigation is another important means of infection prevention.
- Consider primary closure in relatively clean bite wounds or wounds that can be cleansed effectively. Others are best treated by delayed primary closure. Facial wounds, because of the excellent blood supply, are at low risk for infection, even if closed primarily. Bite wounds to the lower extremities, with a delay in presentation, or in immunocompromised hosts generally should be left open. Puncture wounds and bites are usually not sutured (stitched) unless they involve the face.
- Consider tetanus and rabies prophylaxis for all wounds.
- Document the mechanism of injury; unprovoked animal bites are particularly dangerous as such animals may have rabies.
- If possible, obtain an immunization history of the animal; if no history is available, observe the animal for 10 days. If the animal is a suspect for rabies or lost, administer:
  - Human rabies immunoglobulin
  - Human diploid cell strain vaccine (HDCSV) (for details see under Rabies)
- Determine the patient’s tetanus immune status; if status is inadequate or unknown, administer:
  - Tetanus immune globulin or Tetanus anti toxin(TAT).
  - Tetanus toxoid I.M.0.5mL once for primary or booster immunisation

S/Es: Allergic reactions (rarely, may include anaphylaxis), fever, lymph adenopathy, neurologic reaction (confusion, headache, seizures, sleepiness, vomiting, irritability); redness or lump at site of injection

Dosage forms: Ampoule, 05 ml
- Close observation of the patient’s condition
- Psychological support and reassurance
• Ventilatory and cardiovascular support, if required (it may be necessary to refer the patient if such facilities are not available)
• Wounded extremities should be immobilized and elevated.
• Puncture wounds and bites are usually not sutured (stitched) unless they involve the face.

N.B. Local wound infection may develop in as little as 24 hours.

**Non-Drug Treatment**

All bite wounds require immediate, thorough cleansing with fresh tap water. The wound must be scrubbed with soap and water to remove foreign material. Dead tissue from the wound should be removed with sterile scissors or scalpel.

**Drug Treatment**

Cleansing with a sterile solution of Normal Saline.

OR/AND

Disinfectants and Cleansing Agents, e.g. Chlorhexidine + Cetrimide solution

S/E: occasional sensitivity

**For secondary infection:**

Give appropriate antibiotic, e.g. Amoxicillin + Clavulanate. Treatment should be given for 10-14 days (For doses, S/E, C/I and dosage forms, see page 52)

**For Pain:**

NSAIDs, e.g., Paracetamol, P.O. 500-1000 mg as needed (4-6 times daily)

1. **RABIES**

• Rabies is a zoonotic infection of warm blooded animals caused by the rabies virus.
• In Ethiopia the disease is transmitted to humans via dog, and rarely, cat bites; the bites are usually unprovoked.
• The incubation period is usually 1-2 months (rarely longer). The onset is marked by prodromes of non-specific symptoms, which include anorexia, malaise, fatigue, fever, myalgia and headache.
• The site of the bite, which may already have healed, becomes painful and irritable.
• Neurological signs (anxiety, depression, hallucinations, short periods of aggressiveness such as thrashing or biting) are manifested when the virus enters the nervous system.
• Hydrophobia is a characteristic symptom of rabies, marked by laryngeal spasm in response to the sight, sound and feeling of water.

Diagnosis: Clinical

Treatment

Treatment is symptomatic for established disease.

Non-Drug Treatment

• Thorough cleansing and careful management of the wound is very important
• Nurse patient in a quiet, darkened room.
• Nutritional, respiratory and cardiovascular support when required.

Drug Treatment (post exposure prophylaxis)

Human antirabies immunoglobulin, 20 IU/kg, should be given immediately (half the dose should be infiltrated around the site of the bite wound, and the other half be given IM in the deltoid area).

S/Es: Rare, but irritation may occur at site of injection; immune globulin products may give rise to anaphylaxis, angioneurotic edema, and nephritic syndrome.

Dosage forms: Injection, 150 IU/ml in 2ml.

N.B. Store in refrigerator; do not freeze (discard if vaccine has been frozen)

PLUS

Human diploid cell strain vaccine (HDCV), 1 mL IM, given on days 0, 3, 7, 14 and 28

S/Es: Abdominal pain, chills, dizziness, fatigue, headache, irritation at site of injection; immune complex-like reaction (hives or skin rash) during booster dose administration

Dosage forms: Injection, Greater than or equal to 2.5 IU rabies antigen/ml. of reconstituted suspension.

N.B. Use the reconstituted vaccine immediately
2. Snake bites

- Majority of snakebites are non–poisonous; only few species are venomous (poisonous).
- Most common venomous are the pit vipers (vasculotoxic) and the elapidae and hydrepidae (primarily neurototoxic).
- Snake bites (venomous) in the tropics are mainly due to pit vipers.
- Snake venom is a combination of polypeptides, proteolytic enzymes and toxins, which are species specific.
- Presentations include swelling of the site within minutes, and as the venom moves proximally, edema and ecchymosis occur.
- In severe cases bulla formation and tissue necrosis ensue.
- Systemic symptoms include nausea, vomiting, diaphoresis, weakness, tingling around the face, and muscle fasciculation.
- Rarely patients may present in shock with generalized edema or cardiac arrhythmia.
- Complex clotting abnormalities may occur.
- Children because of their smaller body size, are far more likely to have severe envenomination.

Treatment

Non drug treatment

- Whenever possible, determine if the bite was by a poisonous snake and envenomation has occurred.
- If poisonous snake bite is suspected, decrease lymphatic flow to limit the spread of venom in to the circulation by immobilization of the affected extremity, application of pressure at the site of envenomination, and a proximal tourniquet.
- The arterial circulation should not be impaired.

Drug treatment

On arrival at the emergency department, secure a wide bore intravenous access based on the degree of severity in anticipation for treatment of shock
or in case blood transfusion is needed (for IV fluid treatment of shock and blood transfusion, see under shock).

In addition to the measures indicated under "Principles of Management" and disinfecting and cleansing above, give **Snake venom antiserum polyvalent** for snake bites, (see insert for dosing instructions).

Antivenom is most effective if delivered within 4 hours of the bite and is of little value if administration is delayed beyond 12 hours.

**N.B.:** Anti-venoms may give rise to acute anaphylaxis: agents

**PLUS**

- **Tetanus toxoid**, IM, 0.5ml once for primary or booster immunization

  **S/Es:** Allergic reactions (rarely may include anaphylaxis), fever, lymph adenopathy, neurologic reaction (confusion, headache, seizures, sleepiness, vomiting, irritability); redness or lump at site of injection

  **Dosage forms:** Injection, 05 ml, 1ml

**For pain:**

- **Paracetamol**, 500-1000mg P.O. 4-6 times a day

  (For doses, S/Es and C/Is and dosage forms, see page 53)

**Alternative**

**For severe pain:**

- **Morphine**, (For dosage schedule, S/Es.C/Is and dosage forms, see page 78)

**BURNS**

- Scald burn is the most common form of burn injury in children followed by flame burns.
- Burn injuries can also be due to electricity or chemicals.
- Child abuse should be considered when a child presents with “glove or stocking” burns of hands and feet, single area deep burns on the trunk, buttocks, or back and small area, full-thickness burns (cigarette burns).
- Burns are classified according to the depth of tissue damage (Table I):
  - First-degree burns produce a redness of the skin, and they heal without scarring;
  - Second-degree burns cause destruction of deeper structures within the skin, resulting in blistering;
Third-degree burns destroy the full thickness of the skin, leaving an open area.

### Table I. Classes of burns

<table>
<thead>
<tr>
<th>Burn Type</th>
<th>TBSA Adult</th>
<th>Full thickness</th>
<th>Others</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>&lt;10%</td>
<td>&lt;2%</td>
<td>None</td>
<td>Manage as out patient</td>
</tr>
</tbody>
</table>
| Moderate  | 10-20%     | 2-5%           | • High voltage injury  
• Suspected inhalation injury  
• Circumferential burn  
• Medical problem predisposing to infection(e.g., Diabetes) | Manage as in patient |
| Severe    | >20%       | >5%            | • High voltage burn  
• Known inhalation injury  
• Any significant burn to face, eyes, ears, genitalia, or joints  
• Significant associated injuries (fracture or other major trauma) | Refer to burn center |

TBSA: total body surface area;  
Young or old: <10 or >50 years old;  
Adults: >10 or <50 years old

### 1. Emergency measures

- Remove smoldering clothing or clothing saturated with hot liquid.
- Remove or cut away jewelry, particularly rings and bracelets to prevent constriction and vascular compromise during the edema phase in the first 24 – 72 hrs post burn.
- Review the cardiovascular and pulmonary status and document pre-existing asthma, heart disease, renal or hepatic disease.
- Ensure and maintain an adequate airway and provide humidified oxygen by mask or endotracheal tube based on the patient’s condition.
- Start IV Ringer’s lactate or Normal Saline 10 – 20 ml/kg/hr for children with burns greater than 15% BSA, until the required amount is calculated.
- Insert Naso-gastric tube and avoid oral fluids in children with burns greater than 15% BSA to prevent aspiration as they can develop ileus.
• Wrap all wounds with sterile towels until a decision is made about whether to treat on an outpatient basis or refer the patient to an appropriate facility for treatment.
• Insert Foley catheter to monitor urine output in all children who require IV fluid resuscitation.

Estimation of body surface area burnt
Fluid volume needed for resuscitation is calculated from the percent of BSA burnt, the proportion of which differs from age to age (Table II).

<table>
<thead>
<tr>
<th></th>
<th>NEWBORN</th>
<th>3YEARS</th>
<th>6 YEARS</th>
<th>12+ YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD</td>
<td>18%</td>
<td>15%</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>TRUNK</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>38%</td>
</tr>
<tr>
<td>ARMS</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>LEGS</td>
<td>26%</td>
<td>29%</td>
<td>32%</td>
<td>38%</td>
</tr>
</tbody>
</table>

N.B. In small burns under 10% BSA, the “rule of palm” may be used, especially in outpatient settings. The area from the wrist crease finger crease (the palm) in the child equals 1% of the child’s BSA.

Fluid resuscitation
• Ringer’s lactate or NS 4mL/kg/% BSA burned: ½ the fluid is given over the first 8 hrs calculated from the time of onset of the injury and the remaining ½ is given at an even rate over the next 16 hrs.
• The rate of the infusion is adjusted according to the patient’s response to therapy.
• Adequacy of the resuscitation is reflected by vital signs, acid – base balance, mental status and adequate urine output (1mL/kg/hr).
• During the 2nd 24 hr patients begin to reabsorb edema fluid and to diurese. ½ of the first day fluid requirement is needed as Ringer’s lactate in 5% dextrose.
• Oral supplementation may be started after 48hr post burn.
2. Wound management

a. Minor burns

- Treated in an outpatient setting
- The wound is debrided of all loose skin. Blisters are better not excised in first Degree burn and open wound management is preferred.
- All dirt is removed by cleansing with mild soap and irrigating with isotonic saline solution.
- The wound is then covered with Silver sulfadiazine and properly dressed.
- The first dressing change and dressing evaluations are performed 24-48 hrs after injury

**Silver sulfadiazine cream 1%**, apply daily with sterile applicator for treatment and prophylaxis of infection in burn wounds (also adjunct in treatment of infection in leg ulcers and pressure sores),

*S/E*S: allergic reaction, hepatic and renal impairment.

*C/I*: Late-term pregnancy, breast-feeding, sensitivity to sulphonamides, neonates. Systemic toxicity in the form of blood disorders and rashes may occur after topical application to a large area of the skin.

**Dosage forms**: Silver sulfadiazine cream 1%,

**Caution**: Do not use Silver sulfadiazine near the eyes.

OR

**Fusidic acid**, thin films of 2% cream applied to skin 3-4 times daily

*S/E*S: Local hypersensitivity reactions (rare)

**Dosage forms**: cream or ointment, 2%

b. Moderate and Severe burns

- See under Minor burns
- Apply local antibiotic or Vaseline coated dressing
- Oral antibiotics are usually recommended in case of established infection. If infection develops, continue antibiotics for at least 5 days after all signs of infection have cleared.
Additional supportive measures with moderate to severe burn injuries

I. Prevention of stress ulcer

First line

- **Cimetidine**, 200mg-400mg IM OR slow IV, every 4-6 hours (For **S/Es, C/Is** and **dosage forms**, see page 106)

Alternatives

- **Omeprazole**, 20 mg, P.O. QD for 4 weeks (DU) or 8 weeks (GU). (If upper GIT bleeding present) (For **S/Es, C/Is** and **dosage forms**, see page 132)
  
OR

- **Magnesium trisilicate+Aluminum hydroxide**, 500+250mg tabs to be chewed 1 hr before and 3 hrs after meals and at bedtime. (For **S/Es, C/Is** and **dosage forms**, see page 105)

II. Tetanus toxoid booster or primary immunization, IM, 0.5 mL. (For S/Es, C/Is and dosage forms, see page 369)

III. Pain Management:

First Line

- **Paracetamol**, 500-1000mg P.O. 4-6 times a day (For **S/Es** and **C/Is** and **dosage forms**, see page 53)

Alternative

- **Morphine hydrochloride injection** (for severe pain only), 10-20 mg IM OR SC, provided the patient is not edematous, repeat every 4 hours PRN.

**S/Es:** nausea and vomiting, CNS and respiratory depression (For specific antidote, see page 78) prolonged use leads to dependence.

**C/I:** acute respiratory depression

**Dosage forms:** Injection, 10 mg/ml, 20 mg/ml in 1 ml ampoule; caps (modified release), 20 mg, 50 mg, 100 mg, 200 mg; granules for oral suspension, 20 mg, 60 mg, 100 mg, 200 mg, per sachet; oral solution, 10 mg/5ml, 100 mg/5ml; tablet, 100 mg, 500 mg
**Drowning**

Drowning is death from suffocation (asphyxia) following submersion in a liquid medium.

Near-drowning is a survival, at least temporarily, after the suffocation with/without loss of consciousness. Most drownings occur in water, 90% in freshwater (rivers, lakes and pools) 10% in seawater.

Drowning is common where swimming pools and/or beaches are more accessible. Risk factors of near-drowning:

- Inability to swim or overestimation of swimming capabilities.
- Risk-taking behavior.
- Use of alcohol and illicit drugs.
- Inadequate adult supervision.
- Hypothermia, which can lead to rapid exhaustion or cardiac arrhythmias.
- Concomitant trauma, cerebrovascular accident, or myocardial infarction.
- Undetected primary cardiac arrhythmia,
- Hyperventilation prior to a shallow dive which can lead to cerebral hypoxia, seizures, and loss of consciousness, which again can result in drowning.

Suffocation by submersion leads to hypoxemia by means of either aspiration or reflex laryngospasm. Hypoxemia in turn affects every organ system, with the major being cerebral hypoxia.

**Clinical features**

- Shortness of breath, difficulty breathing, apnea
- Persistent cough, wheezing
- In stream, lake, or salt water immersion, possible aspiration of foreign material
- Level of consciousness at presentation, history of loss of consciousness, anxiety
- Vomiting, diarrhea
- Bradycardia or tachycardia, dysrhythmia

Clinical deterioration mostly develops within 7 hours of immersion.
Treatment
Has three phases: prehospital care, emergency unit care, and inpatient care.

Prehospital care
- Cardiopulmonary resuscitation (CPR) should be done as soon as possible without compromising the safety of the rescuer or delaying the removal of the victim from the water.
- High flow supplemental oxygen should be administered to the spontaneously breathing patient by facemask, while the apneic patient should be intubated.
- Rewarming all hypothermic patients with a core temperature <33ºC should be initiated, either by passive or active means as available.
NB: The Heimlich maneuver or other postural drainage techniques to remove water from the lungs are of no proven value.

Emergency unit management
R/o b injuries to the axial skeleton and internal injuries to the abdomen and chest.

Electrocardiography, measurement of serum electrolytes, and assays of serum and urine for illicit drugs are generally recommended in asymptomatic, as well as symptomatic, patients.
Asymptomatic patients should be closely observed for 8 hours, and admitted if deterioration occurs.
In the symptomatic patient, indications for elective intubation include signs of neurologic deterioration and an inability to maintain a PaO2 > 60 mmHg on high fractions of supplemental oxygen.

Inpatient management
Symptomatic patients require hospitalization for supportive care and treatment of organ specific complications.
Neurologic injuries secondary neurologic injuries occur due to ongoing ischemia, cerebral edema, hypoxemia, fluid and electrolyte imbalances, acidosis, and seizure activity.
Useful modalities of treatment:

- Mild hyperventilation to maintain a PaCO2 of approximately 30 to 35 mmHg may reduce intracranial pressure.
- Elevate head of the bed, if potential cervical spine injuries are excluded.
- Diuretics to avoid hypervolemia
- Seizure activity should be controlled. Phenytoin is the preferred as it does not depress consciousness.
- Manage both hypoglycemia and hyperglycemia

Respiratory failure

- Bronchospasm is treated similarly to acute asthma; most cases rapidly improve with inhaled beta-adrenergic agonists.
- Antibiotics should be used only in cases of clinical pulmonary infection or if the victim was submerged in grossly contaminated water.

Hypotension - Persons with hypothermia can have significant hypovolemia and hypotension due to a "cold diuresis."
Optimal fluid replacement and inotropic support.
Hypoxic cardiomyopathy also may occur in near-drowning victims.

Approximately 75% of near-drowning victims survive. Of these, approximately 6% suffer a residual neurologic deficit.

PREVENTION

Near-drowning is preventable in most cases.

- Secure fencing and gating of swimming pools to exclude all children under 5
- Adequate adult supervision,
- Swimming with a partner,
- Appropriate use of personal flotation devices, and
- Avoidance of alcohol and illicit drugs while swimming or boating
HYPOGLYCEMIA

Hypoglycemia is a clinical syndrome in which low serum (or plasma) glucose concentrations lead to symptoms of sympathoadrenal activation and neuroglycopenia. The symptoms of sympathoadrenal activation include sweating, sensation of warmth, anxiety, tremor or tremulousness, nausea, palpitations and tachycardia, and perhaps hunger. The neuroglycopenic symptoms include fatigue, dizziness, headache, visual disturbances, drowsiness, difficulty speaking, inability to concentrate, abnormal behavior, loss of memory, confusion, and ultimately loss of consciousness or seizures. Symptoms could occasionally be absent in some patients because of hypoglycemia unawareness. Hypoglycemia can occur in the fasting or postprandial state and could be insulin mediated or non-insulin mediated. Hypoglycemia can cause significant morbidity and may be lethal if not promptly recognized and managed.

Diagnosis
The presence of Whipple's triad i.e. symptoms, a low serum glucose concentration(Random blood glucose < 50-60mg/dl), and relief by raising serum glucose confirms the diagnosis.

Treatment
- Oral glucose (Initial dose of 20 g) containing fluids, candy, or food is appropriate if the patient is able and willing to take these.
- Neuroglycopenia precludes oral feedings and parenteral therapy is necessary. IV glucose (25 g) should be given using a 40 or 50% solution followed by a constant infusion of 5 or 10% dextrose or oral feeding

Blood should be drawn, whenever possible, before the administration of glucose

N.B. The cause/s of hypoglycemia should be identified and preventive measures instituted. This is particularly important for patients with recurrent hypoglycemia.
Poisonings

- Refers to the development of harmful effects following exposure to chemicals.
- May be local (to the eyes, skin, lungs or gastro-intestinal tract); systemic, or both, depending on dose, absorption, distribution, potency and host susceptibility.
- Exposures most frequently involve cleaning agents, analgesics, cosmetics, plants, cough and cold preparations and hydrocarbons.
- Most exposures are acute, accidental, and occur at home resulting in minor or no toxicity; children up to the age of 6 are most frequently affected.
- Can be divided into: accidental (unintentional) and suicidal (intentional).
- Except when child abuse by the caretaker is suspected, the caretaker must be relied on to give pertinent information to give the remaining ingested substance and its container.
- Children have age-related modifications in the absorption, distribution, metabolism and excretion of poisons as well as altered dose per weight responses.

General management

1. Assessment and maintenance of vital functions

   - Establish and secure a clear airway by head tilt and chin lift or jaw thrust maneuvers as appropriate.
   - Place oropharyngeal or nasopharyngeal airways for brief time if needed or even insert endotracheal tube where appropriate (impaired airway protective reflexes, inadequate ventilation, comatose, or patients in status epilepticus).
   - Assess respiratory status by evaluating chest excursions, breath sounds, and the work of mechanics of breathing and if absent or ineffective, initiate ventilation with bag – valve – mask and 100% oxygen.
   - Suction all secretions (if copious, consider organophosphate poisoning or pulmonary edema).
- Assess cardiovascular status by evaluating the volume, rate, and rhythm of the peripheral pulses, skin and brain perfusion and ECG, if available.
- Establish vascular access to ensure adequate circulation and perfusion.
- Obtain blood for studies of serum levels, if facilities are available.
- Treat shock, if present with NS or Ringer’s Lactate 20mL/kg over 5 minutes and repeat if needed based on response.

2. Removal of poison
   a. Emesis
      - Ipecac dose by age
        - 6 – 9 months: 5ml
        - 9 – 12 months: 10ml
        - 1 – 6 months: 15 ml
        - > 6 years: 30 ml
      - S/Es: excessive vomiting and mucosal damage; cardiac effect if absorbed
      - C/Is:
        - Decreased level of consciousness
        - Caustic substances
        - Materials likely to produce rapid onset of neurologic symptoms, e.g. tricyclic antidepressants,
        - Infants < 6 months old,
        - Debilitated patients
      - P/C: Emesis should not be done on a patient who is comatose, convulsing, or when corrosive substances like strong acids or alkali, or petroleum products have been ingested. Ipecac syrup should not be used for strychnine poisoning.
      - Dosage form: Syrup, 7% powdered
   b. Inactivation in the GIT
      - Activated charcoal: 1 – 2 g/kg body weight.
S/E: constipation

**Dosage forms:** Tablets, 125 mg, 250 mg

c. Catharisis

Should be given only with the first dose of multiple-dose charcoal in order to prevent electrolyte abnormalities and osmotic diuresis.

- **Magnesium sulfate,** 250 mg/kg. **Dosage form:** Crystals
- **Sodium sulfate,** 250 mg/kg. **Dosage form:** Crystals
  
  Children > 3yrs: 2.8 – 4.3 ml/kg in an activated charcoal suspension with the appropriate dose of charcoal
  
  Children 1 – 3 years: 1.4 – 2.1ml/kg, but dilute the solution to 35%. Children < 1year: do not use.

d. Alkaline diuresis

**Sodium bicarbonate,** 1 – 2 mEq/kg every 1 – 2 hr to raise the serum pH to 7.5

**Dosage form:** Tablet, 500mg

**POISONING WITH SPECIFIC AGENTS**

1. **BARBITURATES**

- Barbiturates mainly act in the CNS and, as a consequence, affect other organ systems.

- Direct effects include sedation and hypnosis at lower dosages; they can induce respiratory depression at higher doses.

- Barbiturate overdose fatality is usually secondary to respiratory depression.

- Major complications associated with barbiturate poisoning include pneumonia, shock, hypoxia, and coma. Other associated life-threatening complications include acute renal failure and pulmonary edema.

- Patients with underlying chronic obstructive pulmonary disease (COPD) are more susceptible to these effects, even at doses that would be considered therapeutic in healthy individuals.
The patient with barbiturate toxicity may present with any or all of the following symptoms:

- **Neurologic**: Lethargy, coma, hypothermia, decreased pupillary light reflex, Nystagmus, strabismus, vertigo, slurred speech, ataxia, decreased deep tendon reflexes
- **Psychiatric**: Impairment in thinking (e.g., memory disturbances, poor judgment, limited attention span), irritability, combativeness, paranoia.
- **Respiratory**: Respiratory depression, apnea, hypoxia.
- **Cardiovascular**: Tachycardia, Bradycardia, hypotension, diaphoresis, shock.
- **Skin - Barbiturate blisters** (i.e., bullous lesions typically found on the hands, buttocks, and knees)

**Diagnosis**: Clinical

**Treatment**

Treatment for the patient with barbiturate toxicity is predominantly supportive.

- Aggressively initiate **fluid therapy** if the patient has a low blood pressure or appears to be in Hypovolemic shock (see under fluid treatment of Hypovolemic shock).
- Initiate treatment with **pressors** (e.g., nor-epinephrine, dopamine) if shock persists or worsens (For dose schedule, S/Es and dosage forms, see page 79).
- **GI decontamination**: Perform GI decontamination once the airway is protected and hemodynamic stabilization is addressed.
  - **Activated charcoal** orally or by nasogastric tube is recommended for all patients with potential barbiturate toxicity.
- **Alkalization** of the urine enhances the elimination of Phenobarbital and, likely, other long-acting barbiturates. Urinary Alkalization is not recommended for short-acting barbiturate toxicity.
✓ **Sodium bicarbonate**, 1-2 mEq/kg IV bolus, followed by an I.V. drip of 1000 ml of D5W to which 100-150 mEq of sodium bicarbonate has been added; initiate drip rate at 3 times maintenance IV fluid rate and titrate drip rate to urinary pH. Goal is to maintain a urinary pH >7.5 and urine output >2 ml/kg/h. Child: Administer as in adults.

**C/Is:** Documented hypersensitivity; alkalosis (pH >7.5); volume overload; severe hyponatremia; hypocalcaemia; severe pulmonary edema;

**P/C:**
- In electrolyte imbalances such as in patients with CHF, cirrhosis, edema, corticosteroid use, or renal failure;
- When administering, avoid extravasations, which can cause tissue necrosis.
- Serum potassium level must be >4 mEq/L because urinary Alkalinization cannot occur in the presence of hypokalemia;
- Can cause alkalosis, decreased plasma potassium, hypocalcaemia, and hypernatremia;

**Dosage forms:** Injection, 7.5% (40 mEq/50 ml) in 450 ml ampoule; tablet, 500 mg)

2. **CARBON MONOXIDE**

- Poisoning with carbon monoxide is common where there is incomplete combustion of carbon fuel, especially charcoal.
- Acute poisoning results in headache, nausea and vomiting, mental confusion and agitation.
- Severe toxicity causes confusion, impaired thinking, and may progress to coma, convulsions, and death.
**Diagnosis:** Clinical: history of prolonged exposure to smoke from charcoal in a closed environment.

**Treatment**

In addition to general supportive measures, take the patient out to an open air.

**Drug Treatment**

**Oxygen,** 100% via face mask.

3. **PESTICIDES**

- Organochlorine insecticides (e.g. DDT, Aldrin, Dieldrin, Heptachlor), organophosphorous insecticides (e.g. Parathion, Dichlorovos) and Carbamate insecticides (e.g. Carbaryl, Baygon, Mobam) can cause occupational or accidental poisoning.

- Organochlorine and Carbamate insecticides produce their toxicity by inhibiting acetyl cholinesterase and thus leading to excessive cholinergic activity.

- The onset after exposure may be within minutes or could be delayed for up to 12 hours, depending on the amount and route of exposure.

- The major presenting features are: fatigue, headache, nausea, vomiting, abdominal pain and dyspnea;

- In severe cases: seizures, loss of consciousness, paralysis, incontinence, cyanosis, hypotension, muscle fasciculation and increased bronchial secretions, excessive salivation and pin-point pupil.

- Carbamate poisoning exhibits a similar clinical picture to organophosphate toxicity. However, carbamates have poor CNS penetration and cause minimal CNS symptoms.

**Diagnosis:** Mainly clinical. If conditions allow, the level of serum cholinesterase should be determined. (Table III)
### Clinical Syndromes

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally manifests in minutes to hours</td>
</tr>
<tr>
<td>Evidence of cholinergic excess</td>
</tr>
<tr>
<td>SLUDGE = Salivation, Lacrimation, Urination, Defecation, Gastric Emptying</td>
</tr>
<tr>
<td>BBB = Bradycardia, Bronchorrhea, Bronchospasm</td>
</tr>
<tr>
<td>Respiratory insufficiency can result from muscle weakness, decreased central drive, increased secretions, and bronchospasm</td>
</tr>
</tbody>
</table>

#### Intermediate Syndrome

| Occurs 24-96 hours after exposure |
| Bulbar, respiratory, and proximal muscle weakness are prominent features |
| Generally resolves in 1-3 weeks |

#### Organophosphorous Agent-Induced Delayed Peripheral Neuropathy (OPIDN)

| Usually occurs several weeks after exposure |
| Primarily motor involvement |
| May resolve spontaneously, but can result in permanent neurologic dysfunction |

### Diagnostic Evaluation of Acute Toxicity

- Atropine challenge if diagnosis is in doubt (1 mg IV in adults, 0.01-0.02 mg/kg in children)
- Absence of anticholinergic signs and symptoms (tachycardia, mydriasis, decreased bowel sounds, or dry skin) strongly suggests poisoning with organophosphate or carbamate
- Draw blood sample for measurement of RBC acetylcholinesterase activity to confirm diagnosis

### Serum cholinesterase activity vs. Severity of poisoning

<table>
<thead>
<tr>
<th>Serum cholinesterase activity</th>
<th>Severity of poisoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>21%-50%</td>
<td>mild</td>
</tr>
<tr>
<td>11%-20%</td>
<td>moderate</td>
</tr>
<tr>
<td>0%-10%</td>
<td>severe</td>
</tr>
</tbody>
</table>

### Treatment

#### Non-Drug Treatment

- Ventilatory support by frequent suctioning from the oropharynx and upper airway when secretions are present
- Thorough rinsing with water when dermal exposure is significant; contaminated clothing should be removed, carefully placed in plastic bag and discarded.
Drug treatment

1. Supportive Drug Treatment:
   Ipecac-induced emesis or gastric lavage and the use of activated charcoal are indicated for swallowed pesticides
   (For doses, S/Es and C/Is and dosage forms, see page 382).

2. Specific Drug Treatment
   Atropine Sulphate, 2 mg IM OR IV single dose every 20 to 30 minutes until signs of full atropinization are observed (flushed and dry skin, dilated pupil, dry mucus membrane). The dose should then be tapered and continued until definite improvement occurs and is maintained, sometime for two days or more.
   (For S/Es, C/Is and dosage forms, see page 88)

   PLUS
   Pralidoxime Mesylate (P2S, 2-PAM), IV diluted to 10-15 ml with water for injection and given over 5-10 minutes, 30 mg/kg initially, followed by 1-2 further doses if necessary.
   Children: 20-60 mg/kg as required depending on severity of poisoning and response.
   S/Es: drowsiness, dizziness, nausea, tachycardia, disturbances of vision, headache, hyperventilation, muscle weakness.
   C/Is: Poisoning with carbamates or organophosphorous compounds that have no anticholinesterase activity.
   N.B. Pralidoxime is effective only if given within 24 hrs of exposure.

SEPSIS

Sepsis is a clinical syndrome that complicates severe infection and is characterized by systemic inflammation and widespread tissue injury. In sepsis, tissues remote from the original insult display the cardinal signs of inflammation, including vasodilation, increased microvascular permeability, and leukocyte accumulation. The onset and progression of sepsis is due to a "dysregulation" of the normal response,
with a massive and uncontrolled release of proinflammatory mediators creating a chain of events that leads to widespread tissue injury.

The onset starts from infection and is followed by bacteremia and the progression is from systemic inflammatory response syndrome (SIRS) to sepsis, then to severe sepsis, and finally to septic shock.

Multiple organ dysfunction syndrome (MODS) is the usual explanation for the high mortality rates associated with these syndromes.

**Table IV: Stages of sepsis**

<table>
<thead>
<tr>
<th></th>
<th>Blood culture</th>
<th>Dysregulated host inflammatory response</th>
<th>MAP*</th>
<th>PR</th>
<th>RR</th>
<th>WBC</th>
<th>Signs of organ dysfunction</th>
<th>Vasopressor or **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td>-</td>
<td>-</td>
<td>-/+</td>
<td>&gt;60mm Hg</td>
<td>Normal</td>
<td>-</td>
<td>Not required</td>
<td></td>
</tr>
<tr>
<td>Bacteremia</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>&gt;60mm Hg</td>
<td></td>
<td>+</td>
<td>-</td>
<td>Not required</td>
</tr>
<tr>
<td>SIRS</td>
<td>+/-</td>
<td>++</td>
<td>++/-</td>
<td>&gt;60mm Hg</td>
<td>&gt;90/min</td>
<td>&gt;20/min</td>
<td>&gt;12000 or&lt;4000</td>
<td>-</td>
</tr>
<tr>
<td>Sepsis</td>
<td>+++</td>
<td>++</td>
<td>++/-</td>
<td>&lt;60 mmHg</td>
<td>&gt;90/min</td>
<td>&gt;20/min</td>
<td>&gt;12000 or&lt;4000</td>
<td>-/+</td>
</tr>
<tr>
<td>Severe sepsis</td>
<td>+++</td>
<td>++</td>
<td>++/-</td>
<td>&lt;60 mmHg*</td>
<td>&gt;90/min</td>
<td>&gt;20/min</td>
<td>&gt;12000 or&lt;4000</td>
<td>++</td>
</tr>
<tr>
<td>Septic shock</td>
<td>+++</td>
<td>++</td>
<td>++/-</td>
<td>&lt;60 mmHg*</td>
<td>&gt;90/min</td>
<td>&gt;20/min</td>
<td>&gt;12000 or&lt;4000</td>
<td>+++</td>
</tr>
<tr>
<td>Refractory septic shock</td>
<td>+++</td>
<td>++</td>
<td>++/-</td>
<td>&lt;60 mmHg</td>
<td>&gt;90/min</td>
<td>&gt;20/min</td>
<td>&gt;12000 or&lt;4000</td>
<td>+++</td>
</tr>
</tbody>
</table>

*MAP* = Mean Arterial Pressure, PR pulse rate, RR respiratory rate
**<80 mmHg if the patient has baseline hypertension. Despite adequate fluid resuscitation (Adquate infusion is 40 to 60 mL/kg of saline solution)
** Vasopressors = dopamine, norepinephrine, or epinephrine
*** Need for dopamine at >15 mcg/kg/min, or norepinephrine or epinephrine at >0.25 mcg/kg/min
**Diagnosis**

The diagnosis of sepsis is clinical. Confirmation of the causative organism by culture is vital for antibiotic choice.

**Treatment**

Treat the infection with Antibiotics (empirically or based on the culture result, if available). The following antibiotics could be used for initial empiric treatment.

*First Line*

- **Ampicillin**, 1 g IV QID for 7-10 days (For S/Es, C/Is and dosage forms, see page 18, 314).

PLUS

- **Gentamicin**, 3-5 mg/kg IV as a loading dose, followed by 1.5 mg/kg/day in 3 divided doses, TID for a minimum of 7 days. (For S/Es, C/Is and dosage forms, see page 39).

**N.B. Metronidazole** infusion may be used if anaerobics are suspected

**Dose of Metronidazole:**

**Neonates:**

- < 7 days:
  - < 1.2 kg: 7.5mg/kg every 48hr
  - 1.2 – 2 kg: 7.5mg/kg every 24hr
  - ≥ 2 kg: 15mg/kg/24hr divided in to 12 – hourly doses.

- ≥ 7 days:
  - < 1.2 kg: 7.5 mg/kg every 48hr
  - 1.2 – 2 kg: 15mg/kg/24hr divided in to 12 hourly doses
  - ≥ 2kg: 30mg/kg/24hr divided in to 6-hourly doses

**Infants/children:**

- 30mg/kg/24hr divided in to 6 – hourly doses

(For dosage schedule for adults, S/Es, C/Is and dosage forms, see page 14).

**Alternative**

- **Ceftriaxone**, 1-2g daily as a single dose or 2 divided doses I.M. or slow IV. For children: 20-50mg/kg/day as a single dose or 2 divided doses i.m. or slow IV.

(For S/E, C/I and dosage forms, see page 17)
PLUS

Getamin, 3-5 mg/ kg IV as a loading dose, followed by 1.5 mg/kg/day in 3 divided doses, 8 hourly for a minimum of 7 days. (For S/E, C/I and dosage forms, see page 39).

OR

Cloxacillin, 1-2 g I.V. QID for 7 days (For S/Es, C/Is and dosage forms, see page 39).

PLUS

Gentamicin 5-7 mg/kg I.V. QD in divided doses for 7 days (For S/E, C/E and dosage forms, see page 39).

PLUS

Ceftazidime, Ceftazidime, Ceftazidime, Ceftazidime, 1 gm IV TID OR ceftriaxone, ceftriaxone, ceftriaxone, ceftriaxone, 1-2 g IV OR IM 12 hourly for 7 days. (For S/Es, C/Is and dosage forms, see page 17).

Correct the hemodynamic derangement

- IV Fluids Normal Saline or Ringer’s lactate 1-2 litres.
- Steroids: Hydrocortisone 50mg I.V. QID (For S/Es, C/Is and dosage forms, see page 91)
- Vasopressing agents: Dopamine 2-10 mcg/kg per min, Norepinephrine 0.25 mcg/kg per min, or Epinephrine 0.25 mcg/kg per min

SHOCK

Shock is a state in which there is failure of the circulatory system to maintain adequate cellular perfusion, resulting in reduction of delivery of oxygen and other nutrients to tissues.

Non-drug treatment

- Maintain airway; intubation may be required
- Cardio respiratory resuscitation, with monitoring of vital parameters

Drug treatment

1. Anaphylactic shock

First Line
Adrenaline, 1:1000, SC OR deep IM 0.5-1 ml; may be repeated every 10 min until improvement in blood pressure and pulse rate occurs (maximum dose: 5 mg/day) OR 1:10000, IV, 3-5 ml given slowly

Dosage form: Injection, 0.1% in 1 ml ampoule
(For S/Es and C/Is, see page 90)

PLUS

Sodium chloride solution, 0.9% (normal saline)

Dosage form: Free salt

Alternative

Hydrocortisone, 100 mg-300 mg IV. immediately
(For S/E and C/I, see page 91)

Dosage form: Injection (sodium succinate), 50 mg/ml in 2 ml ampoule, 125 mg/ml; powder for injection, 500 mg in vial; tablet (acetate), 5 mg, 10 mg

PLUS

Aminophylline, 250 mg IV over 10-20 minutes
(For S/Es, C/Is and Dosage forms, see page 90)

OR

Promethazine, 25-50 mg IV immediately
(For S/Es, C/Is and Dosage forms, see page 43, 310)

OR

Chlorpheniramine, 10-20 mg slow IV. injection over 1 minute instead

S/Es: drowsiness, headache, psychomotor impairment, and anti-muscarinic effects

P/C: in prostatic hypertrophy, urinary retention, glaucoma, and hepatic disease

Dosage Forms: Syrup 2mg/5ml; tablet 4mg, 10mg.

N.B.

- To make a 1:10000 dilution mix 1 ml adrenaline with 10 ml sodium chloride solution 0.9% (normal saline)
- I.V. route should be used with extreme care.

2. Cardiogenic shock

Dopamine, 2-20 mcg/kg/min IV diluted with dextrose 5% in Water, or in sodium chloride solution 0.9%;
(For S/Es, C/Is and Dosage forms, see page 79)

AND/OR

Dobutamine, 2.5-15 micrograms/kg/min IV diluted in dextrose 5%.
S/Es: tachycardia, raised blood pressure;
P/C: severe hypotension complicating cardiogenic shock
Dosage form: powder for injection, 250 mg per vial

PLUS

Ringer-lactate solution, 5 – 10 ml IV over 1hr.

N.B. Fluid administration in Cardiogenic shock has to be under extreme caution!!

OR

Adrenaline, 1:10000, IV, 3-5 ml given slowly
(For S/Es, C/I sand dosage forms, see page 90)

3. Hypovolemic shock

- Not due to hemorrhages: Infusion of fluid (Normal Saline or Ringer lactate) 20ml/kg fast; reassess the patient for adequacy of treatment; if needed repeat the bolus with maximum tolerated dose being 60 – 80 ml/kg with in the first 1 – 2 hr.
- If due to hemorrhage, transfusion of packed RBC or whole blood 20ml/kg over 4 hrs, repeated as needed until Hgb level reaches 10gm/dl and the vital signs are corrected.

4. Septic shock:

- Knowledge and identification of likely pathogens and nidus of infection is vital for appropriate antibiotic treatment.
- Adequate organ system perfusion with IV fluids.
- In case of adrenal insufficiency:
  Hydrocortisone, 50 mg IV every 6 hrs
  (For S/Es, C/Is and dosage forms, see page 91)

PLUS

Dopamine, 2 to 10 microgram/kg/min IV
(For S/Es, C/Is and dosage forms, see page 79)

OR
**Dobutamine**, 2.5 to 10microgram/kg/min) IV infusion, the dosage is increased every 2 to 5 min up to a maximum of 20 to 50 microgram/kg/min until mean SBP reaches 90mmHg. (For S/Es, C/Is and dosage forms, see page 393)

Antibiotics could be used for initial treatment (See under **Sepsis**).

**STROKE (CEREBROVASCULAR ACCIDENT)**

Cerebrovascular accident (Stroke) is an acute event in/of the blood vessels of the brain resulting in ischemia or infarction and sudden loss of focal brain function. It is the major neurological disease of our times. The symptoms of brain ischemia may be transient; lasting seconds to minutes, or may persist for longer periods of time.

The causes may
- be intrinsic to the vessel, as in atherosclerosis, lipohyalinosis, inflammation, amyloid deposition, arterial dissection, developmental malformation, aneurysmal dilation, or venous thrombosis
- originate remotely, as occurs when an embolus from the heart or extracranial circulation lodges in an intracranial vessel
- result from inadequate cerebral blood flow due to decreased perfusion pressure or increased blood viscosity
- result from rupture of a vessel in the subarachnoid space or intracerebral tissue

Stroke can lead to
- transient brain ischemia (transient brain ischemic attack or TIA) or permanent brain infarction (ischemic stroke)- 80 % of strokes
- subarachnoid hemorrhage or an intracerebral hemorrhage (primary hemorrhagic stroke) -20 %.
Table V: Subtypes of stroke and their characteristics

<table>
<thead>
<tr>
<th>Stroke type</th>
<th>Clinical course</th>
<th>Risk factors</th>
<th>Other clues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intracerebral hemorrhage</td>
<td>Gradual progression during minutes or hours</td>
<td>Risk factors include hypertension, trauma, bleeding diatheses, illicit drugs (eg, amphetamines, cocaine), vascular malformations. More common in blacks and Asians than in whites.</td>
<td>May be precipitated by sex or other physical activity. Patient may have reduced alertness.</td>
</tr>
<tr>
<td>Subarachnoid hemorrhage</td>
<td>Abrupt onset of sudden, severe headache. Focal brain dysfunction less common than with other types.</td>
<td>Risk factors include illicit drugs (eg, amphetamines, cocaine), bleeding diatheses.</td>
<td>May be precipitated by sex or other physical activity. Patient may have reduced alertness.</td>
</tr>
<tr>
<td>Ischemic (thrombotic)</td>
<td>Stuttering progression with periods of improvement. Lacunae develop over hours or at most a few days; large artery ischemia may evolve over longer periods.</td>
<td>Risk factors include atherosclerotic risk factors (age, smoking, diabetes mellitus, etc.). Men affected more commonly than women. May have history of TIA.</td>
<td>May have neck bruit.</td>
</tr>
<tr>
<td>Ischemic (embolic)</td>
<td>Sudden onset with deficit maximal at onset. Clinical findings may improve quickly.</td>
<td>Atherosclerotic risk factors as listed above. Men affected more commonly than women. History of heart disease (valvular, atrial fibrillation, endocarditis).</td>
<td>Can be precipitated by getting up at night to urinate, or sudden coughing or sneezing.</td>
</tr>
</tbody>
</table>

**Diagnosis:** Clinical

**Treatment**
Check and stabilize vital signs: blood pressure, breathing, and temperature. The first goal is to prevent or reverse brain injury. After initial stabilization, an emergency noncontrast head CT scan should be performed to differentiate ischemic from hemorrhagic stroke;
Treatment designed to reverse or lessen the amount of tissue infarction fall within five categories: (1) medical support, (2) thrombolytics (see under myocardial infarction and deep vein thrombosis) (3) anticoagulants (see under myocardial infarction and deep vein thrombosis) (4) antiplatelet agents (see under myocardial infarction and deep vein thrombosis) and (5) neuroprotection.
### Table VI: Management of Acute Stroke

<table>
<thead>
<tr>
<th>Initial assessment and management</th>
<th>ABCs, serum glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noncontrast head CT</td>
</tr>
<tr>
<td></td>
<td>Hemorrhage</td>
</tr>
<tr>
<td></td>
<td>Medical and surgical management</td>
</tr>
<tr>
<td></td>
<td>Tumor or other CNS process</td>
</tr>
<tr>
<td></td>
<td>Treat as indicated</td>
</tr>
<tr>
<td></td>
<td>Normal or hypodense area consistent with acute ischemic stroke</td>
</tr>
<tr>
<td></td>
<td>Consider thrombolysis, aspirin</td>
</tr>
<tr>
<td></td>
<td>Maintain blood pressure and hydrate</td>
</tr>
<tr>
<td></td>
<td>Admit patient to appropriate level of care depending on concomitant medical problems and airway</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subsequent hospital management</th>
<th>Establish cause of stroke and risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plan for secondary prophylaxis (drugs, risk factor modifications)</td>
</tr>
<tr>
<td></td>
<td>Obtain physical, occupational, and speech therapy consultation and social work as appropriate</td>
</tr>
<tr>
<td></td>
<td>Provide nutrition</td>
</tr>
<tr>
<td></td>
<td>Plan for discharge, including prescriptions for risk factor reduction, including when to institute anti hypertensive treatment, and antithrombotic medication prophylaxis</td>
</tr>
</tbody>
</table>

### Upper Gastrointestinal Bleeding

Upper gastrointestinal (GI) bleeding is bleeding from GI tract proximal to the ligament of Treitz. It commonly presents with hematemesis (vomiting of blood or coffee-ground like material) and/or melena (black, tarry stools). Hematochezia(frank blood per rectum) can be seen with massive upper GI bleeding. The incidence of UGIB is 2-fold greater in males than in females.
Causes: duodenal ulcer hemorrhage (25%), gastric ulcer hemorrhage (20%), mucosal tears of the esophagus or fundus (Mallory-Weiss tear), esophageal varices, erosive gastritis, erosive esophagitis, Dieulafoy lesion, gastric varices, gastric cancer, and ulcerated gastric leiomyoma

**Diagnosis**
Clinical and/or Endoscopic

**Treatment**
- Resuscitation
- All patients with hemodynamic instability (shock, orthostatic hypotension, decrease in hematocrit of at least 6 percent, or transfusion requirement over two units of packed red blood cells) or
- Active bleeding (manifested by hematemesis, bright red blood per nasogastric tube, or hematochezia) should be admitted to an intensive care unit for resuscitation and close observation.
- Gastroenterological consultation should be obtained.
- Surgical consultation should be considered based upon the timing and availability of therapeutic endoscopy and in patients with massive bleeding.
- Nasogastric tube lavage - to remove particulate matter, fresh blood, and clots to facilitate endoscopy.
- Elective endotracheal intubation in patients with ongoing hematemesis or altered respiratory or mental status may facilitate endoscopy and decrease the risk of aspiration

**Acid suppression**
- Oral and IV PPI therapy decreases the hospital stay, rebleeding rate, and the need for blood transfusion in high-risk ulcer bleeders treated with endoscopic therapy.
- Start at presentation and continue until confirmation of the cause of bleeding after which the need for specific therapy can be determined.
ANNEXES

ANNEX 1: RECOMMENDED IMMUNIZATION SCHEDULE

Table 1: Recommended schedule for immunization according to EPI program

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>BCG</td>
</tr>
<tr>
<td></td>
<td>OPV-0</td>
</tr>
<tr>
<td>6 weeks</td>
<td>OPV-1</td>
</tr>
<tr>
<td></td>
<td>DPT1-HBV1-Hib1 (Pentavalent)</td>
</tr>
<tr>
<td>10 weeks</td>
<td>OPV-2</td>
</tr>
<tr>
<td></td>
<td>DPT2-HBV2-Hib2 (Pentavalent)</td>
</tr>
<tr>
<td>14 weeks</td>
<td>OPV-3</td>
</tr>
<tr>
<td></td>
<td>DPT3-HBV3-Hib3 (Pentavalent)</td>
</tr>
<tr>
<td>9 months</td>
<td>Measles</td>
</tr>
</tbody>
</table>

Table 2: Recommended schedule of immunization for children attending clinic at later age but before 5 years

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>First visit</td>
<td>BCG if Mantoux test is negative</td>
</tr>
<tr>
<td></td>
<td>OPV-1</td>
</tr>
<tr>
<td></td>
<td>DPT1-HBV1-Hib1 (Pentavalent)</td>
</tr>
<tr>
<td>Second visit (after one month)</td>
<td>OPV2</td>
</tr>
<tr>
<td></td>
<td>DPT2-HBV2-Hib2 (Pentavalent)</td>
</tr>
<tr>
<td>Third visit (after one month)</td>
<td>OPV-3</td>
</tr>
<tr>
<td></td>
<td>DPT3-HBV3-Hib3 (Pentavalent)</td>
</tr>
<tr>
<td></td>
<td>Measles</td>
</tr>
</tbody>
</table>
Table 3: Hepatitis B vaccine (Engrix B 10 microgram) is also available and three doses are recommended (at birth, at one month and at six months of age). Booster dose is given after 10 years.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Type of vaccine</th>
<th>Route of administration</th>
<th>Adverse reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>Life attenuated</td>
<td>Intradermal</td>
<td>BCGioma</td>
</tr>
<tr>
<td>DPT-HBV-Hib</td>
<td>Toxoid (DT)</td>
<td>IM</td>
<td>Fever, anaphylaxis, crying, &amp; shock</td>
</tr>
<tr>
<td>(Pentavalent)</td>
<td>Inactivated bacteria (P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Protein conjugated polysaccharide (Hib)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recombinant product (HBV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV</td>
<td>Life attenuated virus</td>
<td>Oral</td>
<td>Paralysis</td>
</tr>
<tr>
<td>Measles</td>
<td>Life attenuated virus</td>
<td>Subcutaneous</td>
<td>Fever</td>
</tr>
</tbody>
</table>
ANNEX 2: FEEDING PROBLEMS

Feeding of normal baby:
Mother should be told to start feeding the baby with in one to two hours after delivery. First feed should be the breast milk and there is no need for any test feed with water or dextrose. First few feeds should be supervised and records of feeds should be documented.

Feeding of a preterm, small for date (SGA) and infants of diabetic mothers (IDM):
Infants less than 1500 grams should receive all the fluids and calories intravenously for the first 24 hours. SGA and IDM babies should be started feeding by one hour of age, First few feeds may be given by NG tube and they should be fed at least two hourly if sucking is poor. Once sucking is well established and blood sugar is normal these babies should be given to the mother for supervised breast feeding.

Feeding of term asphyxiated infants:
Mildly asphyxiated infants should feed like any healthy baby but must be closely supervised for the first 12 hours. Babies with severe asphyxia should be started with 2/3 maintenance IV fluids and strict intake records should be maintained routinely.

Evidence for adequate nutrition
Weight gain should be 20 – 30 g/kg/day for premature infants and 10 g/kg/day for full term infants

Adequate growth requires:
- 100-120 kcal / kg/day in term infants
- 115-130 kcal /kg/day for preterm infants
- 150 kcal /kg/day for very low birth weight infants
ANNEX 3: FLUID AND ELECTROLYTE

Normal maintenance requirements (volume of fluid/kg/day)

- Day 1: 60 m1/kg/day
- Day 2: 80 m1/kg/day
- Day 3: 100 m1/kg/day
- Day 4: 120 m1/kg/day
- Day 5: 140 m1/kg/day
- Day 6 & above: 150 m1/kg/day

Additional allowance:

Increase insensible water loss:

a. Radiant warmer 20 m1/kg/day
b. Photo therapy 20 m1/kg/day
c. Increase body temperature 10-20 m1/kg/day

Increase loss water from other roots:

Example: neonatal enterocolitis, GI aspirates, diarrhea. The loss in the above conditions are variable, they should be replaced volume for volume.

Stomach contents should be replaced with half saline with KCL loss small intestinal contents is replaced with normal saline and KCL.
ANNEX 4: THE KANGAROO MOTHER CARE

Kangaroo Mother Care (KMC) is defined as early, prolonged and continuous skin to skin contact between a mother and her low birth weight infants (LBWI), both in hospital and after early discharge until at least the 40th week of postnatal gestational age. KMC does not need sophisticated equipment, and for its simplicity it can be applied almost everywhere including peripheral hospitals. Kangaroo Mother Care also contributes to the humanization of neonatal care and the containment of cost, for which reason it may also be attractive for neonatal units in high-income countries.

Kangaroo care a program of skin-to-skin contact between mother (any family members) and a LBWI is part of the revolution in the care of premature infants. Since its first description in 1983 in Bogota, Colombia, KMC has drawn the attention of international agencies and the scientific community leading to a publication of more than 200 papers and abstracts.

The Multi center study including the neonatal unit of Addis Ababa, Ethiopia showed that LBWI in KMC had better growth, early discharge from hospital, lower cost, acceptable by both hospital staff and mothers when compared to the conventional method of care. KMC is not only feasible but also easily grasped by the hospital staff and accepted by the community. The feasibility of the KMC is also testified by the growing number of reported experiences and by its inclusion in national guidelines for perinatal care. The neonatal unit of Tikur Anbessa hospital also uses KMC as a routine care for all babies weighing less than 2000 grams since 1997.

The benefits of Kangaroo Mother Care: Many studies showed that Kangaroo Mother Care offers the preterm infants many physical and emotional benefits, which includes:

- A stable heart rate
- More regular breathing
- Improve dispersion of oxygen throughout the body
- Prevention of cold stress and also warming babies who are already in cold stress, Kangaroo transportation where transport incubators are not there to keep the warm chain
✓ Longer period of sleep (during which the brain matures)
✓ More rapid weight gain and earlier discharge from hospital
✓ Reduction of purposeless activity which simply burns calories at the expense of infants growth and health
✓ Decreased crying
✓ Opportunities to breast feed and enjoy all the healthful benefits of breast milk
✓ Earlier bonding

The KMC works so beautifully because of three factors affecting the infant:
1. It creates conditions similar to those with which the infant had become familiar in Utero, such as the proximity of the mother’s heart beat sounds and her voice couples with the gentle rhythmic rocking of her breathing
2. It provides containment and allows for flexion and prevent heat loss and provides heat from the skin to skin contact
3. Protects the infant and offers him a reprieve from the stressful elements of NICU

**When to Discharge from Kangaroo position:**
The decision of discharging from Kangaroo position is made by the baby itself (at about the 40th week (gestational age + postnatal age) and weight of about 2000 grams. The baby will be restless and the mother could not maintain the Kangaroo position any more, then this is the time to go out of the kangaroo “pouch”
ANNEX 5: WHO CLINICAL STAGING OF HIV/AIDS FOR

children [Revised 2006]
(For the purpose of WHO staging system, children are defined as individuals aged < 15 years)

Clinical stage 1

- Asymptomatic
- Persistent generalized lymphadenopathy

Clinical stage 2

- Unexplained persistent hepatosplenomegaly
- Papular pruritic eruptions
- Extensive wart virus infections
- Extensive molluscum contagiosum
- Fungal nail infections
- Recurrent oral ulcerations
- Unexplained persistent parotid enlargement
- Lineal gingival erythema
- Herpes zoster
- Recurrent or chronic upper respiratory tract infections (Otitis media, otorrhoea, sinusitis or tonsillitis)

Clinical stage 3

- Unexplained\textsuperscript{a} moderate malnutrition not adequately responding to standard therapy
- Unexplained persistent diarrhea (14 days or more)
• Unexplained persistent fever (above 37.5°C intermittent or constant, for longer than one month)
• Persistent oral candidiasis (after the first 6 – 8 weeks of life)
• Oral hairy leukoplakia
• Acute ulcerating gingivitis or periodontitis
• Lymph node tuberculosis
• Pulmonary tuberculosis
• Severe recurrent bacterial pneumonia
• Symptomatic lymphoid interstitial pneumonitis (LIP)
• Chronic HIV – associated lung disease including Bronchoectasis
• Unexplained anemia (<8g/dl), neutropenia (<0.5 X 10^9 per liter) and/or chronic thrombocytopenia (<50 X 10^9 per liter)

Clinical stage 4
• Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
• Pneumocystis carinii pneumonia
• Recurrent severe bacterial infections (such as empyema, pyomyositis, bone or joint infection or meningitis but excluding pneumonia)
• Chronic herpes simplex infection (orolabial or cutaneous of more than one month duration or visceral at any site)
• Extra pulmonary tuberculosis
• Kaposi sarcoma
• Esophageal candidiasis (or candidiasis of trachea, bronchi or lungs)
• Central nervous system toxoplasmosis (after one month of life)
• HIV encephalopathy
• Cytomegalovirus infection: retinitis or cytomegalovirus infection affecting another organ, with onset at age older than one month.
• Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
• Chronic cryptosporidiosis
• Chronic isosporiasis
• Disseminated non–tuberculous mycobacterial infection
• Cerebral or B cell non–Hodgkin lymphoma
• Progressive multifocal leukoencephalopathy
• Symptomatic HIV–associated nephropathy or HIV–associated cardiomyopathy

a – unexplained refers to where the condition is not explained by other causes.

b – Some additional specific conditions can also be included in regional classifications (reactivation of American trypanosomiasis [Meningoencephalitis and/or Myocarditis] in the WHO region of the Americas, penicilliosis in Asia and HIV–associated rectovaginal fistula in Africa).
ANNEX 6: PERCENTAGE OF ADULT DOSE REQUIRED AT VARIOUS AGES
AND BODY WEIGHT

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean weight For age (Kg)</th>
<th>Percentage of adult dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn (full term)</td>
<td>3.5</td>
<td>12.5</td>
</tr>
<tr>
<td>2 months</td>
<td>4.5</td>
<td>15</td>
</tr>
<tr>
<td>4 months</td>
<td>6.5</td>
<td>20</td>
</tr>
<tr>
<td>1 year</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>3 years</td>
<td>15</td>
<td>33.3</td>
</tr>
<tr>
<td>7 years</td>
<td>23</td>
<td>50</td>
</tr>
<tr>
<td>10 years</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>12 years</td>
<td>39</td>
<td>75</td>
</tr>
<tr>
<td>14 years</td>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td>16 years</td>
<td>58</td>
<td>90</td>
</tr>
<tr>
<td>Adult</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

N.B. The percentage method is derived from the surface area formula for children. This table is to be used only for drugs with a high therapeutic index. The clinical response of the child, age- or disease-related changes in drug clearance and any adverse effects that might present should be given due consideration when calculating doses.
ANNEX 7: GUIDELINES FOR THE MANAGEMENT OF PAIN (INCLUDING POST-OPERATIVE PAIN)

Moderate Pain
Pain score 2

Not adequate

Adequate

Add Diclofenac 50mg PO/PR tid

Severe Pain
Pain score 3

Not adequate

Stop weak opiate

Continue Paracetamol + NSAID (if tolerant)
+ Add Opioid drug e.g. Morphine IM, PCA or oral
Continue laxative + consider prescribing anti-emetic

Mild pain
Pain score 1

Not adequate

Able to take NSAIDS

Yes

Add Diclofenac 50mg PO/PR tid

Regular Pracetamol 1g qds PO/PR

Patient score 0
Or Patient satisfied

Pain score should be assessed after asking the patient to take a deep breath, cough and move.

0  No pain
1  Mild pain - able to continue with whatever patient is doing
2  Moderate pain - beginning to interfere with activities, less able to concentrate
3  Severe pain - unable to think of anything else
ANNEX 8: GUIDELINES FOR USING NON-STEROIDAL ANTI-INFLMAMATORY DRUGS (NSAIDS)

Patient has musculoskeletal pain. History, Examination and investigations suggest

Yes

Patient has active peptic Ulceration, renal impairment severe heart failure or severe

No

Use simple analgesics (E.g. Paracetamol) => Good response?

Yes

Consider further investigations; if no contraindications trial of short – term NSAIDs. Good response?

No

Trial of short-half life NSAID taken when necessary (E.g. ibuprofen, Diclofenac) => Good response?

Yes

Consider intermittent courses of NSAIDs

No

Trial of longer half life => Good response & well

Yes

Good response, but not tolerated, consider alternative NSAID, alternative route (e.g. rectal) or co-prescribe for side-effects e.g. gastroprotective agents => Good responses & well tolerated?

No

Tolerated, but poor response, consider alternative NSAID, or use of compound simple analgesics => Good response?

Yes

Consider further investigation

No

Consider specialist referral

Yes

Patient has active peptic Ulceration, renal impairment severe heart failure or severe

No

Use simple analgesics (E.g. Paracetamol) => Good response?

Yes

Consider further investigations; if no contraindications trial of short – term NSAIDs. Good response?

No

Trial of short-half life NSAID taken when necessary (E.g. ibuprofen, Diclofenac) => Good response?

Yes

Consider intermittent courses of NSAIDs

No

Trial of longer half life => Good response & well

Yes

Good response, but not tolerated, consider alternative NSAID, alternative route (e.g. rectal) or co-prescribe for side-effects e.g. gastroprotective agents => Good responses & well tolerated?

No

Tolerated, but poor response, consider alternative NSAID, or use of compound simple analgesics => Good response?

Yes

Consider further investigation

No

Consider physical therapy Need for more aggressive treatment?

Yes

Consider specialist referral

No

Good response but not tolerated, consider alternative NSAID or further investigations e.g. endoscopy Use simple analgesics => Good response?
ANNEX 9: WHO RECOMMENDATIONS ON MULTIPLE DRUG THERAPY FOR LEPROSY

The basic WHO recommendations on multiple drug therapy for leprosy, using adult doses (Technical report series 675, 1982)

**Table 1. Multibacillary leprosy (adult dosage)**

<table>
<thead>
<tr>
<th>Duration</th>
<th>A minimum of 2 years (or 24 monthly doses within a 36-month period) in all cases, but wherever possible until slit-skin smears are negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drugs used</td>
<td>three: Rifampcin, Dapsone and clofazimine.</td>
</tr>
<tr>
<td>Dosage: Rifampcin</td>
<td>600mg once - monthly, supervised</td>
</tr>
<tr>
<td>Dapsone</td>
<td>100mg daily, self-administered</td>
</tr>
<tr>
<td>Clofazimine</td>
<td>300mg once - monthly, supervised and 50mg daily, self-administered.</td>
</tr>
<tr>
<td>Surveillance</td>
<td>minimum of 5 years after stopping treatment, with clinical, and bacteriological examination at least every 12 months</td>
</tr>
</tbody>
</table>

**N.B.** Ethionamide/prothionamide, in a daily self-administered dose of 250-375mg, may be used if the skin pigmentation or other side effects of clofazimine render this drug totally unacceptable.
### Table 2. Paucibacillary leprosy (adult dosage)

<table>
<thead>
<tr>
<th>Duration</th>
<th>6 months (or 6 monthly doses within a 9 month period).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drugs used</td>
<td>Two: Rifampicin and Dapsone</td>
</tr>
<tr>
<td>Dosage: Rifampicin</td>
<td>600mg once - monthly, supervised 100mg daily, self-administered.</td>
</tr>
<tr>
<td>Dapsone</td>
<td></td>
</tr>
<tr>
<td>Surveillance</td>
<td>Minimum of 2 years after stopping treatment with clinical examination at least every 12 months</td>
</tr>
</tbody>
</table>

### Table 3. Multibacillary leprosy (3 drugs - Dapsone, Rifampicin Clofazimine)

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Dapsone daily dose, Unsupervised</th>
<th>Rifampicin Monthly dose, Supervised</th>
<th>Clofazimine Unsupervised dose</th>
<th>Clofazimine Monthly dose Supervised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 5 years</td>
<td>25mg</td>
<td>150-300mg</td>
<td>100mg once weekly</td>
<td>100mg</td>
</tr>
<tr>
<td>6-14 years</td>
<td>50-100mg</td>
<td>300-450mg</td>
<td>150mg once weekly</td>
<td>150-200mg</td>
</tr>
<tr>
<td>15 years and above (i.e use adult dose)</td>
<td>100mg</td>
<td>600mg</td>
<td>50mg daily</td>
<td>300mg</td>
</tr>
</tbody>
</table>
Table 4. Paucibacillary Leprosy (2 drugs-Dapsone and Rifampicin)

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Dapsone: daily dose, unsupervised</th>
<th>Rifampicin, monthly doses supervised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 5 years</td>
<td>25mg</td>
<td>150-300mg</td>
</tr>
<tr>
<td>6-14 years</td>
<td>50-100mg</td>
<td>300-450mg</td>
</tr>
<tr>
<td>15 years and above i.e. use adult dose</td>
<td>100mg</td>
<td>600mg</td>
</tr>
</tbody>
</table>
ANNEX 10: THE GLASGOW COMA SCALE (GCS)

This gives a reliable objective way of recording the conscious state of a person. It can be used by medical and nursing staff for initial and continuous assessment. It has value in predicting ultimate outcome. 3 types of response are assessed and graded as follows.

I) FOR ADULTS

Eye Opening:
- Spontaneously: 4
- To speech: 3
- To pain: 2
- Never: 1

Best Verbal Response:
- Oriented: 5
- Confused: 4
- Inappropriate words: 3
- Incomprehensible words: 2
- None: 1

Best Motor Response:
- Obey command: 6
- Localizes pain: 5
- Withdrawal: 4
- Flexor response to pain: 3
- Extensor response to pain: 2
- None: 1

An overall score is made by summing the score in the 3 areas assessed. Total 3 - 15

Severe injury GCS< 8; Moderate injury GCS 9-12; minor injury GCS 13-15

ii) FOR CHILDREN

Eye Opening (total points 4)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td>To voice</td>
<td>3</td>
</tr>
<tr>
<td>To pain</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
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Verbal Response (total points 5)

<p>| | |</p>
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<tr>
<td>Older children</td>
<td>Infants and young Children</td>
</tr>
<tr>
<td></td>
<td>Score</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>Oriented</td>
<td>5</td>
</tr>
<tr>
<td>Confused</td>
<td>4</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>3</td>
</tr>
<tr>
<td>Incomprehensive</td>
<td>2</td>
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<tr>
<td>None</td>
<td>1</td>
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</table>

**Motor Response (total points 6)**

<table>
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<th>Score</th>
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<tr>
<td>Obeys</td>
<td>6</td>
</tr>
<tr>
<td>Localize pain</td>
<td>5</td>
</tr>
<tr>
<td>Withdraws</td>
<td>4</td>
</tr>
<tr>
<td>Flexion</td>
<td>3</td>
</tr>
<tr>
<td>Extension</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
</tr>
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</table>
## ANNEX 11: RED EYE

### Table I. Signs of Red Eye

<table>
<thead>
<tr>
<th>Signs</th>
<th>Referral Advisable if Present</th>
<th>Acute Glaucoma</th>
<th>Acute Irido-cyclitis</th>
<th>Keratitis</th>
<th>Bacterial Conjunctivitis</th>
<th>Viral Conjunctivitis</th>
<th>Allergic Conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciliary flush</td>
<td>Yes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Conjunctival hyperemia</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Corneal opacification</td>
<td>Yes</td>
<td>3</td>
<td>0</td>
<td>1 to 3</td>
<td>0</td>
<td>0 or 1</td>
<td>0</td>
</tr>
<tr>
<td>Corneal epithelial disruption</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>1 to 3</td>
<td>0</td>
<td>0 or 1</td>
<td>0</td>
</tr>
<tr>
<td>Pupillary abnormality</td>
<td>Yes</td>
<td>Middilated, nonreactive</td>
<td>Small, may be irregular</td>
<td>Normal or small</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shallow anterior chamber angle</td>
<td>Yes</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Elevated intraocular pressure</td>
<td>Yes</td>
<td>3</td>
<td>-2 to +1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Proptosis</td>
<td>Yes</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Discharge</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>Sometime s</td>
<td>2 or 3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Preauricular lymph-node enlargement</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

N.B. The range of severity of the sign is indicated by -2 (subnormal) to 0 (absent) to 3 (severe).

### Table II. Symptoms of Red Eye

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Referral Advisable if Present</th>
<th>Acute Glaucoma</th>
<th>Acute Irido-cyclitis</th>
<th>Keratitis</th>
<th>Bacterial Conjunctivitis</th>
<th>Viral Conjunctivitis</th>
<th>Allergic Conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blurred vision</td>
<td>Yes</td>
<td>3</td>
<td>1 to 2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pain</td>
<td>Yes</td>
<td>2 to 3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Photophobia</td>
<td>Yes</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Colored halos</td>
<td>Yes</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Exudation</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0 to 3</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Itching</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 to 3</td>
</tr>
</tbody>
</table>

N.B. The range of severity of the sign is indicated by 0 (absent) to 3 (severe).
ANNEX 12: Body surface area

![Image of a nomogram for estimating body surface area](image)

**Nomogram**

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Weight in kg</th>
<th>Surface area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>90</td>
<td>1.30</td>
</tr>
<tr>
<td>160</td>
<td>80</td>
<td>1.20</td>
</tr>
<tr>
<td>170</td>
<td>60</td>
<td>1.00</td>
</tr>
<tr>
<td>180</td>
<td>50</td>
<td>0.90</td>
</tr>
<tr>
<td>190</td>
<td>40</td>
<td>0.80</td>
</tr>
<tr>
<td>200</td>
<td>30</td>
<td>0.70</td>
</tr>
<tr>
<td>210</td>
<td>20</td>
<td>0.60</td>
</tr>
<tr>
<td>220</td>
<td>15</td>
<td>0.50</td>
</tr>
<tr>
<td>230</td>
<td>10</td>
<td>0.45</td>
</tr>
<tr>
<td>240</td>
<td>8</td>
<td>0.40</td>
</tr>
<tr>
<td>250</td>
<td>6</td>
<td>0.35</td>
</tr>
<tr>
<td>260</td>
<td>4</td>
<td>0.30</td>
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<tr>
<td>270</td>
<td>3</td>
<td>0.25</td>
</tr>
<tr>
<td>280</td>
<td>2</td>
<td>0.20</td>
</tr>
<tr>
<td>290</td>
<td>1</td>
<td>0.15</td>
</tr>
<tr>
<td>300</td>
<td>0.5</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Alternative (Meister's formula):**

Surface area (m²) = \(\sqrt{\frac{\text{Height (cm)} \times \text{Weight (kg)}}{3600}}\)

(From: Biers GL, Bailey D. Arch Dis Child 1994; 70:246-247.)
ANNEX 13

The five categories of Food and Drug Administration (FDA) for drug use in pregnancy

**Category A:** Controlled studies in women fail to demonstrate a risk to the fetus in the first trimester, and the possibility of fetal harm appears remote.

**Category B:** Animal studies do not indicate a risk to the fetus, and there are no controlled human studies or animal studies to show an adverse effect on the fetus, but well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus.

**Category C:** Studies have shown the drug to have animal teratogenic or embryocidal effects, but there are no controlled studies in women or no studies are available in animals or women.

**Category D:** Positive evidence of human fetal risk exists, but benefits in certain situation (e.g., life threatening situations or serious diseases for which safer drugs can not be used or are ineffective) may make use of the drug acceptable despite its risks.

**Category X:** Studies in animals or humans have demonstrated fetal abnormalities, or there is evidence of fetal risk based on human experience, or both, and the risk clearly out weighs any possible benefit.
Growth charts
A

Abacavir .......................................................... Abacavir .......................................................... Abacavir .......................................................... Abacavir .......................................................... 6, 10
Acetylsalicylic acid .................................................. 123, 128, 362
Acne vulgaris .............................................................. 196, 197
Acquired Immuno Deficiency Syndrome ................ 12, 196, 197
Actinic keratoses ....................................................... 196
Activated charcoal .......................................................... 383, 385
Acute Dacryoocystitis ................................................. 245
Acute epiglotitis .......................................................... 275
Acute Infectious Dacryoadenitis ................................. 245
Acute laryngitis ......................................................... 275, 297
Acute otitis media ...................................................... 275, 276
Acute pulmonary edema .............................................. 78, 112
Acute rhinitis ............................................................. 275, 288
Acute sinusitis ........................................................... 288
Acute tonsillitis .......................................................... 275, 294
Acute tubal occlusion ................................................. 275, 277
Acute urticaria ........................................................... 224
Acute vestibular paralysis ........................................... 275
Acriderm ................................................................. 90, 93, 394
Albendazole ............................................................... 25, 26, 27
Allergic Conjunctivitis ................................................. 245, 253
Allergic contact dermatitis .......................................... 196, 209
Allergic contact Dermatitis .......................................... 209
Allergic rhinitis .......................................................... 275
Aloprinolin ................................................................. 96, 98, 111
Ambergiasis .............................................................. 1, 14
Amebic liver abscess ................................................... 15
Aminophylline ............................................................ 90, 91, 393
Amiodarone .................................................................. 87
Amisulpirine ............................................................... 216
Amoxicillin ............................................................... 18, 47, 52, 72, 74, 75, 132, 133, 186, 233, 234, 235, 236, 264, 283, 284, 286
Anemia ................................................................. 3, 10, 24, 26, 32, 36, 56, 77, 79, 81, 301, 322, 342
Anxiety disorder .......................................................... 77
Arthritis ................................................................. 77, 85, 90, 125
ASPERATION PNEUMONIA AND LUNG ABSCESS .......... 51
Aspirin .................................................................... 32, 70, 136, 138, 264, 265, 334
Atenolol ................................................................. 119, 120, 130
Atopic Dermatitis ........................................................ 196, 208, 249
Atrioventricular block .................................................. 77
Atrophic rhinitis and ozena .......................................... 275
Atropine .................................................................. 88, 265, 388, 389
Azithromycin ............................................................ 183, 233, 236, 240, 242, 272, 352

B

Bacillary dysentery .............................................................. 15
Bacterial and viral diffuse otitis externa ......................... 275, 280
Bacterial Conjunctivitis ............................................... 245, 255
Bacterial folliculitis ....................................................... 196, 199
Bacterial vaginosis ........................................................ 349, 350
Balanoposthitis .......................................................... 196, 200
Barotrauma ............................................................... 275, 281
Beclomethasone .......................................................... 93, 94, 146, 290
Benzathine penicillin ................................................... 238, 239, 240, 349

456
C

Calamine .................................................................................................................................................................... 104, 105
Calcipotriene ............................................................................................................................................................ 215
Calcium gluconate ..................................................................................................................................................... 221
Camphor .................................................................................................................................................................... 221
Candidal intertrigo ..................................................................................................................................................... 196
Candidal paronychia ................................................................................................................................................... 200
Captopril .............................................................................................................................................................. 196, 201
Carbuncle ................................................................................................................................................................. 120, 121
Cascara .................................................................................................................................................................. 196, 203
Ceftriaxone ............................................................................................................................................................ 32, 33, 411, 412
Cefuroxime ............................................................................................................................................................ 14, 106, 118, 132, 138, 225, 319, 377
Cellulitis ................................................................................................................................................................. 203, 245
Cephalexin ............................................................................................................................................................... 204, 214, 217, 248
Cetirizine ................................................................................................................................................................. 225
Chancroid ................................................................................................................................................................. 228, 232
Chlamydial infections ................................................................................................................................................ 97
Chlorambucil ............................................................................................................................................................. 228
Chlorhexidine + Cetrimide ....................................................................................................................................... 96
Chlorhexidine + Cetrimide ....................................................................................................................................... 370
Chloroquine .............................................................................................................................................................. 33, 36, 139
Chlorpheniramine .................................................................................................................................................... 211, 225, 393
Cholera ................................................................................................................................................................... 1, 21
Chronic lymphocytic leukemia ................................................................................................................................... 77, 95
Chronic myelogenous leukemia .................................................................................................................................. 97
Chronic myelogenous Leukemia ................................................................................................................................ 77
CHRONIC MYELOGENOUS LEUKEMIA ................................................................................................................................................................... 365, 366, 391
Chronic otitis media ................................................................................................................................................... 275, 281
Chronic sinusitis ...................................................................................................................................................... 275
CHRONIC SINUSITIS ............................................................................................................................................... 291
Chronic urticaria ......................................................................................................................................................... 224
Clindamycin .............................................................................................................................................................. 133, 183
Clotrimazole ............................................................................................................................................................. 44, 52, 61, 197, 247, 267, 269, 295, 298, 300, 341, 343, 344, 350
Clofazimine .............................................................................................................................................................. 32, 33, 411, 412
Clofazimine .............................................................................................................................................................. 363
Clonazepam ............................................................................................................................................................... 109
Clonazepam ............................................................................................................................................................... 200, 201, 202, 206, 354
Clobetasol propionate ............................................................................................................................................... 181
Clobetasol propionate ............................................................................................................................................... 17
Cimetidine ............................................................................................................................................................... 106, 118, 132, 138, 225, 319, 377
Cimetidine ............................................................................................................................................................... 355
Conjunctivitis ........................................................................................................................................................... 251, 255, 256, 257, 263
Conjunctivitis ........................................................................................................................................................... 291
Constipation .............................................................................................................................................................. 17, 80, 88, 99, 114, 125, 363, 383
Constipation .............................................................................................................................................................. 177, 245, 255, 256
Contraceptives ........................................................................................................................................................... 355
Contraceptives ........................................................................................................................................................... 77, 99, 128
Contraceptives ......................................................................................................................................................... 8, 69, 108, 351, 359
Cromolyn Sodium .................................................................................................................................................... 153, 184
Cromolyn Sodium .................................................................................................................................................... 251
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<td>Dopamine</td>
<td>79, 392, 393, 394</td>
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<td>Drowning</td>
<td>378, 380</td>
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<tr>
<td>Dithranol</td>
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<tr>
<td>Diarrheal disease</td>
<td>144, 147, 296</td>
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<tr>
<td>Digoxin</td>
<td>79, 85, 86, 113, 157</td>
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<tr>
<td>Diabetic ketoacidosis</td>
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<tr>
<td>Diabetes Mellitus</td>
<td>100, 327, 330</td>
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<tr>
<td>Diabetes mellitus</td>
<td>77, 301</td>
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<tr>
<td>Croup (Acute laryngotracheobronchitis)</td>
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<tr>
<td>External genital warts</td>
<td>228, 231</td>
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<tr>
<td>Folinic acid</td>
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<tr>
<td>Folic acid</td>
<td>82, 173, 323</td>
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**D**

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<td>Dacryoadenitis</td>
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<td>Dapsone</td>
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<td>Dexamethasone</td>
<td>41, 62, 148, 180, 252, 253, 259, 265, 319, 333</td>
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<td>Dexamethasone + Tobramycin</td>
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<tr>
<td>Dexamethasone + Gentamicin</td>
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<tr>
<td>Dextromethorphan</td>
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<tr>
<td>Diabetes mellitus</td>
<td>101, 102, 116, 127, 199, 201, 213, 327, 396</td>
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<tr>
<td>Diarrheal disease</td>
<td>15, 21, 148</td>
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<tr>
<td>Diabetic ketoacidosis</td>
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<tr>
<td>Dizepam</td>
<td>59, 83, 128, 278, 307</td>
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<td>Didanosine</td>
<td>6, 17, 10, 124</td>
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<td>Digoxin</td>
<td>79, 85, 86, 113, 157</td>
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<td>Dithranol</td>
<td>221</td>
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<td>Dobutamine</td>
<td>394, 395</td>
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<td>Dopamine</td>
<td>79, 392, 393, 394</td>
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<tr>
<td>Doxycycline</td>
<td>20, 21, 37, 47, 48, 73, 198, 229, 236, 237, 238, 239, 240, 242, 243, 260, 271, 341, 351, 366</td>
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<td>Drowning</td>
<td>378, 380</td>
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<td>Drowning</td>
<td>367, 378</td>
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<td>Dysmenorrhea</td>
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**E**

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<td>Ear</td>
<td>275, 276, 277, 281, 282, 284, 287</td>
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<tr>
<td>Efavirenz</td>
<td>6, 10</td>
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<tr>
<td>Emtricitabine</td>
<td>10</td>
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<tr>
<td>Enalapril</td>
<td>113, 119, 120, 129</td>
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<tr>
<td>Ephedrine + Theophylline</td>
<td>93</td>
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<tr>
<td>Epilepsy</td>
<td>77, 106</td>
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<tr>
<td>Epinephrine</td>
<td>145, 148, 392</td>
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<tr>
<td>Epistaxis</td>
<td>275, 291</td>
</tr>
<tr>
<td>Ergotamine tartrate and caffeine</td>
<td>6, 7, 10, 124</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>196, 212</td>
</tr>
<tr>
<td>External genital warts</td>
<td>228, 231</td>
</tr>
<tr>
<td>External Hordeolum</td>
<td>245, 261</td>
</tr>
<tr>
<td>External Hordeolum (Stye)</td>
<td>245</td>
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</table>

**F**

<table>
<thead>
<tr>
<th>Category</th>
<th>Page Numbers</th>
</tr>
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<tbody>
<tr>
<td>Famciclovir</td>
<td>234, 235</td>
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<td>Famotidine</td>
<td>132</td>
</tr>
<tr>
<td>Ferrous sulphate</td>
<td>80, 323</td>
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<td>Fluconazole</td>
<td>42, 207, 208, 220, 354</td>
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<td>Fluoromethalone</td>
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<td>Fluoxetine</td>
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<tr>
<td>Flurbiprofen</td>
<td>252</td>
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<tr>
<td>Folic acid</td>
<td>82, 173, 323</td>
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<tr>
<td>Folic acid</td>
<td>61</td>
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</table>
Foreign bodies in the ear................................................................. 275, 282
Foreign bodies in the nose................................................................. 275, 293
**Furunclosis**.................................................................................. 196, 213
**Fusidic acid**................................................................................ 376

**G**

Gamabenzene hexachloride....................................................................... 219, 231
Gastroenteritis...................................................................................... 1
Genital candidiasis.............................................................................. 196
**Genital Candidiasis**...................................................................... 202
Genital herpes.................................................................................... 228, 234
**Gentian violet**.............................................................................. 201, 203
**Gigli 2**.......................................................................................... 100
**Gonorrea**...................................................................................... 228, 241
**Gout**............................................................................................. 96, 110
**Gout**............................................................................................. 77, 110, 111
Granuloma inguinale.......................................................................... 228, 236
Griseofulvin........................................................................................ 192, 207, 208

**H**

heart failure...................................................................................... 54, 60, 78, 85, 111, 112, 117, 129, 156, 157, 333
Heart failure...................................................................................... 111, 144, 155
**Heart Failure**.................................................................................. 112, 113
**hemorrhoids**.............................................................................. 114
**Hemorrhoids**.............................................................................. 77, 114
**Hepatitis**..................................................................................... 129, 326, 344
**Herpes simplex**......................................................................... 234, 243, 249, 268, 319, 406
**Herpes simplex**......................................................................... 3, 196, 214
**Herpes zoster**............................................................................. 3, 196, 215, 275, 286, 405
HIV/ AIDS in Children..................................................................... 144
**HIV/ AIDS IN CHILDREN**.......................................................... 157
**Hormonal contraceptives**............................................................. 355
Hydrochlorothiazide......................................................................... 118, 157
Hydrocortisone................................................................................ 91, 92, 258, 259, 262, 263, 265, 297, 392, 393, 394
Hydron poroxide................................................................................ 77, 216, 349
Hydroxyurea.................................................................................... 98
**Hypertension**............................................................................. 77, 115, 116, 277, 302, 305
**hypoglycemia**.......................................................................... 29, 35, 60, 101, 102, 184, 329, 330, 338, 380, 381
**Hypoglycemia**.......................................................................... 189, 367, 381

**I**

Ibuprofen............................................................................................ 124, 131, 138, 185, 318, 361
Idiopathic facial paralysis................................................................. 275, 283
Imipramine....................................................................................... 126
Imiquimod....................................................................................... 232
**Immune thrombocytopenic purpura**............................................. 77
**IMMUNE THROMBOCYTOPENIC PURPURA**................................. 121
Impetigo.......................................................................................... 196, 216
Indinavir/Ritonavir........................................................................... 6
Indomethacin................................................................................... 110, 138, 318, 361
Lynestrenol............................................................................................................................................................................ 356
lopinavir/ritonavir................................................................................................................................................................. 163
measles ........................................................................................................................................... 177, 194, 272, 273, 274
Lidocaine ........................................................................................................................................................................ 86, 312
Liquid paraffin ............................................................................................................................................................ 100, 211
Lindane ............................................................................................................................................................... 219, 223, 231
Levofloxacin ............................................................................................................................................. 230, 241, 243, 352
Levonorgesterol.......................................................................................................................................................... 355, 356
Leprosy ............................................................................................................................................................... 1, 30, 31, 413
Iron dextran ............................................................................................................................................................................. 81
Ipecac .......................................................................................................................................................................... 383, 389
Iodine ..................................................................................................................................................................................... 218
IUD ............................................................................................................................................................. 351, 357, 358, 366

J

Jaundice in neonates........................................................................................................................................................... 165
JAUNDICE IN NEONATES .................................................................................................................................................. 144

K

Ketoconazole.......................................................................................................................................................................... 181, 206, 207, 208, 220
Ketorolac.................................................................................................................................................................................. 252

L

Labetolol................................................................................................................................................................................. 60, 306
Lactulose................................................................................................................................................................................. 135
Lamivudine................................................................................................................................................................................ 6, 10
Leishmaniasis........................................................................................................................................................................... 1, 3, 28, 29, 30
Leptosy .............................................................................................................................................................................. 1, 30, 31, 413
Levofoxacin............................................................................................................................................................................ 230, 241, 243, 352
Levonorgesterol................................................................................................................................................................... 355, 356
Lichen simplex chronicus........................................................................................................................................................... 196
Lidocaine ................................................................................................................................................................................... 86, 312
Lidocaine + aluminium acetate + zinc oxide + hydrocortisone acetate.................................................................................. 219, 223, 231
Lindane................................................................................................................................................................................ 290
Liquid paraffin...................................................................................................................................................................... 100, 211
Lodoxamide ......................................................................................................................................................................... 251
lopinavir/ritonavir................................................................. 144, 167
Loratadine.............................................................................................................................................................................. 225, 290
lung abscess........................................................................................................................................................................... 51
Lung abscess........................................................................................................................................................................... 51
Lymphphgranuloma venereum ............................................................... 228, 237
Lynestrenol........................................................................................................................................................................... 356

M

Magnesium Hydroxide + Aluminum Hydroxide................................................................................................................. 105
Magnesium Sulphate.............................................................................................................................................................. 99
Magnesium trisilicate+Aluminum hydroxide........................................................................................................................ 377
malaria .................................................................................................................................................................................. 34, 35, 53, 322, 323, 335, 338, 339
Malaria ................................................................................................................................................................................ 1, 34, 173, 301, 338
Maiathion................................................................................................................................................................................ 219, 223
malnutrition............................................................................................................................................................................ 24, 79, 148, 149, 164, 169, 212, 405
Malnutrition............................................................................................................................................................................ 144, 167
mastoiditis ............................................................................................................................................................................... 276, 284
Mastoiditis............................................................................................................................................................................. 284
measles ................................................................................................................................................................................... 177, 194, 272, 273, 274
<table>
<thead>
<tr>
<th>Condition</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mupirocin</td>
<td>216</td>
</tr>
<tr>
<td>Morphine</td>
<td>78, 128, 312, 373, 377</td>
</tr>
<tr>
<td>Mood disorders</td>
<td>77, 125</td>
</tr>
<tr>
<td>Molluscum Contagiosum</td>
<td>217, 245</td>
</tr>
<tr>
<td>Molluscum contagiosum</td>
<td>217, 405</td>
</tr>
<tr>
<td>Mumps</td>
<td>275, 299</td>
</tr>
<tr>
<td>Migraine</td>
<td>77, 122, 354</td>
</tr>
<tr>
<td>Migraine, Molluscum contagiosum</td>
<td>77, 122, 355</td>
</tr>
<tr>
<td>Molluscum Contagiosum</td>
<td>217, 245</td>
</tr>
<tr>
<td>Mometasone</td>
<td>210</td>
</tr>
<tr>
<td>Mood disorders</td>
<td>77, 125</td>
</tr>
<tr>
<td>Morphine</td>
<td>78, 128, 312, 373, 377</td>
</tr>
<tr>
<td>Mucopurulent cervicitis</td>
<td>351</td>
</tr>
<tr>
<td>Mumps</td>
<td>248, 249, 299</td>
</tr>
<tr>
<td>Mumps</td>
<td>275, 299</td>
</tr>
<tr>
<td>Mupirocin</td>
<td>216</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>77, 127</td>
</tr>
</tbody>
</table>

**$N$**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nafcilin</td>
<td>191, 267</td>
</tr>
<tr>
<td>Nalidixic acid</td>
<td>154</td>
</tr>
<tr>
<td>Nafcilin + Antazoline</td>
<td>250</td>
</tr>
<tr>
<td>Nafcilin + Phenylephrine</td>
<td>251</td>
</tr>
<tr>
<td>Nafcilin + Phenylephrine + Neosynephrine + Neomycin + Phenylephrine</td>
<td>14, 25, 29, 123, 131, 309, 317, 328, 377, 386</td>
</tr>
<tr>
<td>Nafcilin + Phenylephrine + Neosynephrine + Neomycin + Phenylephrine</td>
<td>301, 308, 357</td>
</tr>
<tr>
<td>Neosynephrine</td>
<td>6, 10, 163</td>
</tr>
<tr>
<td>Neosynephrine</td>
<td>134, 135</td>
</tr>
<tr>
<td>Neosynephrine</td>
<td>238, 239</td>
</tr>
<tr>
<td>Neosynephrine</td>
<td>6, 10, 163</td>
</tr>
<tr>
<td>Niclosamide</td>
<td>27</td>
</tr>
<tr>
<td>Niclosamide</td>
<td>118, 120, 306</td>
</tr>
<tr>
<td>non-gonococcal urethritis</td>
<td>237</td>
</tr>
<tr>
<td>Non-gonococcal urethritis</td>
<td>228</td>
</tr>
<tr>
<td>Nonspecific inflammation of the external</td>
<td>275</td>
</tr>
<tr>
<td>Norethisterone</td>
<td>360</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>74, 242</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>103</td>
</tr>
<tr>
<td>Nucleoside Reverse Transcriptase</td>
<td>4</td>
</tr>
</tbody>
</table>

**$O$**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oflaxacin</td>
<td>230, 352</td>
</tr>
<tr>
<td>Oflaxacin</td>
<td>251</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>132, 133, 377</td>
</tr>
<tr>
<td>Oncocerciasis</td>
<td>1</td>
</tr>
<tr>
<td>Oncocerciasis</td>
<td>356, 42</td>
</tr>
<tr>
<td>Ophthalmic Zoster (Herpes Zoster Ophthalmicus)</td>
<td>245</td>
</tr>
<tr>
<td>oral candidiasis</td>
<td>164, 406</td>
</tr>
<tr>
<td>Oral candidiasis</td>
<td>3, 196, 202</td>
</tr>
<tr>
<td>Oral thrush</td>
<td>144, 160</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>77, 130</td>
</tr>
</tbody>
</table>

461
<table>
<thead>
<tr>
<th>Drug</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psoriasis</td>
<td>196, 221, 279</td>
</tr>
<tr>
<td>Propranolol</td>
<td>60, 84, 86, 87, 121, 125, 143, 325, 333</td>
</tr>
<tr>
<td>Promethazine</td>
<td>43, 279, 310, 393</td>
</tr>
<tr>
<td>Propylthiouracil</td>
<td></td>
</tr>
<tr>
<td>Procainamide</td>
<td>87</td>
</tr>
<tr>
<td>Probenecid</td>
<td>111, 240</td>
</tr>
<tr>
<td>Praziquantel</td>
<td>27, 55</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>91, 92, 93, 94, 95, 97, 111, 122, 136, 148, 199, 252, 287, 297, 298</td>
</tr>
<tr>
<td>Premature rupture of membranes</td>
<td></td>
</tr>
<tr>
<td>Primidone</td>
<td>36, 37, 45</td>
</tr>
<tr>
<td>Probenecid</td>
<td>111, 240</td>
</tr>
<tr>
<td>Propranolol</td>
<td>60, 84, 86, 87, 121, 125, 143, 325, 333</td>
</tr>
<tr>
<td>Propylthiouracil</td>
<td>142, 332, 333</td>
</tr>
<tr>
<td>Protease Inhibitors</td>
<td>4, 6, 69</td>
</tr>
<tr>
<td>Psoriasis</td>
<td>196, 221, 279</td>
</tr>
<tr>
<td>Pyrantel</td>
<td>25, 26</td>
</tr>
<tr>
<td>Pyrimethamine</td>
<td>52</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>1, 19, 144</td>
</tr>
<tr>
<td>Otitis media</td>
<td>180, 276</td>
</tr>
<tr>
<td>Oxazepam</td>
<td>83</td>
</tr>
<tr>
<td>Oxymethazoline</td>
<td>250</td>
</tr>
<tr>
<td>Oxytetracycline+Polymixin B+Hydrocortisone</td>
<td>265</td>
</tr>
<tr>
<td>oxytocin</td>
<td>316, 321, 322, 358</td>
</tr>
<tr>
<td>Papular urticaria</td>
<td>196</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>265</td>
</tr>
<tr>
<td>Pediculosis corporis and capitis</td>
<td>196</td>
</tr>
<tr>
<td>Pediculosis pubis</td>
<td>219</td>
</tr>
<tr>
<td>Penicillln</td>
<td>18, 38, 40, 57, 137, 180, 190, 192, 204, 212, 240, 256, 287, 295</td>
</tr>
<tr>
<td>Pentamidine</td>
<td>29, 45, 184</td>
</tr>
<tr>
<td>Peric ulcer</td>
<td>33, 77</td>
</tr>
<tr>
<td>Peritonsillar Abscess</td>
<td>295</td>
</tr>
<tr>
<td>Perleche</td>
<td>200</td>
</tr>
<tr>
<td>Permethrin</td>
<td>219, 223, 230</td>
</tr>
<tr>
<td>Pertusis</td>
<td>144, 182</td>
</tr>
<tr>
<td>Pesticides</td>
<td>367</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>107, 189, 307, 380</td>
</tr>
<tr>
<td>Piperazine</td>
<td>25, 26</td>
</tr>
<tr>
<td>Pityriasis versicolor</td>
<td>196</td>
</tr>
<tr>
<td>Pityriasis Versicolor</td>
<td>220</td>
</tr>
<tr>
<td>Pneumocystis carinii pneumonia</td>
<td>3, 144, 406</td>
</tr>
<tr>
<td>pneumonia...12, 25, 38, 39, 44, 46, 47, 51, 154, 155, 160, 172, 177, 178, 183, 184, 185, 189, 272, 384, 406</td>
<td></td>
</tr>
<tr>
<td>Pneumonia...1, 46, 47, 48, 49, 144, 184, 185, 186</td>
<td></td>
</tr>
<tr>
<td>Pneumonia in children</td>
<td>144</td>
</tr>
<tr>
<td>Podofolex</td>
<td>232</td>
</tr>
<tr>
<td>Podophyllin resin</td>
<td>231</td>
</tr>
<tr>
<td>Potassium chloride</td>
<td>113</td>
</tr>
<tr>
<td>Praziquantel</td>
<td>27, 55</td>
</tr>
<tr>
<td>Premature rupture of membranes</td>
<td>313</td>
</tr>
<tr>
<td>Primaquine</td>
<td>36, 37, 45</td>
</tr>
<tr>
<td>Probenecid</td>
<td>111, 240</td>
</tr>
<tr>
<td>Propranolol</td>
<td>60, 84, 86, 87, 121, 125, 143, 325, 333</td>
</tr>
<tr>
<td>Propranolol</td>
<td>142, 332, 333</td>
</tr>
<tr>
<td>Protease Inhibitors</td>
<td>4, 6, 69</td>
</tr>
<tr>
<td>Psoriasis</td>
<td>196, 221, 279</td>
</tr>
<tr>
<td>Pyrantel</td>
<td>25, 26</td>
</tr>
<tr>
<td>Pyrimethamine</td>
<td>52</td>
</tr>
<tr>
<td>Quinine</td>
<td>34, 35, 36</td>
</tr>
<tr>
<td>Radioactive iodine</td>
<td>142, 143, 332</td>
</tr>
<tr>
<td>Relapsing fever</td>
<td>53, 72</td>
</tr>
<tr>
<td>Relapsing fever</td>
<td>53</td>
</tr>
<tr>
<td>Retinoic Acid</td>
<td>218</td>
</tr>
</tbody>
</table>

**Q**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinine</td>
<td>34, 35, 36</td>
</tr>
</tbody>
</table>

**R**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactive iodine</td>
<td>142, 143, 332</td>
</tr>
<tr>
<td>relapsing fever</td>
<td>53, 72</td>
</tr>
<tr>
<td>Relapsing fever</td>
<td>53</td>
</tr>
<tr>
<td>Retinoic Acid</td>
<td>218</td>
</tr>
<tr>
<td>Condition</td>
<td>Pages</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Syphilis</td>
<td>228, 238, 301, 348</td>
</tr>
<tr>
<td>Sulfadoxin pyrimethamine</td>
<td>61, 339</td>
</tr>
<tr>
<td>Trachoma</td>
<td>270, 272</td>
</tr>
<tr>
<td>Subacute bacterial endocarditis</td>
<td>56, 144</td>
</tr>
<tr>
<td>Stroke</td>
<td>367, 395, 396, 397</td>
</tr>
<tr>
<td>Sialadenitis of the parotid and submandibular glands</td>
<td>275, 299, 300</td>
</tr>
<tr>
<td>Silver nitrate</td>
<td>218, 292</td>
</tr>
<tr>
<td>Sialadenitis</td>
<td>275, 299, 300</td>
</tr>
<tr>
<td>Sodum stibogluconate</td>
<td>205</td>
</tr>
<tr>
<td>Sodium valproate</td>
<td>109</td>
</tr>
<tr>
<td>Sodum stibogluconate</td>
<td>205</td>
</tr>
<tr>
<td>Spectinomycin</td>
<td>242</td>
</tr>
<tr>
<td>Squamous cells</td>
<td>313</td>
</tr>
<tr>
<td>Stavudine</td>
<td>6, 10, 163</td>
</tr>
<tr>
<td>Stroke</td>
<td>395, 396, 397</td>
</tr>
<tr>
<td>Subacut bacterial endocarditis</td>
<td>56</td>
</tr>
<tr>
<td>Subacute Bacterial Endocarditis</td>
<td>56</td>
</tr>
<tr>
<td>Sulfadiazine</td>
<td>60, 137</td>
</tr>
<tr>
<td>Sulfadoxin pyrimethamine</td>
<td>61, 339</td>
</tr>
<tr>
<td>Sulfamethoxazole+trimethoprim</td>
<td>16, 19, 22, 23, 72, 74, 236, 268, 271, 276, 279, 289</td>
</tr>
<tr>
<td>Sulphur</td>
<td>223</td>
</tr>
<tr>
<td>Suxamethonium</td>
<td>252</td>
</tr>
<tr>
<td>Syphilis</td>
<td>233, 234, 238, 239, 335, 348, 349</td>
</tr>
<tr>
<td>Syphilis</td>
<td>228, 238, 301, 348</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal bone fracture</td>
<td>275, 287</td>
</tr>
<tr>
<td>Tenofovir</td>
<td>1, 50</td>
</tr>
<tr>
<td>Tetanus</td>
<td>191, 369</td>
</tr>
<tr>
<td>Tetanus</td>
<td>1, 58, 59, 144, 192, 369, 373, 377</td>
</tr>
<tr>
<td>Tetanus (Neonatal)</td>
<td>144</td>
</tr>
<tr>
<td>TETANUS (Neonatal)</td>
<td>191</td>
</tr>
<tr>
<td>Thiamine pyrimethamine</td>
<td>26</td>
</tr>
<tr>
<td>Thyrotoxicosis</td>
<td>77, 142</td>
</tr>
<tr>
<td>Thioctic acid</td>
<td>144, 207</td>
</tr>
<tr>
<td>Tinidazole</td>
<td>15, 24, 353</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>255</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>1, 3, 60</td>
</tr>
<tr>
<td>Trachoma</td>
<td>270, 272</td>
</tr>
<tr>
<td>Trachoma</td>
<td>245, 270</td>
</tr>
</tbody>
</table>

463
Tretinoin ................................................................................................................................................................................ 218
Triamcinolone acetonide ........................................................................................................................................................ 199, 210
Trichomonal vaginitis ............................................................................................................................................................. 352
Trimethoprim ......................................................................................................................................................................... 20, 44, 45, 46, 184, 186
Tuberculosis ........................................................................................................................................................................... 3, 8, 51, 62, 67, 163, 193, 194, 406
Typhoid fever ........................................................................................................................................................................ 53
Typhoid Fever ........................................................................................................................................................................... 1
Typhus ..................................................................................................................................................................................... 53, 54

U

Urinary tract infection ............................................................................................................................................................ 301, 346

V

Valacyclovir ............................................................................................................................................................................... 234, 235
Vancomycin ............................................................................................................................................................................. 40, 50, 57, 58, 266, 269
Verapamil .............................................................................................................................................................................. 84, 86, 87
Verruca vulgaris ...................................................................................................................................................................... 196
Verruca vulgaris ...................................................................................................................................................................... 226
Vitamin A ................................................................................................................................................................................... 153, 173, 178, 245, 272, 273
Vitamin A deficiency .............................................................................................................................................................. 272
Vitamin B12 ............................................................................................................................................................................... 82
Vulvo vaginal candidiasis ......................................................................................................................................................... 3, 301

W

Warfarin ................................................................................................................................................................................... 129, 327

X

Xylomethazoline .................................................................................................................................................................... 288

Z

Zidovudine ................................................................................................................................................................................ 6, 10, 162