POCKET BOOK
OF
Hospital care for mothers
GUIDELINES FOR MANAGEMENT OF COMMON MATERNAL CONDITIONS

World Health Organization
Regional Office for South-East Asia
Foreword

There has been a significant decline in maternal mortality in Member States of the WHO South-East Asia Region over the past two decades. In comparison with 1990, there were 149,000 fewer maternal deaths in 2015 — an unprecedented feat in maternal survival in the history of the Region. Despite this sharp reduction by 69 per cent, maternal mortality continues to be high in many Member States.

To accelerate further reductions in maternal mortality, ‘Ending preventable maternal, newborn and child deaths with focus on neonatal deaths’ in 2014 was declared one of the eight Flagship Priorities for the WHO South-East Asia Region.

The *Pocket Book of Hospital Care for Mothers: Guidelines for Management of Common Maternal Conditions*, brought out by the World Health Organization’s Regional Office for South-East Asia, is a first-of-its-kind compilation of updated WHO guidelines for the treatment recommendations, management of pregnancy and common pregnancy-related or associated complications and diseases at the first referral-level hospitals. It presents relevant, up-to-date, evidence-based clinical guidelines that can be used by clinicians in their daily work in hospitals. An expert group at the regional level was convened to review available updated WHO guidelines on maternal and newborn health for compilation of this Pocket Book.

The guidelines focus on outpatient and inpatient management of normal pregnancy, labour and the postpartum period along with maternal morbidities associated with or
aggravated during pregnancy such as gestational diabetes, hypertension, anaemia, heart disease and mal-presentations as well as emergency conditions. Most of these conditions are responsible for maternal and neonatal morbidity and mortality. The book also covers information on essential medicines that can be used in hospitals along with essential newborn care, and appropriate supportive care of common neonatal problems.

This Pocket Book is an effort to provide information in our Region for optimizing the quality of care during pregnancy, delivery and the postnatal period. It is presented in a user-friendly format as a ready reckoner for use by doctors, nurses and midwives for ease of consultation on a daily basis. The commitment of our providers goes a long way in achieving the target of maternal and newborn mortality reduction that is envisaged in the Sustainable Development Goals and the Global Strategy for Women’s, Children’s and Adolescents’ Health for 2016–2030.

I am sure that Member States will find this Pocket Book on Hospital Care for Mothers: Guidelines for Management of Common Maternal Conditions useful for application in their own settings.

Dr. Poonam Khetrapal Singh
Regional Director
WHO South-East Asia Region
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**Regional Expert Group**

**Bangladesh:** Professor Saria Tasnim, Institute of Child and Mother Health (ICMH), Dhaka.

**India:** Dr Vinita Das, King George Medical University, Lucknow; Dr Pratima Mittal, Safdarjung Hospital, New Delhi; Dr Manju Vatsa; Dr A. K. Deorari and Dr Neeta Singh, All India Institute of Medical Sciences, New Delhi; Dr Lakhbir Dhaliwal, Post-Graduate Institute of Medical Education and Research (PGIMER), Chandigarh; Dr Poonam Shivkumar, Mahatma Gandhi Institute of Medical Sciences, Wardha; Dr Himanshu Bhushan, Ministry of Health and Family Welfare, New Delhi; Dr Sunita Dhamija, Johns Hopkins Program for International Education in Gynaecology and Obstetrics (Jhpiego), India.

**Indonesia:** Dr Dwiana Ocviyanti, University of Indonesia, Jakarta.

**Nepal:** Dr Kiran Regmi, Family Health Bureau, Kathmandu; Dr Nuzhat Rafique, United Nations Children's Fund, Regional Office for South Asia (ROSA), Kathmandu.
**Sri Lanka:** Dr Hemantha Senanayake, Sri Lanka College of Obstetrics and Gynaecology, Colombo.

**Thailand:** Dr Surasith Chaithongwongwatthana, Faculty of Medicine, Chulalongkom University; Dr Streerut Thadakant, Ramathibodi School of Nursing, Faculty of Medicine, Mahidol University, Bangkok.

Dr Susanne Carai, freelance consultant, Berlin, Germany.

Technical support in the finalization of this Pocket Book was provided by Dr Neena Raina, Dr Rajesh Mehta, Dr Arvind Mathur, Dr Martin Weber, Dr Anoma Jayathilaka and Dr Priya Karna of the WHO Regional Office for South-East Asia, New Delhi, India; Dr Matthews Mathai, WHO Headquarters, Geneva; and Dr Rustini Floranita, WHO Country Office, Jakarta, Indonesia.
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Emergency Conditions in Pregnancy and Labour

1.1 Rapid Assessment and Management
   1.1.1 Triage and rapid initial assessment

1.2 Management of Maternal Emergency Conditions
   1.2.1 Airway and breathing
   1.2.2 Circulation
   1.2.3 Vaginal bleeding
   1.2.4 Convulsions
   1.2.5 Difficulty in breathing

1.3 Fetal distress
1.1 Rapid Assessment and Management (RAM)

Rapid assessment and management should be carried out as soon as a woman of childbearing age presents with a problem in order to rapidly assess her condition and to determine life-threatening illnesses that require immediate actions.

1.1.1 Triage and rapid initial assessment

All women with danger signs (see Table 1.1) should receive emergency treatment accordingly.

Table 1.1. Rapid initial assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Danger Signs</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Airway and breathing (maternal collapse)</td>
<td>• No breathing or stops breathing</td>
<td>• Severe anaemia</td>
</tr>
<tr>
<td></td>
<td>• No pulse palpable</td>
<td>(See 3.2 – page 134)</td>
</tr>
<tr>
<td></td>
<td>• Difficulty in breathing</td>
<td>• Heart failure</td>
</tr>
<tr>
<td></td>
<td>• Cyanosis</td>
<td>(see 1.2.5.1 – page 55)</td>
</tr>
<tr>
<td></td>
<td>• Pallor</td>
<td>• Pneumonia</td>
</tr>
<tr>
<td></td>
<td>• Wheezing or rales</td>
<td>(see 1.2.5.4 – page 57)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Asthma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(see 1.2.5.2 – page 56)</td>
</tr>
<tr>
<td>• Circulation (signs of shock)</td>
<td>• Skin cool and clammy</td>
<td>• Shock</td>
</tr>
<tr>
<td></td>
<td>• Pulse &gt; 110 beats per minute and weak</td>
<td>(see 1.2 – page 10)</td>
</tr>
<tr>
<td></td>
<td>• Systolic blood pressure &lt;90 mmHg.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Respiratory rate &gt; 30 breaths per minute</td>
<td></td>
</tr>
</tbody>
</table>
• Vaginal bleeding (early or late pregnancy or after childbirth)

Ask If:
• Pregnant, length of gestation
• Recently given birth
• Placenta delivered

Examine:
• Vulva: amount of bleeding, placenta retained, obvious tears
• Uterus: atony
• Bladder: full

Do Not perform a Vaginal Exam at this Stage in cases of bleeding in later pregnancy and labour

• Abortion
• Molar pregnancy
• Ectopic pregnancy
Vaginal bleeding in early pregnancy
(see Table 1.3 – page 14)
• Abruptio placentae
• Ruptured uterus
• Placenta praevia
Vaginal bleeding in later pregnancy and labour
(see Table 1.6 – page 29)
• Atonic uterus
• Tears of cervix and vagina
• Retained placenta
• Inverted uterus Vaginal bleeding after childbirth
(see 1.2.3.3.5 – page 47)

• Unconscious or convulsing

Ask If:
• Pregnant, length of gestation

Examine:
• Blood pressure: high (diastolic $\geq 90$mmHg)
• Temperature: $\geq 38^\circ$C

• Eclampsia
• Malaria
• Epilepsy
• Tetanus
• Meningitis or encephalitis Convulsions
(see Table 1.10 – page 50)
Fever

**Ask**
- Weak, lethargic
- Frequent, painful urination

**Examine:**
- Temperature: ≥38°C
- Unconscious
- Neck: stiffness
- Lungs: shallow breathing, consolidation
- Abdomen: severe tenderness
- Vulva: purulent discharge
- Breasts: tender

Urinary tract infection
- Malaria
  - Fever during pregnancy (see 3.7.1 – page 160)
- Metritis
- Pelvic abscess
- Peritonitis
- Breast infection
  - Fever after childbirth (see 5.1 – page 238)
- Complications of abortion
  - (see Table 1.4 – page 23)
- Pneumonia
  - (see 1.2.5.4 – page 57)

*Auscultate fetal heart sound for pregnant women with gestation >28 weeks*

**Priority Signs:**

Pregnant women also need prompt attention, if they have any of the following signs:

- Blood stained mucus discharge with palpable contractions.
- Ruptured membranes
- Severe pallor
- Weakness
- Fainting
- Severe headaches
- Blurred vision
- Vomiting
- Fever
- Respiratory distress
These women need prompt assessment (no waiting in the queue) to determine what further treatment is needed. Move the woman with any priority sign to the front of the queue and to be assessed next.

1.2 Management of Maternal Emergency Conditions

1.2.1 Airway and breathing

Maternal collapse

Maternal collapse is defined as an acute event involving the cardiorespiratory systems and/or brain, resulting in a reduced or absent conscious level (and potentially death), at any stage in pregnancy and up to 6 weeks after delivery.

Maternal collapse is a rare but life-threatening event, which can have many reasons. The outcome for mother and fetus depends on prompt and effective resuscitation.

Management

- Prop up the woman on her left side if she is at a gestational age of >20 weeks (with uterus above the umbilicus).
- If available beds cannot be inclined 15°-30°, push the uterus to the left side manually or with a rolled blanket/pillow under the right hip and lumbar area.
- Tilt the woman’s head, keep it tilted and lift chin to open airway.
- Inspect mouth and remove foreign body if present and easily visible.
- Check the airway by looking for chest movements, listening for breath sounds and feeling for breath.

Figure 1.1: Left tilt
If the woman breathes normally, maintain position and give 2-4 L/min of oxygen by nasal cannula. Continue monitoring to ensure that she keeps breathing normally.

If the woman does not breathe or breathes abnormally, check the carotid artery pulse quickly (no more than 10 seconds).

If the pulse is palpable, ventilate with bag and mask or by mouth once every 5-6 seconds. Ensure that the chest rises visibly. Check the carotid pulse every 2 minutes.

If no pulse is palpable, perform cardiopulmonary resuscitation immediately. Chest compressions and ventilation are provided in a ratio of 30:2.

Chest compressions are performed just above the mid-sternum. Compression is carried out quickly and steadily, thrusting the sternum as deep as 5-6 cm at a rate of 100-120/ min.
After 30 compressions, re-open the air way and ventilate twice.

Then continue chest compression and ventilation at a ratio of 30:2.

Insert an intravenous cannula (two lines, if possible) using a large-sized needle (no. 16 or 18 gauge or the largest size available) and give fluids.

If woman responds and regains consciousness AND starts breathing normally, continue to:

- Give oxygen 2-4 L/min via nasal cannula
- Give fluids
- Continue monitoring respiratory rate and other vital signs.

Frequent causes of maternal collapse are:

- Severe bleeding (most frequent)
- Thromboembolic disease
- Heart disease
- Sepsis
- Drug toxicity (e.g., magnesium sulfate, local anaesthetic drugs)
- Eclampsia
- Intracranial haemorrhage
- Anaphylaxis
- Metabolic disorder (e.g., hypoglycemia)
- Dyselectrolytemia
- Hypoxia due to impaired airway and/or pulmonary disease

- Ultrasound examination is instrumental in detecting an intra-abdominal haemorrhage that caused the collapse
- Treat the causes of collapse or refer

1.2.2 Circulation

Signs of shock

Shock is characterized by failure of the circulatory system to maintain adequate perfusion of the vital organs. Shock is a life-threatening condition that requires immediate and intensive treatment.

Suspect or anticipate shock if any of the following conditions is present:

- Bleeding in early pregnancy
- Bleeding in late pregnancy or labour
- Postpartum haemorrhage
- Severe infection (e.g., unsafe or septic abortion, amnionitis, metritis)
- Trauma

Diagnosis

- Fast, weak pulse: >110 /min
- Low blood pressure: systolic <90 mmHg
Other symptoms

- Pallor
- Sweatiness or cold clammy skin
- Rapid breathing: respiration rate of > 30 breaths/min
- Anxiousness, confusion or unconsciousness
- Scanty urine output: <30ml/h

Immediate management

- Shout for help. Urgently mobilize all available personnel.
- Monitor vital signs (pulse, blood pressure, respiration, temperature).
- Make sure that the airway is not obstructed.
- Give oxygen at 6-8L per minute by mask or nasal cannulae.
- Tilt woman to the left side (15°-30°).
- Keep the woman warm (without overheating her).
- Start an IV infusion (two, if possible) using a large-bore (16-gauge or largest available) cannula or needle. Collect blood for estimation of haemoglobin, blood grouping, immediate cross-matching and bedside clotting test, just before infusion of fluids.
- Rapidly infuse IV fluids (0.9% NS or Ringer’s lactate) initially at a rate of 1 L in 15-20 minutes.
- Give at least 2 L of these fluids in the first hour.

Note: A more rapid rate of infusion is required in the management of shock resulting from bleeding. Aim to replace two to three times the estimated fluid loss.

- Continue to monitor vital signs (every 15 minutes) and blood loss.
- Catheterize the bladder and monitor urine output and fluid intake.
Determining and managing the cause of shock

- Determine the cause of shock after the woman is stabilized (see table 1.2), and manage the cause of shock.

Reassessment

- Reassess the woman’s response to fluids within 30 minutes to determine if her condition is improving. Signs of improvement include:
  - Stabilizing pulse: rate of 90 per minute or less
  - Increasing blood pressure: systolic of 100 mmHg or more
  - Improving mental status: less confusion or anxiety
  - Increasing urine output: 30 ml per hour or more

- If the woman’s condition improves adjust rate of infusion of IV fluids to 1 L in 6 hours.

- Continue management for the underlying causes of shock.

- Monitor fluid balance and avoid over hydrating. If the woman starts having shortness of breath and/or swollen limbs, lower infusion rate to 0.5ml/min (8-10 macro-drops/min).

- Consider referral as appropriate.

Table 1.2. Causes of shock

<table>
<thead>
<tr>
<th>Type of Shock</th>
<th>Pathophysiological Mechanism</th>
<th>Cause</th>
<th>Clinical signs</th>
<th>Response to Fluid Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemic</td>
<td>Reduced intravascular blood volume</td>
<td>Bleeding/ Haemorrhagic shock (see 1.2.2.1)</td>
<td>Cold limbs</td>
<td>Responsive</td>
</tr>
<tr>
<td></td>
<td>Decreased blood pressure</td>
<td>Vomiting</td>
<td>Decreased urinary production</td>
<td></td>
</tr>
</tbody>
</table>

(see table 1.2)
<table>
<thead>
<tr>
<th>Category</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiogenic</td>
<td>• Tachycardia and vasoconstriction (compensatory response)</td>
</tr>
<tr>
<td></td>
<td>• Reduced blood volume due to defective cardiac function</td>
</tr>
<tr>
<td></td>
<td>• Decreased blood pressure</td>
</tr>
<tr>
<td></td>
<td>• Tachycardia and vasoconstriction</td>
</tr>
<tr>
<td></td>
<td>• Ischemic heart disease</td>
</tr>
<tr>
<td></td>
<td>• Severe arrhythmia</td>
</tr>
<tr>
<td></td>
<td>• Valvular heart disease</td>
</tr>
<tr>
<td></td>
<td>• Cold limbs</td>
</tr>
<tr>
<td></td>
<td>• Decreased urinary production</td>
</tr>
<tr>
<td></td>
<td>• Unresponsive or deteriorating</td>
</tr>
<tr>
<td>Distributive</td>
<td>• Dilation of peripheral blood vessels</td>
</tr>
<tr>
<td></td>
<td>• Septic shock (see 1.2.2.2)</td>
</tr>
<tr>
<td></td>
<td>• Anaphylactic shock (see 1.2.2.3)</td>
</tr>
<tr>
<td></td>
<td>• Neurogenic shock</td>
</tr>
<tr>
<td></td>
<td>• Warm limbs</td>
</tr>
<tr>
<td></td>
<td>• Decreased urine production</td>
</tr>
<tr>
<td></td>
<td>• Responsive</td>
</tr>
<tr>
<td>Obstructive</td>
<td>• Reduced blood volume pumped by the heart due to obstruction</td>
</tr>
<tr>
<td></td>
<td>• Cardiac tamponade</td>
</tr>
<tr>
<td></td>
<td>• Pneumothorax</td>
</tr>
<tr>
<td></td>
<td>• Decreased blood pressure</td>
</tr>
<tr>
<td></td>
<td>• High jugular venous pressure</td>
</tr>
<tr>
<td></td>
<td>• Responsive or unresponsive</td>
</tr>
</tbody>
</table>
1.2.2.1 Haemorrhagic shock

Specific Management

If heavy bleeding is suspected as the cause of shock:

- Take steps to stop bleeding (e.g., oxytocics, uterine massage, bimanual compression, aortic compression, preparations for surgical intervention).
- Transfuse as soon as possible to replace blood loss.
- Determine the cause of bleeding and manage accordingly:
  - If bleeding occurs during the first 22 weeks of pregnancy, suspect abortion, ectopic or molar pregnancy (see 1.2.3.1.2).
  - If bleeding occurs after 22 weeks or during labour but before delivery, suspect placenta praevia, abruptio placentae or ruptured uterus (see 1.2.3.2.).
  - If bleeding occurs after childbirth (postpartum haemorrhage), suspect ruptured uterus, uterine atony, tears of the genital tract, retained placenta or placental fragments (see 1.2.3.3.).

1.2.2.2 Septic shock

Specific Management

If infection is suspected as the cause of shock:

- Collect appropriate samples (blood, urine, pus) for microbial cultures before starting antibiotic therapy, if the facility is available.
- Give the woman a combination of antibiotics to cover aerobic and anaerobic infections and continue until she is fever-free for 48 hours:
  - Penicillin G 2 million units OR ampicillin 2 g IV every 6 hours.
  - PLUS gentamicin 5 mg/kg body weight IV every 24 hours.
  - PLUS metronidazole 500 mg IV every 8 hours.
Note: Do not give antibiotics by mouth to a woman in shock.

- Give 30 ml/kg iv crystalloid fluids within the first 3 hours, if no response consider vasopressors.

### 1.2.2.3 Anaphylactic shock

Anaphylactic shock is an often life-threatening allergic reaction to an antigen and is associated with systemic vasodilation that causes low blood pressure. Common antigens include insect venoms, foods and medications including antibiotics, local anaesthetics, muscle relaxants, nonsteroidal anti-inflammatory drugs (NSAIDs) and radiocontrast agents.

**Specific Management**

- Stop contact with suspected allergen.
- Give adrenaline 1:1000, 0.5 mL IM, repeated every 10 minutes if necessary.
- Give hydrocortisone 100 mg IV.
- Give diphenhydramine 50 mg IM or IV slowly, then 50 mg by mouth every 6 hours (when woman is conscious and stable).
- Severe or recurrent signs may require hydrocortisone 2mg/kg body weight IV every 4 hours until condition improves.

### 1.2.3 Vaginal bleeding

#### 1.2.3.1 Vaginal bleeding in early pregnancy

Vaginal bleeding is a common complication in early pregnancy (less than 22 weeks of gestation) and is often associated with abortion, ectopic pregnancy and molar pregnancy.
General Management

- Perform a rapid assessment of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature).

- If shock is suspected, immediately begin treatment (see 1.2.2). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.

- In case of heavy bleeding (it takes less than 5 minutes for a clean pad or cloth to be soaked), insert an intravenous line and give fluids immediately. In case of light bleeding, take medical history and carry out a physical examination to determine cause of bleeding.

Table 1.3: Differential diagnosis of vaginal bleeding in early pregnancy

<table>
<thead>
<tr>
<th>Probable Diagnosis</th>
<th>Symptoms</th>
<th>Signs</th>
<th>Ultrasound Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened abortion</td>
<td>• Cramping/lower abdominal pain</td>
<td>• Closed cervix</td>
<td>• Live embryo</td>
</tr>
<tr>
<td></td>
<td>• Light bleeding</td>
<td>• Uterus softer than normal and corresponds to dates</td>
<td>• Rarely subchorionic bleed</td>
</tr>
<tr>
<td>Inevitable abortion</td>
<td>• Cramping/lower abdominal pain</td>
<td>• Dilated cervix</td>
<td>• Dilated cervical os</td>
</tr>
<tr>
<td></td>
<td>• Heavy bleeding</td>
<td>• Uterus corresponds to dates</td>
<td>• Sac seen partially extruding into vagina</td>
</tr>
<tr>
<td></td>
<td>• No expulsion of products of conception</td>
<td>• Uterus tender</td>
<td></td>
</tr>
<tr>
<td>Incomplete abortion</td>
<td>• Cramping/lower abdominal pain</td>
<td>• Dilated cervix</td>
<td>• Retained products of conception seen</td>
</tr>
<tr>
<td></td>
<td>• Heavy bleeding</td>
<td>• Uterus smaller than dates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial expulsion of products of conception</td>
<td>Light cramping/ lower abdominal pain</td>
<td>Light bleeding</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>Missed abortion</strong></td>
<td>Bleeding may or may not be present</td>
<td>Closed cervix</td>
<td>Uterus smaller than dates</td>
</tr>
<tr>
<td><strong>Molar pregnancy</strong></td>
<td>Cramping/lower abdominal pain</td>
<td>Dilated cervix</td>
<td>Uterus larger than dates</td>
</tr>
</tbody>
</table>
**Ectopic pregnancy**
- Amenorrhoea
- Abdominal pain
- Light bleeding
- Fainting
- Closed cervix
- Uterus softer and slightly larger than normal
- Tender adnexal mass
- Cervical motion tenderness
- Empty uterine cavity
- Adnexal mass
- Free fluid in pelvis

*Heavy bleeding: it takes less than 5 minutes for a clean pad or cloth to be soaked.*

### 1.2.3.1.1 Abortion

**Definition**

Abortion is defined as spontaneous or induced termination of pregnancy before period of viability. National Centre for Health Statistics, Centre for Disease Control and Prevention and WHO define abortion as pregnancy termination before 22 weeks of gestation.

Consider abortion in any woman of reproductive age who has a missed period (delayed menstrual bleeding with more than 1 month having passed since her last menstrual period) and has one or more of the following: bleeding, cramping, partial expulsion of products of conception, dilated cervix or smaller uterus than expected.

**Types of abortion**

- **Spontaneous abortion** is defined as the loss of a pregnancy before fetal viability (22 weeks of gestation). The stages of spontaneous abortion may include:
  - Threatened abortion (pregnancy may continue)
  - Inevitable abortion (pregnancy will not continue and will proceed to incomplete/complete abortion).
- Incomplete abortion (products of conception are partially expelled).
- Complete abortion (products of conception are completely expelled).
- Missed abortion (products of conception not expelled but fetal cardiac activity is absent).

- **Induced abortion** is defined as a process by which pregnancy is terminated before viability.

- **Unsafe abortion** is defined as a procedure performed either by persons lacking necessary skills or in an environment lacking minimal medical standards or both.

- If unsafe abortion is suspected, examine for signs of infection or uterine, vaginal or bowel injury.

- **Septic abortion** is defined as abortion complicated by infection. Sepsis may result from infection if organisms ascend from the lower genital tract following either spontaneous or unsafe abortion. Sepsis is likely to occur if there are retained products of conception and evacuation has been delayed. Sepsis is a frequent complication of unsafe abortion involving instrumentation.

![Figure 1.8 Types of spontaneous abortions](image)
**Threatened abortion**

**Management**

- Medical treatment is usually not necessary.
- Advise the woman to avoid strenuous activity and sexual intercourse, but bed rest is not necessary.
- If the bleeding stops, follow up in antenatal clinic after 2 weeks. Reassess if bleeding recurs.
- If bleeding persists, assess for fetal viability or ectopic pregnancy (ultrasound).
- Persistent bleeding, particularly in the presence of a uterus larger than expected may indicate twins or molar pregnancy.

**Inevitable abortion**

**Management**

- Counsel the woman and provide emotional support and encouragement.
- **If pregnancy is less than 12–14 weeks**, plan for evacuation of uterine contents by manual vacuum aspiration (MVA). MVA is the preferred method of evacuation. Dilatation and curettage should be used only if manual vacuum aspiration is not available.
  - If evacuation is not immediately possible:
    - Misoprostol 400 mcg orally (repeated once after 4 hours if necessary).
    - Arrange for evacuation of uterine contents as soon as possible.
- **If pregnancy is greater than 12-14 weeks**
  - Await spontaneous expulsion of products of conception and then evacuate the uterus to remove any remaining products of conception.
  - Ensure monitoring and follow-up of the woman after treatment.
If necessary, infuse oxytocin 40 units in 1L IV fluid at 40 drops per minute to help achieve expulsion of products of conception.

**Incomplete abortion**

**Management**

- Counsel the woman and provide emotional support and encouragement.
- **Ultrasonography (if available)** — Retained products of conception seen.

**Management options:**

- **Expectant** — especially if size of retained product is less than 15 mm, no evidence of infection or heavy bleeding. Success rate is 94%.

- **Surgical** — Manual Vacuum aspiration (for uterine size of up to 14 weeks gestation) has been used as the method of choice for management of retained products of conception.

- **Medical** — with misoprostol 600μg orally/ 400ug sublingually/ 400-800ug vaginally if vaginal bleeding is minimal, for uterine size up to 14 weeks

**Ensure monitoring and follow-up:**

- Antibiotic prophylaxis may be given based on individual clinical indication. "All women having surgical abortion, regardless of their risk of pelvic inflammatory infection, should receive appropriate prophylactic antibiotics pre- or peri-operatively. For women having medical abortion, routine use of prophylactic antibiotics is not recommended."

**Complete abortion**

**Ultrasonography (if available)** — empty uterus, thin endometrium

**Management**

- Counsel the woman and provide emotional support and encouragement.
- Evacuation of the uterus is usually not required.
Observe for heavy bleeding.
Follow up after 2 weeks for routine check-up and contraceptive advice.

Missed abortion

In a missed abortion, there is no bleeding and the fetus continues to stay inside the uterus; the woman's cervix stays closed.

On ultrasonography -
- Discrepancy between sonographic dating and period of gestation.
- Absent fetal cardiac pulsations.
- Blighted Ovum.
- Empty sac with lack of fetal pole.

Management

Counsel the woman and provide emotional support and encouragement and explain the risks and benefits of different treatment modalities.

Expectant – no medical or surgical treatment given. Wait for spontaneous expulsion of products of conception.

Success rate is low for missed abortions varying from 14-47%.

Adequate counselling of patient is important regarding further requirement of surgical intervention at later date and process may take several weeks.

If pregnancy is less than 12-14 weeks

- Medical – Misoprostol 800μg vaginally is an effective drug, achieving complete success in around 87% cases.
- Surgical – If patient opts for surgical evacuation.
Plan for evacuation of uterine contents by manual vacuum aspiration (MVA). MVA is the preferred method of evacuation. Dilatation and curettage should be used only if manual vacuum aspiration is not available.

The choice of method depends on the clinical condition of the patient and her preference.

- **If pregnancy is greater than 12 -14 weeks**
  - Induce cervical ripening with a single dose of 400 mcg of misoprostol sublingually or vaginally administered 3 hours prior to evacuation.
  - If necessary, infuse oxytocin 40 units in 1L IV fluids at 40 drops per minute to help achieve expulsion of products of conception.
  - Evacuate the remaining products of conception from the uterus.

**Septic abortion**

- When abortion is associated with infection restricted to uterus or generalized infection.
- May be associated with retained products of conception.
- USG – retained products of conception, free fluid in abdomen or pelvis suggestive of pyoperitoneum may be present.

**Management –**

- Broad spectrum antibiotics should be started.
- Evacuation recommended if there are retained products of conception.
- Laparotomy in case of pyoperitoneum or suspected gut injury.

**Investigations:**

- Haemoglobin
- ABO RH typing
Monitoring and follow-up after abortion

- Ensure monitoring and follow-up of the woman after treatment.
  - Monitor vital signs every 30 minutes for 1-2 hours. Discharge uncomplicated cases after 1-2 hours.
  - Encourage the woman to eat, drink and walk about as she wishes.
  - Anti D immunoglobulin (Rh immunoprophylaxis) to Rh negative mothers, 50 μgm IM if less than 12 weeks of gestation or 300 μgm IM if gestation is more than 12 weeks.
  - For more complicated cases:
    - Continue monitoring vital signs and vaginal bleeding, abdominal pain and urine output every 6 hours for 24 hours.
    - Check haemoglobin levels after 24 hours. If the woman's condition is stable and Hb>8 g/dl, she can be discharged.
  - All women experiencing an abortion should be offered emotional support and post-abortion contraceptive counselling.
  - Advise the woman to watch for symptoms and signs requiring immediate attention:
    - Prolonged cramping (more than a few days)
    - Prolonged bleeding (more than 2 weeks)
    - Bleeding more than normal menstrual bleeding
    - Severe or increased pain
    - Fever, chills or malaise
    - Fainting
  - Follow up after 2 weeks for routine check-up and contraceptive advice.
Molar pregnancy is characterized by an abnormal proliferation of chorionic villi.

**Diagnosis**

- Heavy bleeding occurs during early pregnancy with a uterus larger than dates and softer than normal and a dilated cervix.
- Spontaneous abortion happens with partial expulsion of products of conception, which resemble grapes and without evidence of a fetus.
- Symptoms include nausea and vomiting, lower abdominal pain and can be accompanied by early onset pre-eclampsia.

---

**Table 1.4. Diagnosis and management of complications of abortion**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Symptoms and Signs</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection/Sepsis</td>
<td>• Lower abdominal pain</td>
<td>• Begin antibiotics as soon as possible before attempting manual vaccum aspiration (Give ampicillin 2 g IV every 6 hours PLUS gentamicin 5 mg/kg body weight IV every 24 hours PLUS metronidazole 500 mg IV every 8 hours until the woman is fever-free for 48 hours)</td>
</tr>
<tr>
<td></td>
<td>• Rebound tenderness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tender uterus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prolonged bleeding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Malaise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fever</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Foul-smelling vaginal discharge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Purulent cervical discharge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cervical motion tenderness</td>
<td></td>
</tr>
<tr>
<td>Uterine/Vaginal/Bowel</td>
<td>• Cramping/abdominal pain</td>
<td>• Perform a laparotomy to repair the injury and perform manual vacuum aspiration simultaneously.</td>
</tr>
<tr>
<td>injuries</td>
<td>• Rebound tenderness</td>
<td>• Seek further assistance if required.</td>
</tr>
<tr>
<td></td>
<td>• Abdominal distension</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rigid (tense and hard) abdomen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Shoulder pain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Nausea/vomiting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fever</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Foul-smelling cervical discharge</td>
<td></td>
</tr>
</tbody>
</table>

---

1.2.3.1.2 Molar pregnancy

Molar pregnancy is characterized by an abnormal proliferation of chorionic villi.
Diagnosis of a molar pregnancy should be assisted by ultrasound.

USG in complete molar pregnancy shows fine vesicular or honeycomb or snowstorm appearance along with large theca lutein cysts.

Partial mole is seen as scattered cystic spaces in the placenta along with fetus.

**Investigations**

- Complete blood counts
- Thyroid function test
- Chest X-Ray, beta HCG
- Blood grouping and cross-matching

**Immediate Management**

**Note:** Molar pregnancy should not be managed in a primary health facility, but should be referred to a first-level referral facility.

- If cervical dilation is needed use a paracervical block
  - If cervical dilatation is needed, use a paracervical block.
  - Use vacuum aspiration. Manual vacuum aspiration (MVA) is safer and associated with less blood loss. The risk of perforation using a metal curette is high.
  - Have three syringes cocked and ready for use during the evacuation. The uterine contents are copious and it is important to evacuate them rapidly.
  - Infuse oxytocin 20 units in 1 L IV fluids (NaCl NaCl 0.9% (NS) or Ringer’s lactate) at 60 drops per minute to prevent haemorrhage once evacuation is under way.
  - Anti D immunoglobulin if blood group is Rh negative.
Subsequent management

- Recommend a hormonal family planning method for at least 1 year to prevent pregnancy. Condom has a high failure rate.

- Voluntary tubal ligation may be offered if the woman has completed her family planning.

- Follow up every 8 weeks for at least 1 year with urine pregnancy tests because of the risk of persistent trophoblastic disease or choriocarcinoma.

- If the urine pregnancy test is not negative after 8 weeks or becomes positive again within the first year, urgently refer the woman to a tertiary care centre for further follow-up and management of choriocarcinoma.

1.2.3.1.3 Ectopic pregnancy

An ectopic pregnancy is one in which implantation occurs outside the uterine cavity. The fallopian tube is the most common site of ectopic implantation (greater than 90%).

- Symptoms and signs are extremely variable depending on whether or not the pregnancy has ruptured.

Table 1.5: Symptoms and signs of unruptured and ruptured ectopic pregnancy

<table>
<thead>
<tr>
<th>Unruptured Ectopic Pregnancy</th>
<th>Ruptured Ectopic Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Symptoms of early pregnancy (irregular spotting or bleeding, nausea, breast heaviness, bluish discoloration of vagina and cervix, softening of cervix, slight uterine enlargement, increased urinary frequency)</td>
<td>• Collapse and weakness</td>
</tr>
<tr>
<td>• Abdominal and pelvic pain</td>
<td>• Fast, weak pulse (110 per minute or more)</td>
</tr>
<tr>
<td></td>
<td>• Hypotension</td>
</tr>
<tr>
<td></td>
<td>• Hypovolaemia</td>
</tr>
<tr>
<td></td>
<td>• Acute abdominal and pelvic pain</td>
</tr>
<tr>
<td></td>
<td>• Abdominal distension*</td>
</tr>
<tr>
<td></td>
<td>• Rebound tenderness</td>
</tr>
<tr>
<td></td>
<td>• Pallor</td>
</tr>
</tbody>
</table>

*Distended abdomen with shifting dullness may indicate free blood.
**Differential Diagnosis**

- Threatened abortion (most common)
- Acute or chronic PID
- Ovarian cysts (torsion or rupture)
- Acute appendicitis

If available, ultrasound may help distinguish a threatened abortion or twisted ovarian cyst from an ectopic pregnancy.

**Note:** Ectopic pregnancy cannot be managed in a primary health facility, but has to be referred to a referral facility.

**Diagnosis**

- **Culdocentesis** (cul-de-sac puncture) is an important tool for the diagnosis of ruptured ectopic pregnancy, but is less useful than a urine pregnancy test combined with ultrasonography. If non-clotting blood is obtained, begin immediate management.

- Urine pregnancy test

- Ultrasonography (if available)
  - Empty uterine cavity.
  - Adnexal findings:
    - Extrauterine yolk sac, embryo or fetus (15%).
    - Hyperechoic halo or tubal ring surrounding anechoic sac (20%).
    - Homogenous complex adnexal mass caused by haemorrhage within ectopic mass or ectopic pregnancy that has ruptured into tube (60%).
    - Placental blood flow within periphery of complex adnexal mass — ring of fire which can be picked up on colour doppler if available.
    - Presence of free fluid in the abdomen (Haemoperitoneum).
Treatment

- Triaging is vital in cases of ectopic pregnancy. Perform a rapid assessment of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature).

- If patient is not haemodynamically stable and has signs of shock she should be taken up for surgery immediately.

- In appropriately triaged patients expectant or medical management can be given.

Surgical management

Indications

- Ruptured ectopic
- Family completed
- Patient not willing for medical management

Immediate management

- Cross-match blood and arrange for immediate laparotomy. *(see appendix A.20)*. Do not wait for blood before performing surgery.

- At surgery, inspect both ovaries and fallopian tubes:
  - If there is extensive damage to the tubes, perform salpingectomy (the bleeding tube and the products of conception are removed together). This is the treatment of choice in most cases.
  - Rarely, if there is little tubal damage, perform salpingostomy (the products of conception can be removed and the tube conserved). This should be done only when the conservation of fertility is very important to the woman, as the risk of another ectopic pregnancy is high. If laparotomy or laparoscopy facilities are not available, refer the patient to higher centre.
Subsequent management

- Prior to discharge, provide counselling and advice on prognosis for fertility. Given the increased risk of future ectopic pregnancy, family planning counselling and provision of a family planning method, if desired, is especially important.
- Correct anaemia with ferrous sulfate or ferrous fumarate 60 mg by mouth daily for 6 months.
- Schedule a follow-up visit at 4 weeks.

FOLLOW-UP

- Beta HCG weekly to be monitored in all patients managed medically until it becomes undetectable.
- Early confirmation of intrauterine gestation in next pregnancy as this is an important reminder to centres with basic facilities for a timely referral.

1.2.3.2 Vaginal bleeding in later pregnancy and labour

General Management

- SHOUT FOR HELP. Urgently mobilize all available personnel.
- Perform a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature).
- If shock is suspected, immediately begin treatment (see 1.2.2). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.
- Start an IV infusion and infuse IV fluids.

Note: Do not perform a vaginal examination at this stage.
Table 1.6: Differential diagnosis of vaginal bleeding in later pregnancy and labour

<table>
<thead>
<tr>
<th>Symptom And Signs Typically Present</th>
<th>Symptoms And Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bleeding after 22 weeks gestation</td>
<td>• Shock</td>
<td>• Placenta praevia (see 1.2.3.2.1)</td>
</tr>
<tr>
<td></td>
<td>• Shock may be precipitated by intercourse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relaxed uterus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fetal presentation not in pelvis/ lower uterine pole feels empty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Normal fetal condition</td>
<td></td>
</tr>
<tr>
<td>• Bleeding after 22 weeks gestation (may be retained in the uterus) Intermittent or constant abdominal pain</td>
<td>• Shock</td>
<td>• Abruptio placentaes (see 1.2.3.2.2)</td>
</tr>
<tr>
<td></td>
<td>• Tense/tender uterus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Decreased/absent fetal movements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fetal distress or absent fetal heart</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sounds</td>
<td></td>
</tr>
<tr>
<td>• Bleeding (intra-abdominal and/or vaginal)</td>
<td>• Shock</td>
<td>• Ruptured uterus (see 1.2.3.2.3)</td>
</tr>
<tr>
<td>• Severe abdominal pain (may decrease after rupture)</td>
<td>• Abdominal distension/ free fluid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Abnormal uterine contour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tender abdomen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Easily palpable fetal parts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Absent fetal movements and fetal heart sounds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rapid maternal pulse</td>
<td></td>
</tr>
</tbody>
</table>
1.2.3.2.1 Placenta praevia

Placenta praevia is the implantation of the placenta at or near the cervix.

Figure 1.9 Types of placenta praevia

Management

**Note:** Do not perform a vaginal examination unless preparations have been made for immediate caesarean section (see Appendix A.6). A careful speculum examination may be performed to rule out other causes of bleeding such as cervicitis, trauma, cervical polyps or cervical malignancy. The presence of these, however, does not rule out placenta praevia.

- Restore blood volume by infusing IV fluids (NS or Ringer’s lactate).

- Assess the amount of bleeding:
  - If bleeding is heavy and continuous, arrange for caesarean delivery irrespective of fetal maturity.
  - If bleeding is light or if it has stopped and the fetus is alive but premature, consider expectant management until delivery or heavy bleeding occurs:
    - Keep the woman in the hospital until delivery.
    - Correct anaemia with ferrous sulfate or ferrous fumerate 60 mg by mouth daily for 6 months.
**Note:** Ensure that blood is available for transfusion, if required.

- If bleeding recurs, decide management after weighing benefits and risks for the woman and fetus of further expectant management versus delivery.
- If <34 weeks gestation give corticosteroids for fetal lung maturity.

### Confirming the Diagnosis

- If a reliable ultrasound examination can be performed, localize the placenta. If placenta praevia is confirmed and the fetus is mature, plan delivery.
- If ultrasound is not available or the report is unreliable and the pregnancy is less than 37 weeks, manage as placenta praevia until 37 weeks.
- If ultrasound is not available or the report is unreliable and the pregnancy is 37 weeks or more, examine the woman and be prepared for either vaginal or caesarean delivery, as follows:
  - Have IV lines running and cross-matched blood available.
  - Examine the woman in the operating theatre with the surgical team present.
  - Use a high-level disinfected vaginal speculum to examine the cervix.
- If the cervix is partly dilated and placental tissue is visible (placenta praevia is confirmed), plan caesarean delivery.
- If the cervix is not dilated, cautiously palpate the vaginal fornices:
  - If spongy tissue is felt (placenta praevia is confirmed), plan caesarean delivery.
  - If a firm fetal head is felt (major placenta praevia is ruled out), proceed to deliver by induction.
- If a diagnosis of placenta praevia is still in doubt, perform a cautious digital examination:
If soft tissue is felt within the cervix (placenta praevia is confirmed), plan caesarean delivery (below).

If membranes and fetal parts are felt both centrally and marginally (placenta praevia is ruled out), proceed to deliver by induction.

**Delivery**

- Plan delivery if:
  - The fetus is mature.
  - The fetus is dead or has an anomaly not compatible with life (e.g., anencephaly).
  - The woman’s life is at risk because of excessive blood loss.

- If there is low placental implantation and bleeding is light, vaginal delivery may be possible. Otherwise, deliver by caesarean section (*see appendix A.6*).

**Note:** Women with placenta praevia are at high risk for postpartum haemorrhage and placenta accreta/increta, a common finding at the site of a previous caesarean scar.

- If delivered by caesarean section and there is bleeding from the placental site:
  - Under-run the bleeding sites with sutures.
  - Infuse oxytocin 20 units in 1 L IV fluids (NS or Ringer’s lactate) at 60 drops per minute.

- If bleeding persists or occurs during the postpartum period, initiate appropriate management. This may include artery ligation (*see appendix A. 18*), compression sutures or hysterectomy (*see appendix A. 19*).

**1.2.3.2.2 Abruptio placentae**

Abruptio placentae is the detachment of a normally located placenta from the uterus before the fetus is delivered.
Management

► Call for help.

► Transfuse as necessary, preferably with fresh blood (see appendix B.7).

► If bleeding is heavy (evident or hidden), deliver as soon as possible:
  ▪ If the cervix is fully dilated, deliver by vacuum extraction (see appendix A.3).
  ▪ If vaginal delivery is not imminent, deliver by caesarean section (see appendix A.6).

**Note:** In every case of abruptio placentae, be prepared for postpartum haemorrhage.

► If bleeding is light to moderate (the mother is not in immediate danger), the course of action depends on the fetal heart rate:
  ▪ If fetal heart rate is normal or absent, rupture the membranes with an amniotic hook or a Kocher clamp:
    - If contractions are poor, augment labour with oxytocin (see appendix A.1.3).
    - If the cervix is unfavourable (firm, thick, closed), perform caesarean section (see appendix A.6).
  ▪ If fetal heart rate is abnormal (less than 100 or more than 180 beats per minute):
    - Perform rapid vaginal delivery.
    - If vaginal delivery is not possible, deliver by immediate caesarean section (see appendix A.6).

► Assess clotting status using this bedside clotting test:
  ▪ Take 2 mL of venous blood into a small, dry, clean, plain glass test tube (approximately 10 mm x 75 mm).
  ▪ Hold the tube in a closed fist to keep it warm (± 37°C).
  ▪ After 4 minutes, tip the tube slowly to see if a clot is forming. Then tip it again every minute until the blood clots and the tube can be turned upside down.
- Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy.
- If coagulopathy is found, use blood products to help control haemorrhage:
  - Give fresh whole blood, if available, to replace clotting factors and red cells.
- If fresh whole blood is not available, choose one of the following based on availability:
  - Fresh frozen plasma for replacement of clotting factors (15 mL/kg body weight).
  - Packed (or sedimented) red cells for red cell replacement;
  - Cryoprecipitate to replace fibrinogen.
  - Platelet concentrates (if bleeding continues and the platelet count is 20000–50000).

**Coagulopathy (Clotting Failure)**

Coagulopathy is both a cause and a result of massive obstetric haemorrhage. It can be triggered by abruptio placentae, fetal death in-utero, eclampsia, amniotic fluid embolism and many other causes.

The clinical picture ranges from major haemorrhage, with or without thrombotic complications, to a clinically stable state that can be detected only by laboratory testing.

**1.2.3.2.3 Ruptured uterus**

Bleeding from a ruptured uterus may occur vaginally unless the fetal head blocks the pelvis. Bleeding may also occur intra-abdominally.

**Management**

- Restore blood volume by infusing IV fluids (NS or Ringer’s lactate) before surgery.
When stable, immediately perform caesarean section and deliver baby and placenta (see appendix A.6).

If the uterus can be repaired with less operative risk than hysterectomy would entail and the edges of the tear are not necrotic, repair the uterus (see appendix A.17). This involves less time and blood loss than hysterectomy.

If the uterus cannot be repaired, perform subtotal hysterectomy (see appendix A.19). If the tear extends through the cervix and vagina, total hysterectomy may be required.

Note: Because there is an increased risk of rupture with subsequent pregnancies, the option of permanent contraception needs to be discussed with the woman after the emergency is over.

1.2.3.3 Vaginal bleeding after childbirth

Vaginal bleeding in excess of 500 mL after childbirth is defined as postpartum haemorrhage (PPH).

- Primary PPH is defined as increased vaginal bleeding within the first 24 hours after childbirth (immediate PPH).

- Secondary PPH is increased vaginal bleeding that occurs following the first 24 hours after delivery of the baby and up to 6 weeks postpartum.

Diagnosis

Table 1.7: Diagnosis of vaginal bleeding after childbirth

<table>
<thead>
<tr>
<th>Symptom and Signs Typically Present</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary PPH *</td>
<td>Shock</td>
<td>Atonic uterus</td>
</tr>
<tr>
<td>Uterus soft and not contracted</td>
<td></td>
<td>(see 1.2.3.3.1)</td>
</tr>
</tbody>
</table>

* Primary PPH: Primary postpartum haemorrhage.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Signs</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary PPH&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Complete placenta</td>
<td>Tears of cervix, vagina or perineum (see 1.2.3.3.2)</td>
</tr>
<tr>
<td>Placenta not delivered within 30 minutes after delivery</td>
<td>Primary PPH&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Retained placenta (see 1.2.3.3.3)</td>
</tr>
<tr>
<td>Portion of maternal surface of placenta missing or torn membranes with vessels</td>
<td>Primary PPH&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Retained placental fragments</td>
</tr>
<tr>
<td>Uterine fundus not felt on abdominal palpation;</td>
<td>Inverted uterus apparent at vulva</td>
<td>Inverted uterus (see 1.2.3.3.5)</td>
</tr>
<tr>
<td>Slight or intense pain</td>
<td>Primary PPH&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Bleeding occurs more than 24 hours after delivery</td>
<td>Bleeding is variable (light or heavy, continuous or irregular) and foul-smelling</td>
<td>Secondary (Delayed) PPH (see 1.2.3.3.4)</td>
</tr>
<tr>
<td>Uterus softer and larger than expected for elapsed time since delivery</td>
<td>Anaemia</td>
<td></td>
</tr>
<tr>
<td>Primary PPH&lt;sup&gt;a&lt;/sup&gt; (bleeding is intra-abdominal and/or vaginal)</td>
<td>Shock</td>
<td>Ruptured uterus (see 1.2.3.2.3)</td>
</tr>
<tr>
<td>Severe abdominal pain (may decrease after rupture)</td>
<td>Tender abdomen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rapid maternal pulse</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Bleeding may be light if a clot blocks the cervix or if the woman is lying on her back.

<sup>b</sup>There may be no bleeding with complete inversion.
### Chart 1.1. Management of postpartum haemorrhage

<table>
<thead>
<tr>
<th>Management of PPH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Haemorrhage not controlled</strong></td>
</tr>
<tr>
<td>• Call for help</td>
</tr>
<tr>
<td>• Check vitals (PR, BP, Respiration)</td>
</tr>
<tr>
<td>• Insert two large bore IV (16 gauge) to draw blood for Hb, blood grouping and cross matching; and assessing the clotting status.</td>
</tr>
<tr>
<td>• Perform repositioning immediately</td>
</tr>
<tr>
<td>• Do NOT give Oxytocin until inversion is corrected</td>
</tr>
<tr>
<td>• Give pethidine or morphine</td>
</tr>
<tr>
<td>• Maintain IV access</td>
</tr>
<tr>
<td>• Continue Oxytocin IV 20 units in 1 L IV fluids at 40 drops per minute (no more than 5 L)</td>
</tr>
<tr>
<td>• Monitor vital signs and bleeding</td>
</tr>
<tr>
<td><strong>Inverted uterus</strong></td>
</tr>
<tr>
<td>• Haemorrhage is controlled</td>
</tr>
<tr>
<td>• Give Oxytocin 10 U IM or 20 U in 1 L IV fluids at 60 drops</td>
</tr>
<tr>
<td>• Infuse IV fluids (0.9% NaCl/ RL)</td>
</tr>
<tr>
<td>• Give Oxygen @ 6 L/min by mask or nasal cannulae</td>
</tr>
<tr>
<td>• Insert two large bore IV (16 gauge) to draw blood for Hb, blood grouping and cross matching; and assessing the clotting status.</td>
</tr>
<tr>
<td><strong>Consider the causes of PPH</strong></td>
</tr>
<tr>
<td>• Atonic uterine</td>
</tr>
<tr>
<td>• Retained Placenta</td>
</tr>
<tr>
<td>• Coagulopathy</td>
</tr>
<tr>
<td>• Ruptured Uterus</td>
</tr>
</tbody>
</table>

**Continued...**
### Causes of PPH

<table>
<thead>
<tr>
<th>Cause</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atonic Uterus</td>
<td>- Give Ergometrine 0.2 mg IM or IV slowly</td>
</tr>
<tr>
<td>Retained Placenta</td>
<td>- Remove the placenta manually or with curettage</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>- Give fresh whole blood or FFP (15ml/kg) or packed red cells or cryoprecipitate or platelet concentrates</td>
</tr>
<tr>
<td>Ruptured uterus/Vaginal/cervical tears</td>
<td>- Transfer to OT - Repair the vaginal/cervical tears - If uterus cannot be repaired perform hysterectomy</td>
</tr>
</tbody>
</table>

**Perform bimanual compression or external aortic compression as temporizing measure**

**If heavy bleeding due to placenta accreta, transfer to OT**

**Perform intrauterine balloon tamponade**

**Coagulopathy**

**Ruptured uterus/Vaginal/cervical tears**

**Perform bimanual compression or external aortic compression as temporizing measure**

**If heavy bleeding due to placenta accreta, transfer to OT**

**Perform intrauterine balloon tamponade**

**Transfer to OT**

**Perform systemic devascularisation/compression sutures Hysterectomy**
General Management

► CALL FOR HELP. Urgently mobilize all available personnel. Work as a team (see figure 1.10).

► Perform a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature).

► If shock is suspected, immediately begin treatment (see 1.2.2). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.

► Massage the uterus to expel blood and blood clots. Blood clots trapped in the uterus will inhibit effective uterine contractions.

► Insert two large cannulas (no. 16 or 18) and start administration of NS or Ringer’s lactate according to maternal condition (see table 1.7). If possible take a blood sample just before administering fluids for haemoglobin, blood group and Rh typing, cross-match Bleeding Time (BT), Clotting Time (CT) and clot retraction time CRT. If facilities are available do, Prothrombin time (PT), Activated partial thromboplastin time (APTT), Platelet Count, Fibrinogen. If laboratory facilities are not available in any case draw blood for bedside clotting test.

► Give oxytocin 10 units IM or 20 units in 1 L IV fluids at 60 drops per minute.

► Anticipate the need for blood early, and transfuse as necessary.

► Catheterize the bladder.

► Determine the cause of bleeding (see table 1.7) and manage the specific cause.
  ▪ Check the tone of the uterus; in case of atonic uterus manage accordingly (see 1.2.3.3.1).
  ▪ Examine the cervix, vagina and perineum for tears (see 1.2.3.3.2).
  ▪ Check if placenta has been completely delivered. If there are signs of retained placental fragments (absence of a portion of maternal surface or torn
membranes with vessels), remove remaining placental tissue (see 1.2.3.3). Do NOT give ergometrine.

- If the uterus is inverted do NOT give ergometrine (see 1.2.3.3.5).
- Assess clotting status using a bedside clotting test. Failure to clot after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (see 1.2.3.2.2).

**Table 1.8. Drug doses for management of PPH**

<table>
<thead>
<tr>
<th>Route and dose</th>
<th>Oxytocin</th>
<th>Ergometrine/ Methyl-ergometrine</th>
<th>15-Methyl prostaglandin F2α</th>
<th>Misoprostol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Route and dose</strong></td>
<td>• Infuse 20 IU in 1 L IV fluids at 60 drops per min</td>
<td>• IM or IV (slowly) 0.2 mg</td>
<td>• IM; 0.25 mg</td>
<td>• Sublingual; 800 mcg</td>
</tr>
<tr>
<td><strong>Continuing dose</strong></td>
<td>• IV: Infuse 20 IU in 1 L IV fluids at 40 drops per minute</td>
<td>• Repeat 0.2 mg IM after 15 minutes</td>
<td>• 0.25 mg every 15 mins</td>
<td>-</td>
</tr>
<tr>
<td><strong>Maximum dose</strong></td>
<td>• Not more than 3 L of IV fluids containing Oxytocin</td>
<td>• 5 doses (Total 1.0 g)</td>
<td>• 8 doses (Total 2 g)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Precautions contraindications</strong></td>
<td>• Do not give IV bolus</td>
<td>• Pre-eclampsia, hypertension, heart disease</td>
<td>• Asthma</td>
<td>• Asthma</td>
</tr>
</tbody>
</table>
**Figure 1.10 Management of postpartum haemorrhage**

<table>
<thead>
<tr>
<th>Head</th>
<th>Arms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check consciousness</td>
<td>Check pulse and blood pressure</td>
</tr>
<tr>
<td>Open the airway</td>
<td>Insert IV line</td>
</tr>
<tr>
<td>Check respiration and give O2</td>
<td>Draw blood for lab tests (Hb, blood group and cross-match, bedside clotting test)</td>
</tr>
<tr>
<td>Record sequence of events</td>
<td>Infuse fluids</td>
</tr>
<tr>
<td></td>
<td>Give uterotonic drugs</td>
</tr>
</tbody>
</table>

**Uterus**

- Massage the uterus
- Deliver the placenta completely
- Empty the bladder
- Determine causes of bleeding
- In case of uterine atony, perform bimanual compression
- Refer the patient, if bleeding continues
Table 1.9: Total of replacement infusion fluid based on estimated volume of blood loss

<table>
<thead>
<tr>
<th>Clinical Assessment</th>
<th>Bleeding Volume (% of total blood volume)</th>
<th>Estimated blood loss (ml) (maternal blood volume ≈ 100 mL/kg body weight)</th>
<th>Amount of Replacement Crystalloid Infusion Fluid (two- to three fold of Total Blood Loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic Blood Pressure (mmHg)</td>
<td>Pulse Rate</td>
<td>Limb Perfusion</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>120</td>
<td>80/min</td>
<td>Warm</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>100</td>
<td>100/min</td>
<td>Pale</td>
<td>± 15%</td>
</tr>
<tr>
<td>&lt;90</td>
<td>&gt;120/min</td>
<td>Cold</td>
<td>± 30%</td>
</tr>
<tr>
<td>&lt;60-70</td>
<td>&gt;140/min to impalpable</td>
<td>Wet</td>
<td>± 50%</td>
</tr>
</tbody>
</table>

1.2.3.3.1 Atonic Uterus

An atonic uterus fails to contract after delivery and is the most frequent cause of postpartum haemorrhage.

**Diagnosis**

- Primary PPH
- Uterus soft and not contracted
- Often with shock
Management

► Perform general management for postpartum haemorrhage
► Continue to massage the uterus.
► Continue oxytocin with 20 units in 1 litre IV fluids at 40 drops per minute
► If bleeding continues:
  ▪ Give ergometrine 0.2 mg IM or IV (slowly), repeat after 15 minutes, if required give 0.2 mg IM or IV slowly every 4 hours (maximal 5 doses, total 1 mg).
  ▪ Give misoprostol sublingual 800 mcg if bleeding continues.
  ▪ If the bleeding does not respond to the second-line treatment, give prostaglandin 0.25 mg IM every 15 minutes (maximal 8 doses, total 2 mg).
  ▪ Use tranexamic acid if oxytocin and other uterotonics fail to stop the bleeding or if it is thought that the bleeding may be partly due to trauma.

Note:

► Do not give prostaglandins intravenously. They may be fatal.
► Do not give more than 3L of oxytocin-containing intravenous solution.
► Do not give ergometrine to women with high blood pressure, pre-eclampsia or heart disease.

► While giving oxytocic drugs, perform bimanual compression of the uterus (see appendix A. 9):
  ▪ Use sterile gloves, insert a hand into the vagina and remove any blood clots from the lower part of the uterus or cervix.
  ▪ Form a fist.
  ▪ Place the fist into the anterior fornix and apply pressure against the anterior wall of the uterus.
  ▪ With the other hand, press deeply into the abdomen behind the uterus, applying pressure against the posterior wall of the uterus.
- Maintain compression until bleeding is controlled and the uterus contracts.
  - If bleeding continues:
    - Perform an intrauterine balloon tamponade (see appendix A. 10).
  - If bleeding continues:
    - Perform bimanual compression of the uterus or external aortic compression as temporizing measure while transferring the woman for surgery.
    - Perform uterine artery embolization if resources available and patient is stable.
    - Attempt compression sutures first (B-lynch suture) (see appendix A.11) if the woman is in a stable condition.
    - If bleeding continues perform uterine, utero-ovarian and hypogastric artery ligation (see appendix A. 18) and if life-threatening bleeding continues after ligation, perform a sub-total/total hysterectomy (see appendix A. 19).

Figure 1.11 Internal bimanual compression

Figure 1.12 External bimanual compression

1.2.3.3.2 Tears of Cervix, Vagina or Perineum

Tears of the birth canal are the second most frequent cause of PPH. Tears may coexist with atonic uterus. Postpartum bleeding with a contracted uterus is usually due to a cervical or vaginal tear.
**Diagnosis**

- Immediate PPH
- Complete placenta
- Uterus contracted

**Management**

- Examine the woman carefully.
- If tears of the cervix are present, perform repair *(see appendix A. 16)*.

If vaginal and perianal tears are present, perform repair *(see appendix A. 16)*.

### 1.2.3.3 Retained Placenta

Retained placenta is defined as lack of expulsion of the placenta within 30 minutes of the delivery of the baby. There is however no evidence for or against this definition, the delay used to diagnose this condition is left to the judgement of the clinician.

**Note:** There may be no bleeding with retained placenta.

- In the absence of bleeding, spontaneous expulsion of the placenta can still occur; thus, a conservative approach is advised and the timing of manual removal as the definitive treatment is left to the judgement of the clinician.
- If the placenta is not expelled spontaneously, give 10 IU of oxytocin and apply controlled cord traction.
- Ensure that the bladder is empty. Catheterize the bladder, if necessary.

**Note:** Do NOT give ergometrine, as it may cause tetanic uterine contractions, which may delay expulsion of the placenta. Also do NOT give prostaglandin E2 (dinoprostone or sulprostone).

- Intraumbilical vein injection of oxytocin with saline may be offered for the management of retained placenta.
If, in spite of controlled cord traction, administration of uterotonic and intraumbilical vein injection of oxytocin + saline, the placenta is not delivered, manual extraction of the placenta should be offered as the definitive treatment.

In the absence of haemorrhage the woman should be observed for a further 30 minutes following the initial 30 minutes before manual extraction of placenta is offered (see A.7.).

A single dose of antibiotics (ampicillin or first-generation cephalosporin) should be offered before manual removal of the placenta.

**Note:** Very adherent tissue may be placenta accreta. Efforts to extract a placenta that does not separate easily may result in heavy bleeding or uterine perforation, which usually requires hysterectomy.

If bleeding continues, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy.

If there are signs of infection (fever, foul-smelling vaginal discharge), give antibiotics as for metritis.

### 1.2.3.3.4 Retained Placental Fragments

When a portion of the placenta—one or more lobes—is retained, it prevents the uterus from contracting effectively.

**Note:** There may be no bleeding with retained placental fragments.

**Diagnosis**

- Early detection is only possible by examining the completeness of the placenta after its delivery.
- Feel inside the uterus for placental fragments. Manual exploration of the uterus is similar to the technique described for removal of the retained placenta.
Note: Very adherent tissue may be placenta accreta. Efforts to extract fragments that do not separate easily may result in heavy bleeding or uterine perforation, which usually requires hysterectomy.

- If bleeding continues, assess for coagulopathy as above.

Management

- Remove placental fragments by hand, ovum forceps or wide curette.

- Give single dose of prophylactic antibiotics. Ampicillin 2 g IV PLUS metronidazole 500 mg IV; OR IV Cefazolin 1 g IV PLUS metronidazole 500 mg IV.

- Perform a digital exploration (when the cervix is open) and remove the blood clots and tissues. If the cervix can only be passed by an instrument, evacuate placental remnants by manual vacuum aspiration or dilation and curettage.

1.2.3.3.5 Inverted Uterus

The uterus is said to be inverted if it turns inside-out during delivery of the placenta. Repositioning the uterus should be performed immediately. With the passage of time the constriction ring around the inverted uterus becomes more rigid and the uterus more engorged with blood.

Management

- If the woman is in severe pain, give pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly or give morphine 0.1 mg/kg body weight IM.

Note: Do not give oxytocic drugs until the inversion is corrected.

- If bleeding continues, assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy.

- Perform repositioning immediately (see appendix A. 8).

- Give a single dose of prophylactic antibiotics after correcting the uterine inversion:
- Ampicillin 2 g IV PLUS metronidazole 500 mg IV OR
- Cefazolin 1 g IV PLUS metronidazole 500 mg IV

- If there are signs of infection (fever, foul-smelling vaginal discharge), give antibiotics as for metritis (see 5.1.1).
- If necrosis is suspected, perform vaginal hysterectomy. This may require referral to a tertiary care centre.

1.2.3.3.6 Coagulopathy (Clotting Failure)
See 1.2.3.2.2 Abruptio placentae

1.2.3.3.7 Delayed (“Secondary”) Postpartum Haemorrhage

**Note:** Delayed PPH may be a sign of metritis.

- Admit the woman to higher level health facility as an emergency. Assess the woman’s condition and if in a remote area start management before transfer if possible. Rub up a contraction by massaging the uterus if is still palpable.
- Give oxytocin 10 units IV in 1 L fluid.
- Take blood for haemoglobin, grouping and cross-matching.
- Put up an IV infusion. Use Normal Saline or Ringer’s lactate initially. If the woman is in shock, run it fast (1 litre in 15 minutes) until the woman stabilizes.
- If bleeding is severe, administer 20 IU oxytocin per litre at 40 drops per minute.
- If anaemia is severe (haemoglobin less than 7 g/dL or haematocrit less than 20%): arrange for a transfusion.
- If there are signs of infection (fever, foul-smelling vaginal discharge): give antibiotics as for metritis.
- If the cervix is dilated, explore by hand to remove large clots and placental fragments. Manual exploration of the uterus is similar to the technique described for removal of the retained placenta.
If the cervix is not dilated, evacuate the uterus to remove placental fragments.

Rarely, if bleeding continues, consider uterine and utero-ovarian artery ligation or hysterectomy.

Perform histopathologic examination of curettings or hysterectomy specimen, if possible, to rule out trophoblastic tumour.

**Monitoring after Postpartum Haemorrhage**

- Check vital signs (blood pressure, pulse rate, respiratory rate, body temperature), fundal height and possible bleeding every 15 minutes during the first hour and subsequently every 30-60 minutes to 1 hour for 4 hours and then every 6 hours for 24 hours.

- Monitor urine output (normal $\geq 30$ mL/h) until the woman is stable.

- In secondary PPH with metritis give a combination of antibiotics until the woman is fever-free for 48 hours:
  - Ampicillin 2 g IV every 6 hours PLUS
  - Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
  - Metronidazole 500 mg IV every 8 hours.

**Follow-up**

- Check for anaemia after bleeding has stopped for 24 hours.

- Arrange transfusion if required. Supplement with oral ferrous sulphate or fumarate plus folic acid.

- Where hookworm is endemic give antihelminthic treatment.

**1.2.4 Convulsions**

A small proportion of women with eclampsia have normal blood pressure. Treat all women with convulsions as if they have eclampsia until another diagnosis is confirmed.
### Table 1.10: Differential diagnosis of convulsions

<table>
<thead>
<tr>
<th>Symptom and Signs Typically Present</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Convulsions</td>
<td>• Coma (unconscious)</td>
<td>• Eclampsia (see 1.2.4.1)</td>
</tr>
<tr>
<td>• Diastolic blood pressure</td>
<td>• Other symptoms and signs of severe pre-eclampsia</td>
<td></td>
</tr>
<tr>
<td>90 mmHg or more after 20 weeks gestation</td>
<td></td>
<td>Epilepsy Normal Blood Pressure Past history of convulsions</td>
</tr>
<tr>
<td>• Proteinuria 2+ or more</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>• Convulsions</th>
<th>• Normal blood pressure</th>
<th>• Convulsions</th>
<th>• Jaundice</th>
<th>• Severe/complicated malaria (See 3.7.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Headache</td>
<td>• Stiff neck</td>
<td>• Convulsions</td>
<td>• Confusion</td>
<td>• Meningitis or Encephalitis</td>
</tr>
<tr>
<td>• Photophobia</td>
<td>• Fever</td>
<td>• Confusion</td>
<td>• Drowsiness</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Coma</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Management

- Never leave the woman alone. A convulsion followed by aspiration of vomit may cause death of the woman and fetus.
- Gather equipment (airway, suction, mask and bag, oxygen) and give oxygen at 4–6 L per minute.
- Position her on her left side to reduce the risk of aspiration of secretions, vomit and blood.
- Protect the woman from injury but do not actively restrain her.
- Provide constant supervision.
1.2.4.1 Eclampsia

In eclampsia, delivery must occur within 12 hours of onset of convulsions. ALL cases of severe pre-eclampsia should be managed actively. Symptoms and signs of “impending eclampsia” (blurred vision, hyperreflexia) are unreliable. Expectant management is not recommended.

Diagnosis

Eclampsia is characterized by seizures or coma occurring in a severe pre-eclampsia.

Management

- Assess airway, respiration and circulation.
- Give 4–6L/min of 100% oxygen by using a mask.
- Check general conditions and vital signs, especially blood pressure.
- Administer Magnesium sulfate
  - **Loading dose**
    - Give 4 g of 20% magnesium sulfate solution IV over 5 minutes.
    - Follow promptly with 10 g of 50% magnesium sulfate solution: give 5 g in each buttock as a deep IM injection with 1ml of 2% lidocaine to minimize discomfort. Ensure aseptic technique when giving magnesium sulfate deep IM injection.
  - **Maintenance dose**
    - Give 5 g of 50% magnesium sulfate solution by deep IM injection into alternate buttocks every 4 hours.
    - If 50% solution is not available, give 1 g of 20% magnesium sulfate solution IV every hour by continuous infusion.
    - Maintenance dose given up to 24 hours after delivery or 24 hours after the last seizure whichever is later.
- In case of repeated seizures, give a bolus of 2 g of magnesium sulphate intravenously.
Manage eclampsia as for a severe pre-eclampsia but plan termination of pregnancy with in 6 hours of the onset of seizures.

Control blood pressure by administering antihypertensive drugs. If mother remains seizing or unconscious, give intravenous antihypertensive drugs (see Table 3.3).

If there is a fetal distress or labour cannot occur within 6 hours of the onset of seizures, perform a Caesarean section (see Appendix A. 6).

Perform an intubation in case of repeated seizures and immediately send mother to the ICU (when available) equipped with a positive pressure ventilator.

### 1.2.4.2 Epilepsy

If the woman is convulsing, give diazepam 10 mg IV slowly over 2 minutes. Repeat if convulsions recur after 10 minutes.

If convulsions continue (status epilepticus), infuse phenytoin 1 g (approximately 18 mg/kg body weight) in 50–100 mL normal saline over 30 minutes (final concentration not to exceed 10 mg per mL):

**Note:** Only normal saline can be used to infuse phenytoin. All other IV fluids will cause crystallization of phenytoin.

- Flush IV line with normal saline before and after infusing phenytoin;
- Do not infuse phenytoin at a rate exceeding 50 mg per minute due to the risk of irregular heartbeat, hypotension and respiratory depression;
- Complete administration within 1 hour of preparation.
- Give phenytoin maintenance dose: 100 mg IV slowly over 2 minutes or by mouth every 8 hours beginning at least 12 hours after the loading dose.
- Maintain a strict fluid balance chart and monitor the amount of fluids administered and urine output to ensure that there is no fluid overload.
- Position the woman on her left side to reduce risk of aspiration of secretions, vomit and blood.
- Aspirate the mouth and throat as necessary.
Monitor vital signs (pulse, blood pressure, respiration), reflexes and fetal heart rate.

Monitor for the development of pulmonary oedema.

Auscultate the lung bases hourly for rales indicating pulmonary oedema. If rales are heard, withhold fluids and give furosemide 40 mg IV once.

If the woman is known to be epileptic, give her the same medication that she had been taking. Follow-up with her regularly and adjust the dose of medication according to the response.

If the woman is known to be epileptic but cannot recall details of her medication, give her phenytoin 100 mg by mouth three times per day.

Follow-up with her regularly and adjust the dose of medication according to her response.

1.2.5 Difficulty in Breathing

General management

- Tilt the head, keep it tilted and lift chin to open airway.
- Inspect mouth and remove foreign body if present and easily visible.
- Open the air way.
- Give 6-8L/min of oxygen by mask.

Table 1.11: Differential diagnosis of difficulty in breathing

<table>
<thead>
<tr>
<th>Symptom and Signs Typically Present</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty in breathing</td>
<td>Lethargy and fatigue</td>
<td>Severe anaemia</td>
</tr>
<tr>
<td>Pallor of the conjunctiva, tongue, nail beds and/or palms</td>
<td>Flat or concave nails</td>
<td></td>
</tr>
<tr>
<td>Haemoglobin 7g per dL or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haematocrit 20% or less</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Symptoms and signs of severe anaemia | Oedema  
Cough  
Rales  
Swelling of legs  
Enlarged liver  
Prominent neck veins | Heart failure due to anaemia
(see 1.2.5.1) |
|-------------------------------------|------------------|------------------|
| Difficulty in breathing  
Diastolic murmur and/or  
Harsh systolic murmur with palpable thrill | Irregular heart beat  
Enlarged heart  
Rales  
Cyanosis  
Cough  
Swelling of legs  
Enlarged liver  
Prominent neck veins | Heart failure due to heart disease
(see 1.2.5.1) |
| Difficulty in breathing  
Wheezing | Cough with expectoration  
Rhonchi/rales | Asthma
(see 1.2.5.2) |
| Difficulty in breathing  
Hypertension  
Proteinuria | Rales  
Frothy cough | Pulmonary oedema associated with pre-eclampsia
(see 1.2.5.3) |
| Difficulty in breathing  
Fever  
Cough with expectoration  
Chest pain | Consolidation  
Congested throat  
Rapid breathing  
Rhonchi/rales | Pneumonia
(see 1.2.5.4) |
1.2.5.1 Heart Failure

Heart failure due to anaemia

Transfusion is almost always necessary in heart failure due to anaemia

- Use packed or sedimented cells as described for severe anaemia (see 3.2)
- Give frusemide 40 mg IV with each unit of packed cells.

Heart failure due to heart disease

- Treat acute heart failure. Drugs used may include:
  - Morphine 10 mg IM as a single dose OR
  - Frusemide 40 mg IV, repeated as necessary OR
  - Digoxin 0.5 mg IM as a single dose OR
- Refer to a higher level if needed.

Management of heart failure during labour

- Prop up the woman on her left side.
- Limit infusion of IV fluids to decrease the risk of circulatory overload, and maintain a strict fluid balance chart.
- Ensure adequate analgesia.
- If oxytocin infusion is required, use a higher concentration at a slower rate while maintaining a fluid balance chart (e.g., the concentration may be doubled if the drops per minute is decreased by half).

Note: Do NOT give ergometrine.

- Have the woman avoid sustained bearing down efforts during the expulsive stage, if possible.
- If necessary decrease the woman’s workload during delivery, perform an episiotomy and assist delivery by vacuum extraction or forceps.
Ensure active management of third stage.

**Note:** Heart failure is not an indication for caesarean section.

### 1.2.5.2 Asthma

Bronchial asthma complicates 3–4% of pregnancies. Pregnancy is associated with worsening of the symptoms in one-third of affected women.

**Management**

- If mild/moderate bronchospasm (can walk and speak whole sentences in one breath): give 4–12 puffs salbutamol (100mcg per actuation) OR 4mg salbutamol

- If severe bronchospasm (any of: unable to speak in sentences, visibly breathless, increased work of breathing, oxygen saturation 90–94%):
  - Give 12 puffs salbutamol (100mcg per actuation). Start oxygen (if oxygen saturation less than 95%)
  - Repeat dose every 20–30 minutes for first hour if needed or sooner as needed
  - Arrange immediate transfer to higher-level care if no improvement or worsening

- If there is no response to bronchodilators, give corticosteroids such as hydrocortisone IV 2 mg/kg body weight every 4 hours as needed (max 200 mg/dose).

- If there are signs of infection (bronchitis), give ampicillin 2 g IV every 6 hours.

- After acute exacerbation has been managed, continue treatment with inhaled bronchodilators and inhaled corticosteroids to prevent recurrent acute episodes.

**Note:** Do NOT use prostaglandins. For prevention and treatment of postpartum haemorrhage, give oxytocin 10 units IM or give ergometrine 0.2 mg IM.
1.2.5.3 Pulmonary oedema associated with pre-eclampsia

**Diagnosis**
- Difficulty in breathing
- Hypertension
- Proteinuria
- Rales
- Frothy cough

**Management**
- Prop up the woman.
- Give oxygen at 4 L per minute by mask or nasal cannulae.
- Give frusemide 40 mg IV as a single dose.

1.2.5.4 Pneumonia

Inflammation in pneumonia affects the lung parenchyma and involves respiratory bronchioles and alveoli. There is loss of lung capacity that is less tolerated by pregnant women.

A radiograph of the chest may be required to confirm the diagnosis of pneumonia.

**Management**
- Give erythromycin 500 mg by mouth four times per day for 7 days.
- Give steam inhalation.
- Consider the possibility of tuberculosis in areas where it is prevalent.
1.3 Fetal Distress

Diagnosis

- Abnormal fetal heart rate (less than 100 or more than 180 beats per minute).
- Thick meconium-stained amniotic fluid.
- Use cardiotocography (CTG) to diagnose abnormal fetal heart rate. If not available, Doppler or stethoscope can be used.

- A normal fetal heart rate may slow during a contraction but usually recovers to normal as soon as the uterus relaxes.
- A very slow fetal heart rate in the absence of contractions or persisting after contractions is suggestive of fetal distress.
- A rapid fetal heart rate may be a response to maternal fever, drugs causing rapid maternal heart rate (e.g. terbutaline or ritodrine) or amnionitis. In the absence of a rapid maternal heart rate, a rapid fetal heart rate should be considered a sign of fetal distress.

Abnormal Fetal Heart Rate

Management

- Administer intravenous fluids.
- Prop up the woman or place her on her left side.
- Stop oxytocin if it is being administered.
- Give oxygen 4–6 L by mask or nasal cannulae.
- Tocolytics like terbutaline, magnesium sulfate if tachysystole is present.
- If a maternal cause is identified (e.g., maternal fever, drugs), initiate appropriate management.
If a maternal cause is not identified and the fetal heart rate remains abnormal throughout at least three contractions, perform a vaginal examination to check for explanatory signs of distress:

- If there is bleeding with intermittent or constant pain, suspect abruptio placentae (see 1.2.3.2.2).
- If there are signs of infection (fever, foul-smelling vaginal discharge) give antibiotics as for amnionitis (see 3.9.4).
- If the cord is below the presenting part or in the vagina, manage as prolapsed cord. (see 4.7).

If fetal heart rate abnormalities persist or there are additional signs of distress (thick meconium-stained fluid), plan delivery:

- If the cervix is fully dilated and the fetal head is not more than 1/5 above the symphysis pubis or the leading boney edge of the fetal head is at 0 station, deliver by vacuum extraction or forceps as applicable. (see A.3, A.4).
- If the cervix is not fully dilated or the fetal head is more than 1/5 above the symphysis pubis or the leading boney edge of the fetal head is above 0 station, deliver by caesarean section.
- Anticipate the need for neonatal resuscitation.

**Note:**

- Meconium staining of amniotic fluid is seen frequently as the fetus matures and by itself is not an indicator of fetal distress. A slight degree of meconium without fetal heart rate abnormalities is a warning of the need for vigilance.

- Thick meconium however suggests passage of meconium in reduced amniotic fluid and may indicate the need for expedited delivery and management of the neonatal upper airway at birth to prevent meconium aspiration.

- In breech presentation, meconium is passed in labour because of compression of the fetal abdomen. This is not a sign of distress unless it occurs in early labour.
Notes
# Normal Pregnancy, Labour and Puerperium

## 2.1 Antenatal Care

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<tr>
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</tr>
</thead>
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## 2.2 Normal Labour and Childbirth

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2.3 The Postpartum Period

2.3.1 Background

2.3.2 Immediate postpartum management (in case of health facility delivery)

2.3.3 Subsequent postnatal care

2.3.4 Nutrition

2.3.5 Postnatal exercises

2.3.6 Psychosocial support

2.3.7 Family planning and sexual health counselling

2.3.8 Malaria prevention

2.3.9 Initial care of the newborn
2.1 Antenatal Care

All pregnant women should have a minimum of eight ANC visits. These visits should be goal-orientated, with the first visit scheduled to take place before 12 weeks' gestation, and subsequent visits taking place at 20, 26, 30, 34, 36, 38 and 40 weeks' gestation. This model is referred to as the focused antenatal care plus (FANC Plus) model. Enabling a positive pregnancy experience should be the defining principle of FANC Plus.

Principle of FANC Plus

An ANC delivery system that enables a positive experience and may facilitate identification of medical problems and may reduce the risk of stillbirths as well.

Table 2.1: FANC Plus model 2016

Visit 1: Before 12 weeks

- Confirm pregnancy and estimated delivery date (EDD)
- Ask about risk factors and refer women needing additional ANC
- Calculate BMI
- Check blood pressure
- Perform a urine test (ASB, protein, glucose)
- Perform blood tests (Hb, syphilis, HIV)
- Perform other context-specific tests¹
- Perform fetal ultrasound to confirm gestational age and singleton pregnancy
- Promote a healthy pregnancy, giving general, and context-specific advice and support, including advice on physiological symptoms
- Discuss a birth and emergency plan
- Commence iron and folic acid supplements
- Offer treatment for asymptomatic bateriuria (ASB), syphilis and severe anaemia (if not yet treated) if indicated

¹This may include blood grouping, and screening for intimate partner violence (IPV) and tuberculosis.
• Consider other context-specific supplements (e.g., calcium)
• Consider whether other context-specific treatment is needed at the next visit and give treatment if appropriate (e.g., anthelminthics, SP-IPTp)$^2$
• Give first tetanus toxoid vaccination if indicated

**Visit 2: 20 weeks**

• Ask about maternal symptoms
• Check and discuss results of tests not dealt with in the previous visits
• Perform abdominal palpation or SFH measurement
• Check blood pressure
• Perform a urine screening test (ASB, protein, glucose)
• Perform fetal ultrasound to exclude congenital anomalies and multiple pregnancy
• Give individualized advice and support
• Offer treatment for ASB, syphilis and severe anaemia (if not yet treated) if indicated
• Continue iron and folic acid supplements
• Give second tetanus toxoid vaccination if indicated
• Consider whether other context-specific treatment is needed and give treatment if appropriate (e.g., anthelminthics, SP-IPTp)$^3$
• Refer women needing additional care

**Visit 3: 26 weeks**

• Ask about maternal symptoms and symptoms related to pre-eclampsia, and fetal movements
• Check and discuss results of tests
• Perform abdominal palpation or SFH measurement
• Check blood pressure

---

$^2$This may include provision of ARVs to HIV positive women in some settings.

$^3$This may include provision of ARVs to HIV positive women in some settings.
- Perform a urine test (ASB, protein, glucose)
- Repeat blood tests (Hb, syphilis, HIV\(^4\))
- Perform fetal ultrasound if not done earlier
- Give individualized advice and support
- Offer treatment for ASB, syphilis, and severe anaemia if indicated
- Continue iron and folic acid supplements
- Give context-specific treatment if appropriate (e.g., anthelminthics, SP-IPTp)\(^5\)
- Refer women needing additional care

**Visit 4: 30 weeks**

- Ask about maternal symptoms, symptoms related to pre-eclampsia, and decreased fetal movements
- Check and discuss results of blood tests (with further tests or treatment, as appropriate) if not dealt with in the previous visits
- Perform abdominal palpation or SFH measurement
- Check blood pressure
- Perform a urine test (ASB, protein, glucose)
- Discuss birth-preparedness and review emergency plan
- Continue iron and folic acid supplements
- Give context-specific treatment if appropriate (e.g., anthelminthics, SP-IPTp)\(^6\)
- Refer women needing additional care

**Visit 5: 34 weeks**

- Ask about maternal symptoms, symptoms related to pre-eclampsia, and decreased fetal movements
- Perform abdominal palpation or SFH measurement
- Check blood pressure

\(^4\)For populations in which HIV infection is consistently prevalent at more than 1% among pregnant women

\(^5\)This may include provision of ARVs to HIV positive women in some settings.

\(^6\)This may include provision of ARVs to HIV positive women in some settings.
• Perform a urine test (ASB, protein, glucose)
• Continue iron and folic acid supplements
• Refer women needing additional care

Visit 6: 36 weeks

• Ask about maternal symptoms, symptoms related to pre-eclampsia, and decreased fetal movements
• Perform abdominal palpation or SFH measurement
• Check fetal presentation and refer for ECV if breech
• Check blood pressure
• Perform a urine test (ASB, protein, glucose)
• Offer treatment for ASB if indicated
• Give individualized advice and support
• Continue iron and folic acid supplements
• Review and modify birth and emergency plan
• Refer women needing additional care

Visit 7: 38 weeks

• Ask about maternal symptoms, symptoms related to pre-eclampsia, and decreased fetal movements
• Perform abdominal palpation or SFH measurement
• Check fetal presentation and refer if breech
• Check blood pressure
• Perform a urine test (ASB, protein, glucose)
• Offer treatment for ASB if indicated
• Continue iron and folic acid supplements
• Review and modify birth and emergency plan
• Refer women needing additional care
Visit 8: 40 weeks

- Ask about maternal symptoms, symptoms related to pre-eclampsia, and decreased fetal movements
- Perform abdominal palpation or SFH measurement
- Check fetal presentation and refer if breech
- Check blood pressure
- Perform a urine test (ASB, protein, glucose)
- Offer treatment for ASB if indicated
- Continue iron and folic acid supplements
- Review and modify birth and emergency plan
- Refer women needing additional care

If undelivered, return for delivery at 41 weeks’ gestation.

2.1.1 Medical history

- During the first visit, a complete history should be taken. An overview is given in Table 2.2.
- During the last visit inform the woman to return, if she does not deliver within 1 week after the expected date of delivery.

Table 2.2: Medical history to be completed at the first visit

<table>
<thead>
<tr>
<th>Personal information</th>
<th>Current Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Duration of pregnancy</td>
</tr>
<tr>
<td>Age</td>
<td>First day of last period</td>
</tr>
<tr>
<td>Address</td>
<td>Vaginal Bleeding</td>
</tr>
<tr>
<td>Phone Number</td>
<td>Vaginal Discharge</td>
</tr>
<tr>
<td></td>
<td>Nausea and vomiting</td>
</tr>
<tr>
<td></td>
<td>Problems in current pregnancy</td>
</tr>
<tr>
<td></td>
<td>Medication or other treatments</td>
</tr>
<tr>
<td>Previous pregnancies</td>
<td>Medical History</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td>• Number and detail of prior pregnancies with live births and stillbirths.</td>
<td>• Heart problems</td>
</tr>
<tr>
<td>• Number of prior deliveries</td>
<td>• Hypertension</td>
</tr>
<tr>
<td>• Labour at term/preterm labour</td>
<td>• Diabetes mellitus (DM)</td>
</tr>
<tr>
<td>• Prior caesarean/forceps/vacuum delivery</td>
<td>• Liver diseases such as hepatitis</td>
</tr>
<tr>
<td>• Number of living children and birth weight</td>
<td>• HIV</td>
</tr>
<tr>
<td>• Infant weight of &lt;2.5kg or &gt; 4 kg</td>
<td>• Sexually transmitted diseases</td>
</tr>
<tr>
<td>• Number of miscarriages</td>
<td>• Tuberculosis (TB)</td>
</tr>
<tr>
<td>• Number of abortions</td>
<td>• History of surgery</td>
</tr>
<tr>
<td>• Bleeding in previous pregnancies, labour, and puerperium</td>
<td>• Allergies</td>
</tr>
<tr>
<td>• Presence of hypertension in previous pregnancies</td>
<td>• Kidney diseases</td>
</tr>
<tr>
<td>• Presence of problems in previous pregnancy, labour and puerperium</td>
<td>• Thalassemia/other haematological disorders</td>
</tr>
<tr>
<td></td>
<td>• Asthma</td>
</tr>
<tr>
<td></td>
<td>• Epilepsy</td>
</tr>
<tr>
<td></td>
<td>• History of trauma/accidents</td>
</tr>
<tr>
<td></td>
<td>• Status of tetanus immunization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socioeconomic History</th>
<th>Family History</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupation and daily activities</td>
<td>• Hypertension</td>
</tr>
<tr>
<td>• Education</td>
<td>• Diabetes</td>
</tr>
<tr>
<td>• Smoking, use of drugs and alcohol</td>
<td>• Tuberculosis</td>
</tr>
<tr>
<td>• Clinical enquiry about the possibility of IPV</td>
<td>• Thalassemia</td>
</tr>
<tr>
<td>• Tobacco use (past and present) and exposure to second-hand smoke</td>
<td>• Twin Pregnancy</td>
</tr>
<tr>
<td></td>
<td>• Congenital malformations</td>
</tr>
<tr>
<td></td>
<td>• Any genetic disease</td>
</tr>
</tbody>
</table>
2.1.2 **General physical examination**

**First visit:**
- Vital signs: (blood pressure, body temperature, pulse rate, respiratory rate)
- Body weight
- Height and gait
- Pallor, icterus, oedema
- Head to toe (whole body), thyroid, heart, lung, breast (for lumps)
- Inspect the abdomen for scars

**Subsequent visits:**
- Vital signs (as above)
- Examination related to problems identified in previous visits

2.1.3 **Obstetric physical examination**

Ask the woman to empty her bladder before examination.

**First visit:**
- Fundal height
- Vulva/perineum to check for presence of varicose veins, condylomata, oedema, haemorrhoids or other abnormalities
Per speculum examination to assess cervix, signs of infection, and fluid from the cervical os

Vaginal examination to assess: cervix*, uterus*, adnexa*, Bartholin’s glands, urethra, (*when gestational age is <12 weeks)

Subsequent visit:

Monitor fetal growth and development by measuring uterine fundal height as in Table 2.3.

Table 2.3: Estimated uterine fundal height (see Figure 2.1)

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Uterine fundal height By palpation</th>
<th>By measuring tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 12 weeks</td>
<td>• Palpable above the pubic symphysis</td>
<td>-</td>
</tr>
<tr>
<td>• 16 weeks</td>
<td>• In between the pubic symphysis and umbilicus</td>
<td>-</td>
</tr>
<tr>
<td>• 20 weeks</td>
<td>• At the umbilicus</td>
<td>(20 ± 2) cm</td>
</tr>
<tr>
<td>• 22-27 weeks</td>
<td></td>
<td>(Gestational age in weeks± 2) cm</td>
</tr>
<tr>
<td>• 28 weeks</td>
<td>• Lower one third of the distance between the umbilicus and xiphisternum</td>
<td>(28 ± 2) cm</td>
</tr>
<tr>
<td>• 32nd week</td>
<td>• Two third of the distance between the umbilicus and xiphisternum</td>
<td></td>
</tr>
<tr>
<td>• 29-35 weeks</td>
<td></td>
<td>(Gestational age in weeks± 2) cm</td>
</tr>
<tr>
<td>• 36 weeks</td>
<td>• At the level of Xiphisternum</td>
<td>(36 ± 2) cm</td>
</tr>
</tbody>
</table>
Palpate abdomen using Leopold’s manoeuvres I-IV as shown below to assess fetal presentation from 28 weeks/third visit onwards:

- Leopold I: determining fetal parts located in the uterine fundus
- Leopold II: determining position of the fetal back
- Leopold III: determining fetal parts located at the bottom of the uterus
- Leopold IV: determining how far fetus enters the pelvis (done at the fourth visit).

Auscultate fetal heart rate using a stethoscope or Doppler (if gestational age is >20 weeks).

Figure 2.2: Leopold’s manoeuvres I-IV

2.1.4 Supporting Tests

Perform routine laboratory tests (for all pregnant women) on the first visit:
- Haemoglobin (repeat in third trimester in case of suspected anaemia)
- Blood group ABO and RhD status
- HIV and syphilis testing
- Blood sugar
- Urine analysis (for protein), at each visit.

*Thyroid Stimulating hormone and Thalassemia screening (if indicated/as per national guidelines)

- Additional laboratory tests, if indicated (see Chapter 3).
- Perform ultrasound (USG) scan.
  - Routine ultrasound scan is advisable at least once during pregnancy at about 18-20 weeks of gestation in order to detect fetal anomalies. This can also assist in dating, placental localisation and in identifying multiple pregnancies.

2.1.5 Nutritional Interventions

- Counselling about adhering to a healthy diet and keeping physically active during pregnancy should be done.
- Nutritional education on increasing daily energy and protein intake should be done in undernourished women.
- Daily oral iron supplementation with 30 mg to 60 mg of elemental iron and 400 μg (0.4 mg) folic acid should be advised.
- Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron\(^7\) and 2800 μg (2.8 mg) folic acid once weekly can be given for pregnant women to improve maternal and neonatal outcomes if daily iron is not acceptable due to side-effects.
- In populations with low dietary calcium intake and in women at higher risk of pre-eclampsia, daily calcium supplementation (1.5 g - 2.0 g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia.
- For pregnant women with high daily caffeine intake (more than 300 mg per day), daily caffeine intake should be lowered to reduce the risk of pregnancy loss and low birth weight neonates

\(^7\)The equivalent of 120 mg of elemental iron equals 600 mg of ferrous sulfate heptahydrate, 360 mg of ferrous fumarate or 1000 mg of ferrous gluconate.
2.1.6 Preventive Measures

- If the woman is at risk of pre-eclampsia/eclampsia give low dose acetylsalicylic acid (aspirin) 75 mg per day.

- Immunize the women with tetanus toxoid (TT) vaccine according to her immunization status. If the woman has never been immunized or has an unknown immunization status, give a dose of vaccine (0.5 ml IM) and give a second dose 1 month apart before delivery.

**Note:** Do NOT give TT immunization to women with a history of severe adverse reaction to TT immunization in the past. Women with high fever and severe illness can be immunized.

2.1.7 Information and counselling

- Answer any questions or concerns the woman may have.

- Advise and counsel on:
  - Breast feeding
  - Birth spacing after delivery

The equivalent of 120 mg of elemental iron equals 600 mg of ferrous sulfate heptahydrate, 360 mg of ferrous fumarate or 1000 mg of ferrous gluconate.

- HIV counselling and testing
- Correct and consistent condom use
- Laboratory tests
- Bringing the home-based maternal record to every visit

**INTERVENTIONS FOR COMMON PHYSIOLOGICAL SYMPTOMS IN PREGNANCY**

- Non-pharmacological options, such as ginger, chamomile, and vitamin B6, acupuncture are recommended for the relief of nausea in early pregnancy based on women’s preferences and availability.
  - Women should be informed that symptoms of nausea and vomiting usually resolve in the second half of pregnancy.
- Pharmacological treatments for nausea and vomiting, such as doxylamine and metoclopramide, should be reserved for those pregnant women experiencing distressing symptoms that are not relieved by non-pharmacological options, under the supervision of a medical doctor.

- Women should be offered advice on diet and lifestyle to prevent and relieve heartburn in pregnancy. Antacid preparations should be considered for women with troublesome symptoms that are not relieved by lifestyle modification.

- Lifestyle advice to prevent and relieve symptoms of heartburn includes avoidance of large, fatty meals and alcohol, smoking cessation, and raising the head of the bed to sleep.

- Antacids, such as magnesium carbonate and aluminium hydroxide preparations, are probably unlikely to cause harm in recommended dosages

- Antacids may impair absorption of other drugs, therefore should not be taken within 2 hours of iron and folic acid supplements.

- There is no single intervention that can be recommended for pregnant women for the relief of leg cramps. Magnesium, calcium or non-pharmacological treatment options should be considered based on women’s preferences and availability.

- Regular exercise throughout pregnancy is recommended for pregnant women to prevent low back and pelvic pain in pregnancy. There are a number of different treatment options, such as physiotherapy, support belts, and acupuncture that should be considered based on women’s preferences and availability.

- Wheat bran or other fibre supplements for constipation in pregnancy that fails to respond to dietary modification should be considered based on women’s preferences and availability.

- Non-pharmacological options such as compression stockings, leg elevation, and water immersion, should be considered for the management of varicose veins and oedema in pregnancy based on women’s preferences and availability.
Care during pregnancy

Advise the pregnant woman to

- Eat more and healthier foods, including more fruits and vegetables, beans, meat, fish, eggs, cheese, milk
- Take iron tablets every day
- Rest when possible and avoid lifting heavy object
- Adequate sleep
- NOT to take medication unless prescribed at the health centre
- NOT to drink alcohol or smoke

Danger signs

Advise the woman to come to the hospital or health centre immediately, day or night, to NOT wait, if she has any of the following signs:

- Vaginal bleeding or leaking
- Convulsions/fits
- Severe headaches with blurred vision
- Fever and too weak to get out of bed
- Severe abdominal pain
- Fast or difficult breathing

Advise the woman to come to the health centre as soon as possible if she has any of the following signs:

- Fever
- Abdominal pain
Water breaks and not in labour after 6 hours
Feeling ill
Swollen fingers, face and legs

**Signs of labour**

Advise the woman to come to the health centre as soon as she can, if she has any of these signs.

- Painful contractions every 20 minutes or less
- Bag of water breaks
- Bloody discharge

**The birth plan**

- At every visit, review and discuss the birth plan with the woman. Adjust the plan, if complications develop.
- Provide information to help prepare the birth plan. Based on the woman’s health condition, make suggestions as to where it would be best to deliver.

**Planning for delivery at the hospital or health centre**

Help the woman to plan for an emergency and delivery:

- Where should she go?
- How will she get there? Will she have to pay for transport to get there?
- How much will it cost to deliver at the facility? How will she pay for this?
- Can she start saving for these costs now?
- Who will go with her and support her during labour and delivery?
Who will help her while she is away and care for her home and other children? Advise her to bring the following:

- Home-based maternal record
- Clean cloths of different sizes: for the bed, for drying and wrapping the baby, and for her to use as sanitary pads
- Clean clothes for her and the baby
- Food and water for her and the support person

2.1.8 Identification of complications and referral

Every complication arising during the pregnancy that is detected during the antenatal care visit should be managed accordingly or referred. Conditions requiring management or referral are classified in Table 2.4 below.

Table 2.4: Classifications of pregnancy

<table>
<thead>
<tr>
<th>Categories</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Normal pregnancy</td>
<td>• Blood pressure: &lt;140/90 mmHg</td>
</tr>
<tr>
<td></td>
<td>• Proper weight gain during pregnancy of at least 8 kg (1 kg per month)</td>
</tr>
<tr>
<td></td>
<td>• Oedema of the extremities only</td>
</tr>
<tr>
<td></td>
<td>• Fetal heart rate: 120-160 bpm</td>
</tr>
<tr>
<td></td>
<td>• Fetal movements are palpable from 18-20 weeks of gestation onwards until delivery</td>
</tr>
<tr>
<td></td>
<td>• No complications in previous pregnancies</td>
</tr>
<tr>
<td>Note: Manage any complications immediately or refer.</td>
<td></td>
</tr>
<tr>
<td>For management of complications in pregnancy and labour refer to Chapter 3.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.5: Focused antenatal care (ANC): The four-visit ANC model outlined in WHO clinical guidelines

<table>
<thead>
<tr>
<th>Goals</th>
<th>First visit 8 - 12 weeks</th>
<th>Second visit 24-26 weeks</th>
<th>Third visit 32 weeks</th>
<th>Fourth visit 36-38 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Confirm pregnancy and EDD</td>
<td>Assess maternal and fetal well being</td>
<td>Assess maternal and fetal well being</td>
<td>Assess maternal and fetal well being</td>
</tr>
<tr>
<td></td>
<td>Classify women for basic ANC (4 visits) or more specialized care.</td>
<td>Exclude PIH and anaemia</td>
<td>Exclude PIH, anaemia and multiple pregnancies</td>
<td>Exclude PIH, anaemia, multiple pregnancies and malpresentation</td>
</tr>
<tr>
<td></td>
<td>Screen, treat and give preventive measures.</td>
<td>Give preventive measures</td>
<td>Give preventive measures</td>
<td>Give preventive measures</td>
</tr>
<tr>
<td></td>
<td>Develop a birth and emergency plan</td>
<td>Review and modify birth and emergency plan</td>
<td>Review and modify birth and emergency plan</td>
<td>Review and modify birth and emergency plan</td>
</tr>
<tr>
<td></td>
<td>Advise and counsel</td>
<td>Advise and counsel</td>
<td>Advise and counsel</td>
<td>Advise and counsel</td>
</tr>
</tbody>
</table>

Activities

Rapid assessment and management for emergency signs, give appropriate treatment and refer to hospital if needed
<table>
<thead>
<tr>
<th>History (ask, check records)</th>
<th>Examination (look, listen, feel)</th>
<th>Screening and tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess significant symptoms</td>
<td>• Complete general (height, weight, vitals, pallor, oedema) and obstetrical examination, BP</td>
<td>• Haemoglobin, Syphilis, HIV, Proteinuria</td>
</tr>
<tr>
<td>• Take psychosocial, medical and obstetric history</td>
<td>• Check record for previous complications and treatments during the pregnancy</td>
<td>• GTT, Bacteriuria, USG (advisable)</td>
</tr>
<tr>
<td>• Confirm pregnancy and calculate EDD</td>
<td>• Reclassification if needed</td>
<td>• Haemoglobin (if suspected anaemia), Proteinuria</td>
</tr>
<tr>
<td>• Classify all women (in some cases after test results)</td>
<td>• Anaemia, BP, fetal growth and movements</td>
<td>• Proteinuria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anaemia, BP, fetal growth and multiple pregnancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anaemia, BP, fetal growth and movements, multiple pregnancy, malpresentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>History (ask, check records)</th>
<th>Examination (look, listen, feel)</th>
<th>Screening and tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess significant symptoms</td>
<td>• Check record for previous complications and treatments during the pregnancy</td>
<td>• Haemoglobin, Syphilis, HIV, Proteinuria</td>
</tr>
<tr>
<td>• Take psychosocial, medical and obstetric history</td>
<td>• Reclassification if needed</td>
<td>• GTT, Bacteriuria, USG (advisable)</td>
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<tr>
<td>• Confirm pregnancy and calculate EDD</td>
<td>• Anaemia, BP, fetal growth and movements</td>
<td>• Haemoglobin (if suspected anaemia), Proteinuria</td>
</tr>
<tr>
<td>• Classify all women (in some cases after test results)</td>
<td></td>
<td>• Proteinuria</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>History (ask, check records)</th>
<th>Examination (look, listen, feel)</th>
<th>Screening and tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess significant symptoms</td>
<td>• Check record for previous complications and treatments during the pregnancy</td>
<td>• Haemoglobin, Syphilis, HIV, Proteinuria</td>
</tr>
<tr>
<td>• Take psychosocial, medical and obstetric history</td>
<td>• Reclassification if needed</td>
<td>• GTT, Bacteriuria, USG (advisable)</td>
</tr>
<tr>
<td>• Confirm pregnancy and calculate EDD</td>
<td>• Anaemia, BP, fetal growth and movements</td>
<td>• Haemoglobin (if suspected anaemia), Proteinuria</td>
</tr>
<tr>
<td>• Classify all women (in some cases after test results)</td>
<td></td>
<td>• Proteinuria</td>
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</tr>
<tr>
<td>• Classify all women (in some cases after test results)</td>
<td></td>
<td>• Proteinuria</td>
</tr>
<tr>
<td>Treatments</td>
<td>Preventive measures</td>
<td>Health education, advice and counselling</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>• Syphilis</td>
<td>• Tetanus toxoid</td>
<td>• Self care</td>
</tr>
<tr>
<td>• ARV if eligible</td>
<td>• <strong>Iron and folate</strong></td>
<td>• Nutrition</td>
</tr>
<tr>
<td>• Treat bacteriuria if indicated</td>
<td>• Aspirin and calcium as indicated</td>
<td>• Safe sex</td>
</tr>
<tr>
<td>• Tetanus toxoid</td>
<td>• Iron and folate</td>
<td>• Rest, sleeping under ITN</td>
</tr>
<tr>
<td>• <strong>Iron and folate</strong></td>
<td>• IPTp</td>
<td>• Birth and emergency plan</td>
</tr>
<tr>
<td>• Aspirin and calcium as indicate</td>
<td>• ARV</td>
<td>• Birth and emergency plan</td>
</tr>
<tr>
<td>• ARV if eligible</td>
<td>• ARV</td>
<td>• Birth and emergency plan</td>
</tr>
<tr>
<td>• If breech, ECV or referral for ECV</td>
<td></td>
<td>• Birth and emergency plan</td>
</tr>
<tr>
<td>• IPTp</td>
<td></td>
<td>• Infan feeding</td>
</tr>
<tr>
<td>• ARV</td>
<td></td>
<td>• Postpartum/postnatal care</td>
</tr>
<tr>
<td>• ARV if eligible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2 Normal Labour and Childbirth

Labour and childbirth are considered normal if:

- Spontaneous in onset, low-risk at the start of labour and remaining so throughout labour and delivery

- The infant is born spontaneously in the vertex position between 37 and 42 completed weeks of pregnancy

- After birth, mother and infant are in good condition.

2.2.1 Initial evaluation of a woman in labour

- Perform a rapid evaluation of the general condition of the woman including vital signs (pulse, blood pressure, respiration, temperature).
Assess fetal condition:

- Listen to the fetal heart rate immediately after a contraction.
- Count the fetal heart rate for a full minute at least once every 30 minutes during the active phase and every 5 minutes during the second stage.
- If there are fetal heart rate abnormalities (less than 100 or more than 180 beats per minute), suspect fetal distress.

If the membranes have ruptured, note the colour of the draining amniotic fluid:
- Presence of thick meconium indicates the need for close monitoring and possible intervention for management of fetal distress. Absence of fluid draining after rupture of the membranes is an indication of reduced volume of amniotic fluid, which may be associated with fetal distress.

2.2.2 Diagnosis

Diagnosis of labour includes:
- Diagnosis and confirmation of labour
- Diagnosis of stage and phase of labour
- Assessment of engagement and descent of the fetus
- Identification of presentation and position of the fetus

Note: An incorrect diagnosis of labour can lead to unnecessary anxiety and interventions.

Diagnosis and confirmation of labour

- Suspect or anticipate labour if the woman has:
  - Intermittent abdominal pain after period of viability
  - Pain often associated with blood-stained mucus discharge (show)
  - Watery vaginal discharge or a sudden gush of water.
Carry out vaginal examination and record the following:

- Colour of amniotic fluid
- Cervical dilatation
- Descent (can also be assessed abdominally).

Confirm the onset of labour if there is:

- Cervical effacement—the progressive shortening and thinning of the cervix during labour
- Cervical dilatation—the increase in diameter of the cervical opening measured in centimetres (Figure 2.3).

Figure 2.3. Effacement and dilatation of the cervix

If the cervix is not dilated on first examination it may not be possible to diagnose labour.

If contractions persist, re-examine the woman after 4 hours for cervical changes. At this stage, if there is effacement and dilatation, the woman is in labour; if there is no change, the diagnosis is false labour.
### Diagnosis of stage and phase of labour

#### Table 2.6: Diagnosis of stage and phase of labour

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Stage</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Contractions may be irregular in strength, length and frequency</td>
<td>• False labour/ Not in labour</td>
<td></td>
</tr>
<tr>
<td>• Cervix not dilated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Contractions may be irregular in strength, length and frequency</td>
<td>• First</td>
<td>• Latent</td>
</tr>
<tr>
<td>• Cervical shortening/effacement &lt;0.5 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cervix dilated less than 4 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Regular uterine contractions</td>
<td>• First</td>
<td>• Active</td>
</tr>
<tr>
<td>• Cervix dilated 4–9 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Rate of dilatation typically 1 cm per hour or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fetal descent begins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cervix fully dilated (10 cm)</td>
<td>• Second</td>
<td>• Early (non-expulsive)</td>
</tr>
<tr>
<td>• Fetal descent continues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No urge to push</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cervix fully dilated (10 cm)</td>
<td>• Second</td>
<td>• Late (expulsive)</td>
</tr>
<tr>
<td>• Presenting part of fetus reaches pelvic floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bulging thin perineum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Head visible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Woman has the urge to push</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ends with the delivery of the baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stage starts immediately after the baby is delivered and ends with the delivery of the placenta</td>
<td>• Third</td>
<td></td>
</tr>
</tbody>
</table>
Assessment of engagement and descent of the fetus

- Assess descent in terms of fifths of fetal head palpable above the symphysis pubis by abdominal palpation (Figure below):
  - A head that is entirely above the symphysis pubis is five-fifths (5/5) Palpable (B)
  - A head that is entirely below the symphysis pubis is zero-fifths (0/5) Palpable (Figure 2.10)

Figure 2.4. Abdominal palpation for descent of the fetal head

- If necessary, assess the descent by vaginal examination by relating the level of the fetal presenting part to the ischial spines of the maternal pelvis (Figure below).

Figure 2.5. Assessing descent of the fetal head by vaginal examination – 0 station is at the level of the ischial spine (Sp)
Note: When there is a significant degree of caput or moulding, assessment by abdominal palpation using fifths of head palpable is more useful than assessment by vaginal exam.

Identification of presentation and position of the fetus

► Determine the presenting part

- The most common presenting part is the vertex of the fetal head. If the vertex is not the presenting part, manage as a malpresentation (see Chapter 3).
- If the vertex is the presenting part, use landmarks on the fetal skull to determine the position of the fetal head in relation to the maternal pelvis (Figure below).

► Determine the position of the fetal head:

Figure 2.6. Landmarks of the fetal skull

![Diagram of fetal skull landmarks]

- The fetal head normally engages in the maternal pelvis in an occiput transverse position, with the fetal occiput transverse in the maternal pelvis (Figure 2.7).
- With descent, the fetal head rotates so that the fetal occiput is anterior in the...
maternal pelvis (occiput anterior positions, Figure 2.8). Failure of an occiput transverse position to rotate to an occiput anterior position should be managed as an occiput posterior position (Chapter 4).

- An additional feature of a normal presentation is a well-flexed vertex (Figure 2.9), with the occiput lower in the vagina than the sinciput
If the fetal head is well-flexed with occiput anterior or occiput transverse (in early labour), proceed with delivery.

If the fetal head is not occiput anterior, identify and manage the malposition.

If the fetal head is not the presenting part or the fetal head is not well flexed, identify and manage the malpresentation (table 4.2).

2.2.3 Using the Partogram

The WHO partogram has been modified to make it simpler and easier to use.

The latent phase has been removed and plotting on the partogram begins in the active phase when the cervix is 4 cm dilated.

Record the following on the partogram:

**Patient information:** Fill out name, gravida, para, hospital number, date and time of admission, and time of ruptured membranes or time elapsed since rupture of membranes (if rupture occurred before charting on the partogram began).

**Fetal heart rate:** Record every half hour.

**Amniotic fluid:** Record the colour of amniotic fluid at every vaginal examination:

- I: membranes intact
- R: membranes ruptured
- C: membranes ruptured, clear fluid
- M: meconium-stained fluid
- B: blood-stained fluid

**Moulding:**

- 1+: sutures apposed
- 2+: sutures overlapped but reducible
- 3+: sutures overlapped and not reducible
**Cervical dilatation:** Assessed at every vaginal examination and marked with a cross (X). Begin plotting on the partogram at 4 cm.

**Alert line:** A line starts at 4 cm of cervical dilatation to the point of expected full dilatation at the rate of 1 cm per hour.

**Action line:** Parallel and 4 hours to the right of the alert line.

**Descent assessed by abdominal palpation:** Refers to the part of the head (divided into five parts) palpable above the symphysis pubis; recorded as a circle (O) at every abdominal examination. At 0/5, the sinciput (S) is at the level of the symphysis pubis.

**Figure 2.10. Descent of the head**

**Hours:** Refers to the time elapsed since onset of active phase of labour (observed or extrapolated).

**Time:** Record actual time.

**Contractions:** Chart every half hour; count the number of contractions in a 10-minute time period, and their duration in seconds.

- Less than 20 seconds
- Between 20 and 40 seconds
- More than 40 seconds
**Oxytocin:** Record the amount of oxytocin per volume IV fluids in drops per minute every 30 minutes when used.

**Drugs given:** Record any additional drugs given.

**Pulse:** Record every 30 minutes and mark with a dot (.).

**Blood pressure:** Record every 4 hours and mark with arrows.

**Temperature:** Record every 2 hours.

**Protein, acetone and volume:** Record when urine is passed.

### 2.2.4 The First Stage

**Management**

Supportive Care during Labour and Childbirth

- Encourage the woman to have personal support from a person of her choice throughout labour and birth (depending on the country policy):
  - Encourage support from the chosen birth companion.
  - Arrange seating for the companion next to the woman.
  - Encourage the companion to give adequate support to the woman during labour and childbirth (rub her back, wipe her brow with a wet cloth, assist her to move about).

- Ensure good communication and support by staff.

- Explain all procedures, seek permission and discuss findings with the woman:
  - Provide a supportive, encouraging atmosphere for birth that is respectful of the woman's wishes.
  - Ensure privacy and confidentiality.

- Maintain cleanliness of the woman and her environment:
  - Encourage the woman to wash herself or bathe or shower at the onset of labour.
Figure 2.11. The modified WHO partogram
Wash the vulval and perineal areas before each examination.
Wash your hands with soap before and after each examination.
Ensure cleanliness of labouring and birthing area(s).
Clean up all spills immediately.

Ensure mobility:
- Encourage the woman to move about freely.
- Support the woman’s choice of position during labour and birth.
- Encourage the woman to empty her bladder regularly.

Note:
- Do NOT routinely give an enema to women in labour.
- Do NOT shave the woman’s pubic hair as this increases the risk of wound infection.
- Do NOT clean the vagina with antiseptics during labour.
- Encourage the woman to eat and drink as she wishes. If the woman has visible severe wasting or tires during labour, make sure she is fed. Nutritious liquid drinks are important, even in late labour.
- Teach breathing techniques for labour and delivery. Encourage the woman to breathe out more slowly than usual and relax with each expiration.
- Help the woman in labour who is anxious, fearful or in pain:
  - Give her praise, encouragement and reassurance.
  - Give her information on the process and progress of her labour.
  - Listen to the woman and be sensitive to her feelings.
- If the woman is distressed by pain:
- Suggest changes of position (Figure 2.12).
- Encourage mobility.
- Encourage her companion to massage her back or hold her hand and sponge her face between contractions.
- Encourage breathing techniques.
- Encourage warm bath or shower.
- If necessary, give pethidine or morphine for pain relief.
- Once diagnosed, assess progress of labour by:
  - Measuring changes in cervical effacement and dilatation (Figure 2.11) during the latent phase;
  - Measuring the rate of cervical dilatation (Figure 2.3) and fetal descent (Figure 2.4) during the active phase;
  - Assessing further fetal descent during the second stage.
- Once the woman enters the active phase of labour plot progress of the first stage of labour on a partogram. A sample partogram is shown in Figure 2.11). Alternatively, plot a simple graph of cervical dilatation (centimetres) on the vertical axis against time (hours) on the horizontal axis.
- Carry out vaginal examinations at least once every 4 hours during the first stage of labour and after rupture of the membranes. Plot the findings on a partogram.
- At each vaginal examination, record the following:
  - Colour of amniotic fluid
  - Cervical dilatation
  - Descent (can also be assessed abdominally)
  - Moulding
- Monitor the following parameters regularly.
Table 2.7: Monitoring during the first stage

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Frequency during latent first stage</th>
<th>Frequency during active first stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure</td>
<td>Every 4 hours</td>
<td>Every 4 hours</td>
</tr>
<tr>
<td>Temperature</td>
<td>Every 4 hours</td>
<td>Every 2 hours</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>Every 30-60 minutes</td>
<td>Every 30-60 minutes</td>
</tr>
<tr>
<td>Fetal heart rate</td>
<td>Every 30 minutes</td>
<td>Every 15 minutes</td>
</tr>
<tr>
<td>Contractions</td>
<td>Every 1 hour</td>
<td>Every 30 minutes</td>
</tr>
<tr>
<td>Cervical dilation</td>
<td>Every 4 hours*</td>
<td>Every 4 hours*</td>
</tr>
<tr>
<td>Head descent</td>
<td>Every 4 hours*</td>
<td>Every 4 hours*</td>
</tr>
<tr>
<td>Colour of amnionic fluid</td>
<td>Every 4 hours*</td>
<td>Every 4 hours*</td>
</tr>
<tr>
<td>Moulding</td>
<td>Every 4 hours*</td>
<td>Every 4 hours*</td>
</tr>
</tbody>
</table>

*Assessed in every vaginal examination

Progress of first stage of labour

Progress in the first stage of labour is satisfactory, if:

- Regular contractions of progressively increasing frequency and duration
- Rate of cervical dilatation at least 1 cm per hour during the active phase of labour (cervical dilatation on or to the left of alert line in the partogram)
- Cervix well applied to the presenting part

Progress in the first stage of labour is unsatisfactory, if:

- Irregular and infrequent contractions after the latent phase OR
- Rate of cervical dilatation slower than 1 cm per hour during the active phase of labour (cervical dilatation to the right of alert line in the partogram) OR
- Cervix poorly applied to the presenting part

Unsatisfactory progress in labour can lead to prolonged labour (see 4.1).
Note: Do NOT ask the mother to push before the cervix is fully dilated as this may cause cervical tears and/or oedema.

2.2.5 The second stage

Management

- Check if all needed equipment, material and essential drugs is available and ready to use.
- In the second stage of labour, perform vaginal examinations once every hour.
- Assess for progress of labour:
  - Findings suggestive of satisfactory progress in second stage of labour are:
    - Steady descent of fetus through birth canal.
    - Onset of expulsive (pushing) phase.
  - Findings suggestive of unsatisfactory progress in second stage of labour are:
    - Lack of descent of fetus through birth canal
    - Failure of expulsion during the late (expulsive) phase.
- If unsatisfactory progress of labour or prolonged labour is suspected, manage the cause of slow progress (see 4.1).
- Check the fetal heart rate after each contraction, if less than 100 or more than 180 beats per minute, suspect fetal distress.
- Check the position and presentation, if other than occiput anterior with a well-flexed vertex, it is considered a malposition or malpresentation (see 4.2).
- Check the woman for signs of distress, if the woman’s pulse is increasing, she may be dehydrated or in pain.
- Encourage the mother to drink sufficiently and ensure adequate hydration orally or via IV routes.
► If vomiting occurs, give promethazine 25 mg IM or IV.

► If the woman’s blood pressure falls, suspect haemorrhage (see 1.2.3).

► If acetone is present in the woman’s urine, suspect poor nutrition and give dextrose IV.

► Once the cervix is fully dilated and the woman is in the expulsive phase:
  - Tell the woman that cervix is fully dilated and the baby doing well.
  - Encourage her to assume the position she prefers.
  - Ask her to push with every contraction.

**Note:** Do NOT push on the mother’s abdomen as it is painful and increases the risk of uterus rupture.

  - Assess the fetal heart rate after each contraction.

**Figure 2.12. Various positions for birthing**

**Episiotomy should be considered only in the case of:**

► Complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum extraction)

► Scarring from female genital cutting or poorly healed third or fourth degree tears

► Fetal distress
Delivery of the head

- Ask the woman to give only small pushes with contractions as the baby’s head delivers.

- To control birth of the head, place the fingers of one hand against the baby’s head to keep it flexed (bent).

- Continue to gently support the perineum as the baby’s head delivers.

- Once the baby’s head delivers, ask the woman not to push.

- Feel around the baby’s neck for the umbilical cord:
  - If the cord is around the neck but is loose, slip it over the baby’s head
  - If the cord is tight around the neck, clamp at two points and cut in between before unwinding it from around the neck. Do not forget to keep protecting baby’s neck.

Delivery of the shoulder

- Allow the baby’s head to turn spontaneously.

- After the head turns, place a hand on each side of the baby’s head. Tell the woman to push gently with the next contraction.

Figure 2.13 (a) and (b) Cutting the cord

(a)

(b)

Figure 2.14. Delivery of anterior shoulder
- Reduce tears by delivering one shoulder at a time.
- Move the baby’s head posteriorly to deliver the shoulder that is anterior.
- Lift the baby’s head anteriorly to deliver the shoulder that is posterior.

**Note:** If there is difficulty delivering the shoulders, suspect shoulder dystocia (See 4.3).
- Support the rest of the baby’s body with one hand as it slides out.
- Place the baby on the mother’s abdomen.
- Dry the baby with a clean towel.
- Observe the infant while drying and assess the baby’s breathing:

**Note:** Most babies begin crying or breathing spontaneously within 30 seconds of birth and require only simple supportive care at and after delivery.

- If the baby is crying or breathing (chest rising at least 30 times per minute), maintain the infant in skin-to-skin contact position with the mother.
- If baby does not start breathing within 30 seconds, SHOUT FOR HELP and take steps to resuscitate the baby (see 7.2)
- Clamp and cut the umbilical cord at least 1 minute after birth: clamp the umbilical cord at about 3 cm from the baby’s umbilicus and apply a second clamp at 2 cm distally to the first one. Lift the clamped cord and cut it in between the two clamps (while protecting baby’s abdomen). Tie the cord using an HLD/sterile thread/use cord clamp.
**Note:** Do NOT wrap the umbilical stump or apply any liquid/material to the umbilical stump.

- Cover the infant to prevent heat loss: Ensure that the baby is kept warm and in skin-to-skin contact on the mother’s chest. Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss.

- If the mother is not well, ask an assistant to care for the baby.

- Palpate the abdomen to rule out the presence of an additional baby(s) and proceed with active management of the third stage.

**Note:** Do NOT carry out suctioning of the airway of the new born routinely.

### 2.2.6 Active management of third stage

Active management of the third stage (active delivery of the placenta) helps prevent postpartum haemorrhage. It includes:

- Immediate oxytocin

- Controlled cord traction (not recommended when skilled birth attendant not available)

- Uterine massage (not recommended as an intervention to prevent PPH in women who have received prophylactic oxytocin)

**Oxytocin**

- Give oxytocin 10 units IM within 1 minute of delivery of the baby.

- Oxytocin is preferred because it is effective 2 to 3 minutes after injection, has minimal side effects and can be used in all women.

- If oxytocin is not available, give ergometrine 0.2 mg IM.

- If ergometrine is not available, give prostaglandins (Misoprostol 600 mcg oral).
Ask the mother to put the newborn to the breast to initiate breast feeding, which will stimulate the body’s own oxytocin production.

**Note:** Do **NOT** give ergometrine to women with pre-eclampsia, eclampsia or high blood pressure because it increases the risk of convulsions and cerebrovascular accidents.

**Controlled cord traction**

- After a delayed clamping of cord close (5-10cm) to the perineum using a sponge forceps hold the clamped cord with the end of forceps with one hand (*Fig 2.16*).

- Place the other hand just above the woman’s pubic bone and stabilize the uterus by applying counter traction during controlled cord traction. This helps prevent inversion of the uterus.

- Keep slight tension on the cord and await a strong uterine contraction (2 to 3 minutes).

- When the uterus becomes rounded or the cord lengthens, very gently pull downward on the cord to deliver the placenta. Do not wait for a gush of blood before applying traction on the cord. Continue to apply counter traction to the uterus with the other hand.

- If the placenta does not descend during 30 to 40 seconds of controlled cord traction (i.e., there are no signs of placental separation), do not continue to pull on the cord:
  - Gently hold the cord and wait until the uterus is well contracted again. If necessary, use a sponge forceps to clamp the cord closer to the perineum as it lengthens;
  - With the next contraction, repeat controlled cord traction with counter traction.

**Note:** Never apply cord traction (pull) without applying counter traction (push) above the pubic bone with the other hand.
As the placenta delivers, the thin membranes can tear off.
- Hold the placenta in two hands and gently turn it until the membranes are twisted.
- Slowly pull to complete the delivery.
- If the membranes tear, gently examine the upper vagina and cervix wearing high-level disinfected or sterile gloves.
- Use a sponge forceps to remove any pieces of membrane that are present.
- Look carefully at the placenta to be sure none of it is missing. If a portion of the maternal surface is missing or there are torn membranes with vessels, suspect retained placental fragments (see 1.2.3.3.3).
- If uterine inversion occurs, reposition the uterus (see 1.2.3.3.5).
- If the cord is pulled off, manual removal of the placenta may be necessary (see A. 7).

**Examination for tears**

- Examine the woman carefully for perineal tears.
- Repair any tears to the cervix (see A. 16.1) or vagina (see A. 16.2). There are four degrees of tears that can occur during delivery.
2.3 The Postpartum Period

2.3.1 Background

The puerperium begins with the completion of the delivery of the placenta and ends when the reproductive organs return to pre-gestational condition, lasting approximately 6 weeks. Provide postnatal care during the first 24 hours after birth and up to 6 weeks to mother and newborn.

2.3.2 Immediate postpartum management (in case of health facility delivery)

- Assess the woman regularly for temperature, pulse rate, fundal height, uterine contraction, vaginal bleeding, episiotomy and local tears during the first 24 hours:

<table>
<thead>
<tr>
<th>Degrees</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First-degree tears involve the vaginal mucosa and connective tissue.</td>
</tr>
<tr>
<td>2</td>
<td>Second-degree tears involve the vaginal mucosa, connective tissue and underlying muscles.</td>
</tr>
<tr>
<td>3</td>
<td>Third degree tears involve transection of the anal sphincter.</td>
</tr>
<tr>
<td>3a</td>
<td>Partial tear of less than 50% of the external anal sphincter</td>
</tr>
<tr>
<td>3b</td>
<td>Greater than 50% tear of external anal sphincter</td>
</tr>
<tr>
<td>3c</td>
<td>Internal sphincter torn</td>
</tr>
<tr>
<td>4</td>
<td>Fourth degree tears involve the rectal mucosa.</td>
</tr>
</tbody>
</table>

Note: It is important that absorbable sutures be used for closure. Polyglycolic sutures are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications. Chromic catgut is an acceptable alternative, but is not ideal.
Monitor the woman every 15 minutes in the first hour after delivery for emergency signs by rapid assessment (see Table 1.1).

Thereafter monitor her at 2, 3 and 4 hours and then every 4 hours for 24 hours.

- Blood pressure should be measured shortly after birth. If normal, the second blood pressure measurement should be taken within 6 hours.

- Encourage the woman to eat and drink.

- Urine voiding should be documented within 6 hours.

- Ask the companion to stay with the mother.

- Keep the mother and the baby together.

- Advise on postpartum care and hygiene.

- All women should be encouraged to exclusively breast feed from birth until 6 months of age, provide counselling and support for exclusive breast feeding at each postnatal contact.

- After an uncomplicated vaginal birth in a health facility, healthy mothers and newborns should receive care in the facility for at least 24 hours after birth.

- All women should be counselled to consult a health care provider in case of any health concerns/danger signs.

**Danger Signs**

- Give information about the physiological process of recovery after birth, and that some health problems are common, and advice to report any health concerns to health care professionals, in particular:

  - Symptoms and signs of postpartum haemorrhage: sudden and profuse blood loss or persistent increased blood loss; faintness; dizziness; palpitations/tachycardia
▪ Symptoms and signs of infection: fever; shivering; abdominal pain and/or offensive vaginal discharge

▪ Symptoms and signs of thromboembolism: unilateral calf pain; redness or swelling of calves; shortness of breath or chest pain

▪ Symptoms and signs of pre-eclampsia/eclampsia: convulsions; severe headaches accompanied by one or more of the symptoms of visual disturbances, nausea, vomiting, epigastric or hypochondrial pain, feeling faint.

► Advise to go to a hospital or health centre immediately, day or night, **WITHOUT WAITING**, if any of the following signs:

▪ Vaginal bleeding: more than 2 or 3 pads soaked in 20-30 minutes after delivery OR

▪ Bleeding increases rather than decreases after delivery

▪ Convulsions

▪ Fast or difficult breathing

▪ Fever and too weak to get out of bed

▪ Severe abdominal pain.

► Advise to go to health centre as soon as possible if any of the following signs:

▪ Fever

▪ Abdominal pain

▪ Feels ill

▪ Breasts swollen, red or tender breasts, or sore nipple

▪ Urine dribbling or pain on micturition

▪ Pain in the perineum or draining pus

▪ Foul-smelling lochia.
2.3.2.1 Advice given during postpartum care regarding various aspects including hygiene

► To always have someone near her for the first 24 hours to respond to any change in her condition

► Early ambulation is advised

► Not to insert anything into the vagina

► To have enough rest and sleep

► The importance of washing to prevent infection of the mother and her baby:
  ▪ Wash hands before handling baby.
  ▪ Wash perineum daily and after urination and defecation.
  ▪ Change perineal pads every 4 to 6 hours, or more frequently if heavy lochia.
  ▪ Wash used pads or dispose them safely.
  ▪ Wash the body daily.

► To avoid sexual intercourse until the perineal wound heals.

Care of bladder and bowel:

► Women should be advised to pass urine frequently and keep the area dry after that. She should take lot of liquids and roughage to prevent constipation.
2.3.2.2 Supporting breastfeeding

To enable mothers to establish and sustain exclusive breastfeeding for 6 months, WHO and UNICEF recommend:

- **Early initiation of breastfeeding** - within the first hour of life
- **Exclusive breastfeeding** - the infant only receives breast milk without any additional food or drink, not even water
- **Breastfeeding on demand** - as often as the child wants, day and night
- No use of bottles, teats or pacifiers

Breastfeeding is most important for protecting infants from illness.

Exclusive breastfeeding is recommended from birth until 6 months of age.

Continued breastfeeding, with adequate complementary foods, is recommended from 6 months to ≥ 2 years.

Health workers have the responsibility to encourage mothers to breastfeed and to help them overcome any difficulties.

- Help the mother to breastfeed.
- Make sure the newborn is attached well to the breast (*Fig 2.17,2.18*). Signs of good attachment are:
  - Areola visible above infant’s mouth
  - Mouth wide open
  - Lower lip turned out
  - Infant’s chin touching the breast.

Make sure the mother holds her newborn correctly to support breastfeeding (*see Figure 2.20*). The newborn:

- Should be held close to the mother.
- Should face the breast.
- His/her body should be in a straight line with the head.
- His/her whole body should be supported

**Figure 2.17. Good (left) and poor (right) attachment of infant to the mother’s breast**

- Help is most important soon after delivery, when the baby starts breastfeeding:
  - Build the mother’s confidence
  - Encourage her to give plenty of skin-to-skin contact, and proper attachment to the breast
  - Give her this help early, in the first day, before her breast milk 'comes in' and her breasts are full
  - Help her to try different positions to hold her baby
- If a baby cannot suckle effectively in the first week or two, help the mother to:
  - Express her milk and feed it to her baby with a cup — this helps to keep breasts soft and easier for the baby to attach to the breast
  - Express a little milk directly into her baby’s mouth
  - Continue to give baby skin-to-skin contact
Breastfeed the baby in different positions at different feeds

Care of the breast:

- **No specific care of the breast is needed for normal breastfeeding** - Breasts do not need to be washed before or after feeds — normal washing as for the rest of the body is all that is necessary. Washing removes natural oils from the skin, and makes soreness more likely.
Management of sore nipples - Look for a cause:

- Check attachment
- Examine breasts — engorgement, fissures, Candida
- Check baby for Candida and tongue-tie

Give appropriate treatment:

- Build mother’s confidence
- Improve attachment, and continue breastfeeding
- Reduce engorgement — suggest feed frequently, express
- Treat for Candida if skin is red, shiny, flaky, or if there is itchiness or deep pain, or if soreness persists

Advise the mother to:

- Wash breasts only once a day, and avoid using soap
- Avoid medicated lotions and ointments
- Rub hind milk on areola after feeds

Low-birth-weight and sick infants:

- Infants with a birth weight < 2.5 kg need breast milk even more than larger infants; often, however, they cannot breastfeed immediately after birth, especially if they are very small.

- For the first few days, an infant may not be able to take oral feeds and may have to be fed IV. Initiate early feeding with small oral feeds even on day 1 or as soon as the infant can tolerate enteral feeds.

- Very low-birth-weight infants (< 1.5 kg) may have to be fed by naso- or orogastric tube during the first days of life. Preferably give the mother’s expressed breast milk.
The mother can let the infant suck on her cleaned finger while being tube fed. This may stimulate the infant’s digestive tract and help weight gain.

- **Low-birth-weight infants at ≥ 32 weeks’ gestational age** can start suckling on the breast. Let the mother put her infant to the breast as soon as the infant is well enough. Continue giving expressed breast milk by cup or tube to make sure that the infant gets all the nutrition needed.

- **Infants at ≥ 34–36 weeks’ gestational age** can usually take all that they need directly from the breast.

- **Non-breastfed infants** should receive either:
  - Expressed breast milk (preferably from their own mothers) or donor human milk where safe and affordable milk-banking facilities are available.
  - Formula milk prepared with clean water according to instructions or, if possible, ready-made liquid formula.

    If the above are not available, consider animal milk. Dilute cow’s milk by adding 50 ml of water to 100 ml of milk, then add 10 g of sugar, with an approved micronutrient supplement. If possible, do not use for premature infants.

- **Feeding infant with expressed breast milk from a cup.**

Expressed breast milk is the best choice, in the following amounts:

![Figure 2.20. Infants who cannot breastfeed](image)
Infants $\geq 2.0$ kg: Give 150 ml/kg daily, divided into eight feeds at 3 hours intervals.

Infants $< 2.0$ kg: See 7.11 for detailed guidance for low-birth-weight infants.

If the child is too weak to suck but can swallow, feeding can be done with a cup. Feed by naso- or orogastric tube if the child is lethargic or severely anorexic or unable to swallow.

Prevention of neonatal infections

Many early neonatal infections can be prevented by:

- Avoiding unnecessary separation of the newborn from the mother, e.g., baby unit.
- Hand-washing before delivering and handling the infant.
- Good basic hygiene and cleanliness during delivery (e.g., chlorhexidine cream for all maternal vaginal examinations
- Appropriate umbilical cord care.
- Appropriate eye care.
- Give prophylactic antibiotics only to neonates with documented risk factors for infection:
  - Membranes ruptured > 18 hours before delivery
  - Mother had fever > 38 °C before delivery or during labour
  - Amniotic fluid was foul-smelling or purulent.
- Give IM or IV ampicillin and gentamicin for at least 2 days and reassess; continue treatments only if there are signs of sepsis (or a positive blood culture).
- Many late neonatal infections are acquired in hospitals. These can be prevented by:
  - Exclusive breastfeeding
  - Strict procedures for hand-washing or alcohol hand rubs for all staff and for families before and after handling infants
  - Using Kangaroo mother care and avoiding use of incubators for preterm infants. If an incubator is used, do not use water for humidification (where Pseudomonas will easily colonize) and ensure that it was thoroughly cleaned with an antiseptic
  - Strict sterility for all procedures
  - Clean injection practices
  - Removing intravenous drips when they are no longer necessary.
2.3.3 Subsequent Postnatal Care

- Assess progress of breast feeding at each postnatal contact.
  - Ensure that baby gains weight adequately.
- Encourage exclusive breastfeeding.
- Check urine output.
  - Baby urinates as much as 6 times per 24 hours
- There is no strict rule regarding infant feeding frequency (typically as much as 10-12 times per 24 hours). Practise demand feeding.
- Counsel on breastfeeding – proper attachment (see 2.3.2.2).
  - Breasts can feel tender and empty after breastfeeding.
- Listen to mother and build confidence

Table 2.9: Assessment of postnatal mother in subsequent visit

<table>
<thead>
<tr>
<th>Enquire about common health problems</th>
<th>Assess for</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Headache</td>
<td>• Pallor</td>
</tr>
<tr>
<td>• Back pain</td>
<td>• Pulse rate</td>
</tr>
<tr>
<td>• Fever</td>
<td>• Temperature</td>
</tr>
<tr>
<td>• Fatigue, breast pain</td>
<td>• Breast lump/tenderness/red areas</td>
</tr>
<tr>
<td>• Abdominal pain, perineal pain</td>
<td>• Uterine tenderness</td>
</tr>
<tr>
<td>• Vaginal bleeding</td>
<td>• Lochia</td>
</tr>
<tr>
<td>• Bowel and bladder habit</td>
<td>• Perineal hygiene</td>
</tr>
<tr>
<td>• Emotional outbursts (feeling unhappy or crying easily)</td>
<td>• Perineal wound healing</td>
</tr>
</tbody>
</table>
Increasing supply of breast milk
- Breastfeed the baby every 2 hours
- Baby suckles on the breast in a properly attached position; there are sounds of active swallowing
- Breastfeed the baby in a quiet and comfortable place
- Always drink fluids before breast feeding the baby
- Sleep beside the baby
- Teach and monitor the correct method of breast feeding.

Breast problems:
- Crack nipples
- Engorged breast(s)

2.3.4 Nutrition
- Provide iron and folic acid supplementation for at least 3 months.
- Advise the woman to eat a greater amount and variety of healthy foods, such as meat, fish, oils, nuts, seeds, cereals, beans, vegetables, cheese, milk, to help her feel well and strong (give examples of types of food and how much to eat). Keep her preferences in mind.
- Reassure the mother that she can eat any normal foods — these will not harm the breast feeding baby. Spend more time on nutrition counselling with very thin women and adolescents.
- Determine if there are important taboos about foods which are nutritionally healthy.
- Advise the woman against these taboos.
- Talk to family members such as partner and mother-in-law, to encourage them to help ensure the woman eats enough and avoids hard physical work.
2.3.5  **Postnatal Exercises**

- Encourage all women to take up exercises in the postnatal period. These exercises are specially designed to reduce backache, tone up abdominal and perineal muscles thus preventing pendulous abdomen and incontinence of urine.
  
  - Teach exercises for abdominal and pelvic floor muscles (Kegel exercises):
    
    - Pull abdominal muscles while breathing in a supine sleeping position with arms lying sideways, hold breath for a count of 5, lift the chin to the chest, repeat 10 times.
    
    - Stand with both legs pressed together. Hold and tighten buttocck and hip muscles until a count of 5, repeat 5 times.

2.3.6  **Psychosocial Support**

- Provide an opportunity for women to discuss their birth experience during their hospital stay.

- At each postnatal contact, ask the woman about her emotional well-being, what family and social support she has and her usual coping strategies for dealing with day-to-day matters.

- Encourage all women and their families/partners to tell their healthcare professional about any changes in mood, emotional state and behaviour that are outside of the woman’s normal pattern (see 5.2).

- At 10–14 days after birth, ask the woman about resolution of mild, transitory postpartum depression (“maternal blues”). If symptoms have not resolved, the woman’s psychological well-being should continue to be assessed for postnatal depression, and if symptoms persist, evaluated.

2.3.7  **Family Planning and Sexual Health Counselling**

- Counsel on birth spacing and family planning.
  
  (The counselling for the same should have been started in the antenatal period)
Discuss contraceptive options, and contraceptive methods should be provided if requested (see Chapter 6).

If appropriate, ask the woman if she would like her partner or another family member to be included in the counselling session.

Explain that after birth, if she has sex and is not exclusively breastfeeding, she can become pregnant as soon as 4 weeks after delivery. Therefore it is important to start thinking early about what family planning method they will use.

Ask about plans for having more children. If she (and her partner) want more children, advise that waiting at least 2 years before trying to become pregnant again is good for the mother and for the baby's health.

Information on when to start a method after delivery will vary depending on whether a woman is breastfeeding or not.

Make arrangements for the woman to see a family planning counsellor, or counsel her directly.

Counsel on safer sex including use of condoms for dual protection from sexually transmitted infection (STI) or HIV and pregnancy. Promote their use, especially if at risk for sexually transmitted infection (STI) or HIV.

Her partner can decide to have a vasectomy (male sterilization) at any time.

Ask all women about resumption of sexual intercourse and possible dyspareunia as part of an assessment of overall well-being 2–6 weeks after birth.

2.3.8 Malaria Prevention

In malaria endemic areas, advise mother and baby to sleep under an impregnated bed net.

2.3.9 Initial Care of the Newborn

Skin-to-skin contact and early breastfeeding are the best ways to keep an infant warm and
prevent hypoglycaemia. Term and low-birth-weight neonates weighing more than 1500 g who do not have complications and are clinically stable should be put in skin-to-skin contact with the mother soon after birth after they have been dried thoroughly to prevent hypothermia.

- Follow the assessment steps in Chart 7.1.
- Avoid separating mother and baby whenever possible.
- Do not leave mother and baby unattended at any time.
- Keep the baby in skin-to-skin contact on the mother’s chest or at her side, in a warm, draught-free room.
- Check the newborn’s breathing and colour every 5 minutes if the baby becomes cyanotic or is having difficulty breathing (less than 30 or more than 60 breaths per minute), give oxygen by nasal catheter or prongs.
- Check temperature: Make sure that baby’s body temperature is normal (36.5 to 37.5°C). If the baby’s temperature is less than 36.5°C, re-warm the baby.
- Check the cord for bleeding every 15 minutes. If the cord is bleeding, re-tie the cord more tightly.
- Initiate breastfeeding within the first hour as soon as the baby shows signs of readiness to feed.
- After approximately 1 hour of skin-to-skin contact:
  - Weigh and measure the baby.
  - Give IM vitamin K (phytomethadione) to all newborns.
    - 1 ampoule (1mg/0.5ml or 1mg/ml) once. (Do not use 10mg/ml ampoule).
    - For preterm neonates, give 0.4 mg/kg IM (maximum dose, 1mg).
- Apply antiseptic eye drops or ointment (e.g., tetracycline ointment) to both eyes once, according to national guidelines.
- Give oral polio, hepatitis B and bacille Calmette-Guérin (BCG) vaccines, depending on national guidelines.

- Give the baby identifier bracelet containing information on the name of his/her mother, time of birth, sex.

- Check for presence of congenital malformations (cleft lip/palatal cleft, anal atresia, abdominal wall defects) and danger signs.

**Note:** In case of any danger sign, call the paediatrician or prepare for referral.

- Postpone the process of bathing the newborn up to at least 6 hours after the temperature is stable (preferably 24 hours week).

- Help mother to breastfeed.
### Pregnancy with Problems

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3.1 Hypertension in Pregnancy

The hypertensive disorders of pregnancy include

- Gestational hypertension
- Preeclampsia
- Eclampsia
- Chronic hypertension
- Chronic hypertension with superimposed preeclampsia

3.1.1 Diagnosis

Gestational hypertension

- Defined as systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure (DBP) ≥90 mm Hg in a previously normotensive pregnant woman who is ≥ 20 weeks of gestation and has no proteinuria or new signs of end-organ dysfunction.

- The blood pressure readings should be documented on at least two occasions at least 4 hours apart.

Preeclampsia

- Two readings of diastolic blood pressure 90–110 mm Hg 4 hours apart after 20 weeks gestation.

- Proteinuria ≥1+ on Dipstick Test.

- In the absence of proteinuria, hypertension with evidence of organ dysfunction (as in severe preeclampsia).

Preeclampsia is classified as mild and severe preeclampsia.

Mild preeclampsia:

- Two readings of diastolic blood pressure 90–110 mm Hg 4 hours apart after 20 weeks gestation.
Proteinuria ≥1+ on Dipstick.
No evidence of organ dysfunction.

**Severe preeclampsia**
- Diastolic blood pressure 110 mm Hg or more after 20 weeks gestation.
- Proteinuria 3+ or more on Dipstick.
- And sometimes:
  - Headache (increasing frequency, not relieved by regular analgesics).
  - Blurred vision.
  - Oliguria (passing less than 400 mL urine in 24 hours).
  - Upper abdominal pain (epigastric pain or pain in right upper quadrant).
  - Pulmonary oedema.
  - Lab parameters (thrombocytopenia (Platelet count <100,000 mm3), raised liver enzymes (>twice normal), Serum creatinine >1.2 mg/dl)).

**Eclampsia**
- Convulsions.
- Diastolic blood pressure 90 mm Hg or more after 20 weeks gestation.
- Proteinuria ≥1+ on Dipstick.
- And sometimes:
  - Altered sensorium or loss of consciousness.
  - Other symptoms and signs of severe preeclampsia.

**Note:**
- A small proportion of women with eclampsia have normal blood pressure.
- Treat all women with convulsions as if they have eclampsia until another diagnosis is confirmed.
Mild preeclampsia often has no symptoms.

Increasing proteinuria may be sign of worsening preeclampsia.

Oedema of the feet and lower extremities is not considered a reliable sign of preeclampsia.

Mild preeclampsia may progress rapidly to severe preeclampsia.

The risk of complications, including eclampsia, increases greatly in severe preeclampsia.

Random urine sampling, such as the dipstick test for protein, is a useful screening tool.

If dipsticks are not available, a sample of urine can be heated to boiling in a clean test tube. Add a drop of 2% acetic acid to check for persistent precipitates that can be quantified as a percentage of protein to the volume of the total sample.

Vaginal secretions or amniotic fluid may contaminate urine specimens.

Only clean-catch mid-stream specimens should be used.

**Chronic hypertension**

If hypertension occurs before 20 weeks of gestation or persists for more than 12 weeks postpartum, it is classified as chronic hypertension.

**Chronic hypertension with superimposed preeclampsia** in a patient of chronic hypertension if there is:

- Sudden exacerbation of hypertension, or a need to escalate the antihypertensive drug dose especially when well-controlled with these medications.

- Urine dip test shows proteinuria of $\geq 1+$ at $> 20$ weeks of gestation.

- Manifest symptoms like right upper quadrant pain, severe headache pulmonary edema or renal insufficiency.

- Lab abnormalities as in severe preeclampsia
Table 3.1. Classification of hypertensive disorders in pregnancy

<table>
<thead>
<tr>
<th>Symptoms and Signs Typically Present</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two readings of diastolic blood pressure 90–110 mm Hg 4 hours apart after 20 weeks gestation</td>
<td>–</td>
<td>Gestational hypertension</td>
</tr>
<tr>
<td>No proteinuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure 90 mm Hg or more before first 20 weeks of gestation</td>
<td>–</td>
<td>Chronic hypertension</td>
</tr>
<tr>
<td>Features of severe preeclampsia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure 90–110 mm Hg detected before 20 weeks of gestation and new development of proteinuria ≥1+</td>
<td></td>
<td>Chronic hypertension with superimposed preeclampsia</td>
</tr>
<tr>
<td>Proteinuria ≥1+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two readings of diastolic BP 90–110 mm Hg 4 hours apart after 20 weeks gestation</td>
<td>–</td>
<td>Mild preeclampsia</td>
</tr>
<tr>
<td>Proteinuria ≥1+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure 110 mm Hg or more and systolic BP more than 160mmHg after 20 weeks gestation</td>
<td>Proteinuria might be absent</td>
<td></td>
</tr>
<tr>
<td>Proteinuria 3+ or more</td>
<td>Headache (increasing frequency, unrelieved by regular analgesics)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blurred vision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe preeclampsia</td>
<td></td>
</tr>
</tbody>
</table>
### Prevention

**Note:** The following is NOT recommended to prevent the development of preeclampsia and its complications:

- Rest at home and strict bed rest are NOT recommended.
- Restriction in dietary salt intake is NOT recommended.
- Vitamin D supplementation is NOT recommended.
- Individual or combined vitamin C and vitamin supplementation is NOT recommended.

### 3.1.2 Management of hypertensive disorders in pregnancy

- Women with severe preeclampsia and eclampsia should be stabilised and immediately referred to a higher centre for management.
- Women with mild preeclampsia may rapidly progress to severe preeclampsia.
Table 3.2. Management of hypertensive disorders in pregnancy

<table>
<thead>
<tr>
<th><strong>Gestational Hypertension/ Preeclampsia</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Admit</td>
</tr>
<tr>
<td>• Monitor BP twice daily, urine protein daily</td>
</tr>
<tr>
<td>• Baseline blood (Hb, Hct, Platelet count, serum creatinine, blood urea, ALT, AST) and urine parameters and examination of retina for changes is advisable</td>
</tr>
<tr>
<td>• Monitor fetal condition (growth and well being)</td>
</tr>
<tr>
<td>• Women with systolic BP less than 160mmHg and Diastolic less than 110 mmHg antihypertensive medications may not be administered</td>
</tr>
<tr>
<td>• Discharge if BP normalises and investigations are normal</td>
</tr>
<tr>
<td>• Follow-up twice weekly with weekly platelet counts and liver enzymes</td>
</tr>
<tr>
<td>• Monitor fetal growth, if signs of growth restriction consider early delivery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Severe preeclampsia</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Admit</td>
</tr>
<tr>
<td>• Stabilize patient and referral to higher centre</td>
</tr>
<tr>
<td>• Principles of management:</td>
</tr>
<tr>
<td>- Monitor BP, urine albumin, fetal condition and lab parameters</td>
</tr>
<tr>
<td>- Start antihypertensives (see Table 3.2)</td>
</tr>
<tr>
<td>- Start MgSo4 (if symptoms like headache, upper quadrant pain, blurring of vision)</td>
</tr>
</tbody>
</table>
Eclampsia

- Admit
- Stabilize patient and referral to higher centre
- Principles of management:
  - Monitor BP, urine albumin, fetal condition and lab parameters.
  - Start antihypertensives (see Table 3.2)
  - Start MgSo4
  - Plan delivery

### Table 3.3. Antihypertensive medications

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyldopa</td>
<td>250 mg tds(max 2g)</td>
<td>Fatigue, depression</td>
</tr>
<tr>
<td>Labetalol</td>
<td>100 mg bd-tds (max 2400 mg)</td>
<td>IUGR, hypoglycemia</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>10 mg bd-tds (max 120 mg)</td>
<td>Hypotension, headache</td>
</tr>
</tbody>
</table>

### Table 3.4. Drugs in hypertensive emergencies (defined as organ damage occurring because of severely elevated BP, BP ≥ 160/110)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Repeat</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Hydralazine</td>
<td>• 5 mg IV slowly over 5 minutes until blood pressure is lowered</td>
<td>• Repeat hourly as needed or give hydralazine 12.5 mg IM every 2 hours as needed</td>
</tr>
<tr>
<td>- Labetolol</td>
<td>• 10 mg IV</td>
<td>• If response to labetolol is inadequate (diastolic blood pressure remains above 110 mm Hg) after 10 minutes, give labetolol</td>
</tr>
</tbody>
</table>
**Magnesium Sulfate**

**Note:** For settings where it is not possible to administer the full magnesium sulfate regimen, the use of magnesium sulfate loading dose followed by immediate transfer to a higher level health-care facility is recommended for women with severe preeclampsia and eclampsia.

**Loading dose**

- Give 4 g of 20% magnesium sulfate solution IV over 5 minutes.
- Follow promptly with 10 g of 50% magnesium sulfate solution: give 5 g in each buttock as a deep IM injection with 1 ml of 2% lidocaine to minimize discomfort. Ensure aseptic technique when giving magnesium sulfate deep IM injection.
- Warn the woman that a feeling of warmth will be felt when magnesium sulfate is given.

**Maintenance dose**

- Give 5 g of 50% magnesium sulfate solution with by deep IM injection into alternate buttocks every 4 hours.
- If 50% solution is not available, give 1 g of 20% magnesium sulfate solution IV every hour by continuous infusion.
20% magnesium sulphate solution is prepared for IV loading dose by diluting 50% solution. If the facility has another concentration e.g. 25%, efforts to taken to ensure that 50% is made available.

While giving IV infusion, the infusion rate should be carefully monitored to avoid sudden increase in magnesium levels and complications. Ideally this should be practised only in places where reliable infusion pumps are available.

Table 3.5. Dose and regimen of magnesium sulfate

<table>
<thead>
<tr>
<th></th>
<th>Zuspan</th>
<th>Pritchard</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Loading dose</td>
<td>• 4g IV(20%) over 5-10 minutes</td>
<td>• 4g (20% solution) IV over 5 minutes and 5g IM (50% sol) into each buttock</td>
</tr>
<tr>
<td>• Maintenance dose</td>
<td>• 1g/hr IV infusion</td>
<td>• 5g IM every 4 hour into alternate buttock</td>
</tr>
</tbody>
</table>

Monitoring

- Closely monitor the woman for signs of toxicity.
- Before repeat administration, ensure that:
  - Respiratory rate is at least 16 per minute
  - Patellar reflexes are present

In case of respiratory arrest:

- Assist ventilation (mask and bag, anaesthesia apparatus, intubation).
- Give calcium gluconate 1 g (10 mL of 10% solution) IV slowly until calcium gluconate begins to antagonize the effects of magnesium sulfate and respiration begins.
Chart 3.1. Plan for delivery

- **Gestational HTN**
  - At term (37 completed weeks)
    - If favourable induce with ARM followed by oxytocin
    - If unfavourable ripen with PGs or Foley's catheter/ Caesarean section
  - Delivered once maternal condition is stabilized
  - Delivered after stabilization

- **Mild preeclampsia**
  - At term (37 weeks)
    - Worsening maternal or fetal condition
    - Labour/rupture of membranes
  - Assess cervical status
  - If favourable induce with ARM followed by oxytocin
  - If unfavourable ripen with PGs or Foley's catheter/ Caesarean section
  - Delivered once maternal condition is stabilized
  - Delivered after stabilization

- **Severe preeclampsia**
  - 34-37 weeks
  - Contraindications to expectant management
    - Eclampsia
    - Non-reassuring fetal status
    - Pulmonary edema
    - DIC
    - Acute Renal failure
    - Abruption
  - Additional complications:
    - Persistent symptoms
    - HELLP syndrome
    - IUGR
    - Worsening fetal status
    - Labour/Rupture of membrane
  - Expectant management:
    - Admit
    - Steroids
    - MgSo4
    - Antihypertensives
    - Maternal and Fetal monitoring

- **Eclampsia**
  - <34 weeks
  - Deliver in 12 hours
  - Continue expectant management

**Contraindications to expectant management**
- Eclampsia
- Non-reassuring fetal status
- Pulmonary edema
- DIC
- Acute Renal failure
- Abruption
- HELLP syndrome: Haemolysis
- Elevated Liver enzymes (EL)
- Low Platelet count (LP)

**Additional complications**
- Persistent symptoms
- HELLP syndrome
- IUGR
- Worsening fetal status
- Labour/Rupture of membrane

**Expectant management**
- Admit
- Steroids
- MgSo4
- Antihypertensives
- Maternal and Fetal monitoring

**ARM:** Artificial rupture of membranes
**PG:** Prostaglandins
**DIC:** Disseminated Intravascular Coagulation
**IUGR:** Intrauterine growth restriction
**HELLP syndrome:** Haemolysis
**Elevated Liver enzymes (EL)**
**Low Platelet count (LP)**
**Note:** If Caesarean section is performed, ensure that:

- Coagulopathy has been ruled out
- Safe general anaesthesia is available. Spinal anaesthesia is associated with the risk of hypotension. This risk can be reduced if adequate IV fluids (500–1000 mL) are infused prior to administration of the anaesthetic.

### 3.1.3 Eclampsia

Delivery must occur within 12 hours of onset of convulsions in eclampsia.

**Management**

- Rapid assessment and management should be done simultaneously.
- Secure airway and give oxygen at 4–6 L per minute.
- Protect the woman from injury but do not actively restrain her.
- Start an IV infusion and infuse IV fluids.
- Give anticonvulsive drugs.
- Position the woman on her left side to reduce risk of aspiration of secretions, vomit and blood.
- Aspirate the mouth and throat as necessary.
- Monitor vital signs (pulse, blood pressure, respiration), reflexes and fetal heart rate hourly.
- If diastolic blood pressure remains above 110 mm Hg and systolic BP more than 160 mm Hg, give antihypertensive drugs (see Table 3.4). Reduce the diastolic blood pressure to less than 100 mm Hg but not below 90 mm Hg (this helps to maintain perfusion to the fetus).
- Catheterize the bladder to monitor urine output and proteinuria.
  - Maintain a strict fluid balance chart (monitor the amount of fluids administered and urine output) to prevent fluid overload.
If urine output is less than 30 mL per hour:

- Withhold magnesium sulfate and infuse IV fluids (normal saline or Ringer's lactate) at 1 L in 8 hours.

- Monitor for the development of pulmonary oedema.

- Never leave the woman alone. A convulsion followed by aspiration of vomit may cause death of the woman and fetus.

- Auscultate the lung bases hourly for rales indicating pulmonary oedema. If rales are heard, withhold fluids and give frusemide 40 mg IV once.

- Assess clotting status with a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy (see 1.2.3.)

- Give a full intravenous or intramuscular magnesium sulfate regimen.

**Note:** For settings where it is not possible to administer the full magnesium sulfate regimen, the use of magnesium sulfate loading dose followed by immediate transfer to a higher level health-care facility is recommended for women with severe preeclampsia and eclampsia.

**Referral**

Consider referral for tertiary level care of women who have:

- Oliguria that persists for 48 hours after delivery

- Coagulation failure (e.g. coagulopathy)

- Haemolysis, elevated liver enzymes and low platelets (HELLP) syndrome

- Persistent coma lasting more than 24 hours after convulsion

**Note:** Do NOT use corticosteroids for the specific purpose of treating women with HELLP syndrome.
Management of Chronic Hypertension

- Encourage rest.
- Do not lower blood pressure below 120/80 mmHg. High levels of blood pressure maintain renal and placental perfusion in chronic hypertension.
- If disease is well-controlled, continue the same antihypertensives if acceptable in pregnancy.
- Start antihypertensives if BP ≥ 150/100.
- If proteinuria or other signs and symptoms are present, consider superimposed preeclampsia and manage as preeclampsia (see Table 3.1)
- Monitor fetal growth and condition:
  - If there are no complications, deliver at 37 weeks.
  - If fetal growth restriction is severe and pregnancy dating is accurate, assess the cervix and consider delivery.

3.2 Anaemia in Pregnancy

- Full blood count testing is the gold standard method for diagnosing anaemia during pregnancy. Where full blood count testing is not available, onsite haemoglobin testing with a haemoglobinometer is recommended over the haemoglobin colour scale method as the method for detecting anaemia

The most common cause of anaemia in pregnancy is iron deficiency.

Iron deficiency causes maternal morbidity due to increased susceptibility to infections, physical weakness, preterm labour, increased risk of postpartum haemorrhage, low birth weight babies. Maternal iron depletion also increases the risk of iron deficiency in the neonate. Other common causes of anaemia in pregnancy are acute haemorrhage and folic acid deficiency.

- **Symptoms:** fatigue, lethargy, breathlessness, palpitations, dizziness.
**Signs:** pallor, tachycardia, signs of Congestive Heart Failure (CHF) (in severe anaemia).

- Hb level of <11 g/dl (trimesters I and III) or <10.5 g/dl (trimester II).
- Severe anaemia: Hb level of <7 g/dl or haematocrit level of <20%.

**Management**

- Check for bleeding and manage accordingly.
- If Plasmodium falciparum malaria is suspected, manage as severe malaria.

### 3.2.1 Iron deficiency anaemia

- Full blood count testing is the gold standard method for diagnosing anaemia during pregnancy. Where full blood count testing is not available, onsite haemoglobin testing with a haemoglobinometer is recommended over the haemoglobin colour scale method as the method for detecting anaemia.

**Mild to moderate anaemia**

- Give ferrous sulfate or ferrous fumerate (Elemental iron 120mg) by mouth PLUS folic acid 400 mcg by mouth once daily for 6 months during pregnancy. Continue for 3 months postpartum.
- Counsel on compliance with treatment.
- Reassess at next antenatal visit (4-6 weeks). If anaemia persists, refer to hospital.

**Severe anaemia**

- Transfuse as necessary:
  - Use packed cells; if blood cannot be centrifuged, let the bag of blood hang until the cells have settled.
  - Infuse the cells slowly and dispose of the remaining serum.
Transfusion Guidelines for Chronic Anaemia in Pregnancy

Duration of pregnancy less than 36 weeks
1. Haemoglobin 5.0 g/dl or below, even without clinical signs of cardiac failure or hypoxia
2. Haemoglobin between 5.0 and 7.0 g/dl and in the presence of the following conditions:
   - Established or incipient cardiac failure or clinical evidence of hypoxia
   - Pneumonia or any other serious bacterial infection
   - Malaria
   - Pre-existing heart disease, not causally related to the anaemia

Duration of pregnancy 36 weeks or more
1. Haemoglobin 6.0 g/dl or below
2. Haemoglobin between 6.0 g/dl and 8.0 g/dl and in the presence of the following conditions:
   - Established or incipient cardiac failure or clinical evidence of hypoxia
   - Pneumonia or any other serious bacterial infection
   - Malaria
   - Pre-existing heart disease, not causally related to the anaemia

Elective Caesarean section
When elective Caesarean section is planned and there is a history of:
- Antepartum haemorrhage (APH)
- Postpartum haemorrhage (PPH)
- Previous Caesarean section

- Give frusemide 40 mg IV with each unit of packed cells.
- Urgent referral to centre with transfusion facilities
1. Haemoglobin between 8.0 and 10.0 g/dl: establish/confirm blood group and save freshly taken serum for cross matching

2. Haemoglobin less than 8.0 g/dl: two units of blood should be crossmatched and available

- Where hookworm is endemic (prevalence of 20% or more)
  - Give one of the following anthelmintic treatments
    - Albendazole 400 mg by mouth once OR
    - Mebendazole 500 mg by mouth once or 100 mg two times per day for 3 days OR
    - Levamisole 2.5 mg/kg body weight by mouth once daily for 3 days OR
    - Pyrantel 10 mg/kg body weight by mouth once daily for 3 days.

- If hookworm is highly endemic (prevalence of 50% or more), repeat the anthelmintic treatment 12 weeks after the first dose.

3.3 Diabetes in Pregnancy

3.3.1 Background

- Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy. Worldwide, one in 10 pregnancies is associated with diabetes, 90% of which are GDM.

- Consequences.
  - GDM
    - Significant maternal and fetal complications if untreated
    - Increased risk of developing type 2 diabetes later in life
- More prone to develop preeclampsia, poly-hydramnios, infections, prolonged and obstructed labour, higher chances of caesarean delivery and PPH

- Fetal risk are of macrosomia, intra uterine fetal death

- Pregestational diabetes
  - Risk of ketoacidosis
  - Congenital malformations mainly central nervous system, cardiac, skeletal and gastrointestinal tract and renal. Caudal regression syndrome is the most specific fetal malformation.

- Neonatal hypoglycemia in poorly controlled GDM pregnancy

3.3.2 Screening for GDM

- All pregnant women should be screened for GDM during pregnancy at 24-28 weeks as per protocol depicted in Chart 3.2 and should be managed accordingly.

- Women with risk factors like previous macrosomic baby, unexplained IUD, previous h/o GDM, obesity or family history of diabetes should be screened at first visit or in first trimester.

  - If negative, screen should be repeated at 24-28 weeks.

WHO recognizes hyperglycemia in pregnancy as diabetes in pregnancy and gestational diabetes. Blood sugar values are as given in Table 3.6.

Table 3.6. Blood sugar cut-offs in diabetes

<table>
<thead>
<tr>
<th>OGGT with 75 gms glucose</th>
<th>GDM</th>
<th>DM in pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting (mg/dl)</td>
<td>92-125</td>
<td>≥126</td>
</tr>
<tr>
<td>1 hour (mg/dl)</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>2 hours (mg/dl)</td>
<td>153-199</td>
<td>≥200</td>
</tr>
</tbody>
</table>
Depending on local burden, resources and priorities alternate protocols may be followed.

### 3.3.3 Management of GDM

- GDM is managed initially with medical nutrition therapy (MNT) and if it is ineffective, management is to be initiated with insulin.

- Patients with diabetes in pregnancy should be managed in consultation with a physician or referred to higher centre. These women are more likely to require insulin therapy and fetal monitoring.

#### General guidelines for MNT

- Eat foods with less sugar and fat, drink at least 1-1½ litres of water per day.

- Do not diet or lose weight during pregnancy.

- Total calorie intake is split into 3 meals and 3 snacks. The composition of the diet should be carbohydrates 55-60%, protein 15-20% and fat 5-10%.

- Total gain in body weight during pregnancy should ideally not exceed 6-8 kg.

- Foods containing sugar and sweets, biscuits, chocolates and soft drinks/ juices, high calorie fruits like mango, banana, jack fruit, sapota (chickoo), grapes and custard apple should be avoided.

- Vegetables specially green leafy vegetables, salads, sprouts and pulses should be preferred.

- The recommended caloric in take depends on the pre-pregnancy BMI of the pregnant woman and is as follows: Under weight (< 19.8): 36-40 KCal/Kg/Day; Normal weight (19.8 – 26): 30 KCal/Kg/Day; Over weight (26.1 – 29): 24 KCal/Kg/Day; Obese (>29): 12-18 KCal/Kg/Day
Pregnant woman in community

Screening for GDM at 24 – 28 weeks of gestation by plasma glucose (PG) (75 g oral glucose tolerance test-fasting, 1 hour, 2 hours plasma glucose value) after overnight fasting

- Fasting ≥126
  - 2 hours ≥ 200
  - Manage as DM in pregnancy
  - Refer to higher centre

- Fasting ≥92,
  - 1 hour ≥180
  - 2 hours ≥153
  - Manage as Gestational Diabetes Mellitus
  - Women kept on Medical Nutrition Therapy (MNT)
  - After 2 weeks
  - FPG, 2 hours PPPG
    - FPG < 95, PPPG < 120 mg/dl
      - Continue MNT
      - Monitor FPG, 2 hour PPPG
        - Up to 32 weeks: Once in 2 weeks
        - After 32 weeks: Once a week
    - FPG > 95, PPPG > 120 mg/dl
      - Refer to physician/higher centre for insulin therapy

- Negative
  - Manage as Normal ANC

GDM: Gestational Diabetes Mellitus
DM: Diabetes Mellitus/ Overt diabetes
Insulin Therapy (in consultation with a physician/at a higher centre)

- Insulin therapy is the accepted medical management of pregnant women with GDM not controlled on medical nutrition therapy in 2 week

- Insulin to be administered subcutaneously using insulin syringe (40 IU syringe) on front / lateral aspect of the thigh, anterior abdominal wall

- For good control aim is to keep fasting plasma glucose< 95 mg/dl and 2 hour post prandial plasma glucose< 120 mg/dl

- Pregnant women should also be counselled for recognition and management of hypoglycaemia (Plasma glucose level < 60 mg/dl)

- Hypoglycemia is recognised as early symptoms of tremors, sweating, hunger, easy fatigability, headache, mood changes, irritability, low attentiveness, tingling sensation around the mouth / lips and severe symptoms of confusion, abnormal behaviour, visual disturbances, nervousness, anxiety, and at times seizures and loss of consciousness rarely

- For immediate management, the woman should be given 3 tablespoon fulls of glucose powder (15-20 grams) dissolved in a glass of water and should be advised rest for some time

- If she develops > 1 episode of hypoglycemia in a day she should consult doctor immediately

Special points for Antenatal care

- GDM with well-controlled plasma sugar levels without any complications: routine antenatal care

- With uncontrolled plasma sugar levels or any complication of pregnancy: every 2 weekly visits in second trimester every week in third trimester

- A fetal anomaly scan by USG: at 18-22 weeks
Fetal echocardiography at 24-26 weeks

If women with GDM between 24 and 34 weeks of gestation and requiring early delivery, should be given antenatal steroids and referred to higher centre.

Woman is counselled to keep record of daily fetal movement counts as there are higher chances of unexplained intra uterine fetal death.

Women on MNT with well-controlled plasma glucose levels can deliver at term, preferably at a centre where neonatal care facilities are available.

Women on insulin should be referred for delivery at higher centre where proper facility for monitoring during labour, infusion pump for insulin therapy and neonatal facilities to deal with any neonatal problems are available.

3.3.4 Immediate neonatal care of GDM pregnancy

Neonatal care should be done as per guidelines with emphasis on early breastfeeding.

Newborn should be monitored for hypoglycemia (capillary blood glucose < 44 mg/dl). Neonate should also be evaluated for other neonatal complications like respiratory distress, convulsions and hyper-bilirubinemia.

3.3.5 Post-delivery follow-up of pregnant women with GDM

Immediate postpartum care in GDM is not different from women without GDM but women are at high risk to develop Type 2 Diabetes mellitus in future.

Maternal plasma glucose levels usually return to normal after delivery. Nevertheless, a FPG and 2 hour PPPG is performed on the 3rd day of delivery. Thus GDM cases are not discharged after 48 hours unlike other normal PNC cases.

Subsequently, 75 g GTT at 6 weeks postpartum is to be done to evaluate glycemic status of woman and management is recommended accordingly.

All these women are counselled for healthy lifestyle, diet and exercise.
Pre-conception care and counselling.

- Known diabetic women planning for conception should also undergo preconception counselling.
- Desired Plasma glucose levels: FPG <100 mg/dl, 2 hour PPPG - <140 mg/dL and Hb A1 C should be <6.5%.
- Should be started on folic acid 5 mg daily.
- Counselling to consult obstetrician as soon as she misses her period.

3.4 Heart Disease in Pregnancy

3.4.1 Background

- Cardiac disease is the leading cause of indirect maternal death. Pregnancy in patients with heart disease is becoming more common due to its early diagnosis and better treatment.
- In developing countries rheumatic heart diseases are the most common disorders (up to 95%). Of these mitral stenosis is the most common lesion.
- In developed countries, congenital heart diseases are commoner than rheumatic heart diseases (up to 50% are ASD,VSD or PDA).
- Ischemic heart diseases rare but now due to use of hormonal contraceptives, smoking, pregnancies in elderly women and diabetics, their occurrence has become slightly more common.

3.4.2 NYHA functional classification of cardiac disease

- Class I: No symptoms and no limitation in ordinary physical activity, e.g., shortness of breath when walking, climbing stairs, etc
- Class II: Mild symptoms (mild shortness of breath and/or angina) and slight limitation during ordinary activity
Class III: Marked limitation in activity due to symptoms, even during less-than-ordinary activity, e.g., walking short distances (20-100 m). Comfortable only at rest.

Class IV: Severe limitations. Experiences symptoms even while at rest. Mostly bed-bound patients.

### 3.4.3 Diagnosis of heart disease

Patient may be a known case of heart disease or come with the following features suggestive of heart problem (see table 3.6):

**Table 3.7. Symptoms and signs of heart disease**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy fatigability, shortness of breath</td>
<td>Cyanosis</td>
</tr>
<tr>
<td>Progressive dyspnoea or orthopnea</td>
<td>Dependant edema</td>
</tr>
<tr>
<td>Nocturnal cough</td>
<td>Clubbing of fingers and toes</td>
</tr>
<tr>
<td>Palpitation</td>
<td>Raised JVP</td>
</tr>
<tr>
<td>Syncope</td>
<td>Diastolic murmur</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>Systolic murmur</td>
</tr>
<tr>
<td>Chest pain</td>
<td>Persistent arrhythmia</td>
</tr>
<tr>
<td></td>
<td>Basal crepitations</td>
</tr>
</tbody>
</table>

If the patient is a diagnosed case of heart disease or there is a clinical suspicion, she should be immediately referred to a centre where there is a provision of combined care by obstetrician and cardiologist.

**Investigations**

Preferably refer the patient to the higher centre for investigations. However, in some cases the following may be done for diagnosing any heart problem:
3.4.4 Management

Antenatal Care

- Patient should have regular antenatal care with more frequent visits than normal pregnancy at the referral centre. She should be counselled about the complications that can develop during pregnancy and the risk to the fetus. In cases of congenital heart disease, hereditary risk should be explained.
- Encourage rest, avoid undue exertion and pain and crowded places.
- Early treatment of anaemia and infections should be encouraged, as they may precipitate heart failure.

Management During Labour and Delivery

- Assess the stage of labour and refer the patient immediately to a higher centre if delivery is not imminent. If, however, delivery is imminent make preparations for delivery with precautions.

First Stage

- Prop up
- Oxygen by mask
- Restrict IV fluids
- Monitor progress of labour and look for signs and symptoms of congestive heart failure
- Antibiotic prophylaxis as indicated
- Pain relief
During 2nd stage of labour:

Treatment and supportive care

- Put the patient in semi-recumbent position
- Oxygen inhalation in between contractions
- Avoid bearing down or straining.
- Cut short 2nd stage of labour by forceps / ventouse application under pudendal and / or perineal block.
- Ventouse preferred as it can be applied in lateral recumbent position.

During 3rd stage of labour:

- Ergometrine is avoided
- Propped up position
- Oxygen by mask
- Injection morphine 3mg I.V
- Monitoring with close observation for at least 2 hours
- If pulmonary edema/ Congestive Cardiac Failure develops manage accordingly (see 1.2.5.1)
- Follow-up at 6 weeks and refer to usual cardiac care.

3.5 Prevention of Mother to Child Transmission (MTCT) of HIV Infection

3.5.1 Background

- The estimated risk of MTCT of HIV infection in the absence of any intervention ranges from 10-35%.
Transmission can occur during pregnancy, labour and breastfeeding.

This rate can be decreased to less than 2% with the help of

- Highly effective antiretroviral drug regimens (HAART)
- Elective Caesarean section
- Replacement feeding from birth

### 3.5.2 Screening and diagnosis of HIV infection

- Provider initiated testing after counselling of the pregnant women.
- Linkage of HIV positive women to (Antiretroviral Therapy) ART centre is advocated for promotion of mother’s health and prevention of new paediatric infections.
- All pregnant women should have their HIV sero status evaluated when they first present for prenatal care.
- Consider retesting in third trimester and also offer partner testing.
- The most common screening test is an enzyme linked immunosorbent assay (ELISA), which looks for the presence of antibodies. If this test result is positive, the ELISA is repeated to eliminate laboratory error prior to proceeding to a confirmatory test. The ELISA has 98% sensitivity. Confirmatory test is rapid antibody test which is a membrane-based Enzyme immunoassay for the detection and differentiation of HIV-1 and HIV-2 antibodies.

### 3.5.3 Additional tests

- CD4 count, Hepatitis B, Hepatitis C serology, TB screening, Basic blood chemistry (CBC, liver function tests, renal function tests, blood sugar) and urine analysis recommended initially.
- HIV viral load testing and screening for sexually transmitted disease (STI) (Syphilis, Gonorrhoea, Chlamydia) is desirable if feasible in such women.
3.5.4 Treatment

- New approach of lifelong ART for all pregnant and breastfeeding women with HIV is recommended regardless of CD4 count or clinical stage (option B+). WHO recommends one simplified triple regimen for all pregnant and breastfeeding women with HIV during the period of risk of mother-to-child HIV transmission and continuing lifelong ART either for all women or for the women meeting eligibility criteria for their own health. This may be modified according to the regional guidelines.

Chart 3.3

**Option B+: Lifelong ART for all pregnant and breastfeeding women with HIV**

- **Pregnant and breastfeeding women with HIV**
  - Initiate lifelong ART:
    - TDF + 3TC (or FTC) + EFV (Preferred regimen)
  - Assess CD4 baseline where possible

- **HIV exposed infants**
  - **Breastfeeding**
    - Daily NVP for 6 weeks
  - **Replacement feeding**
    - 4-6 weeks of NVP or twice daily AZT

- **Linkage to treatment and care for both woman and infant**

FTC: Emtricitabine 200 mg once daily
NVP: Nevirapine
EFV: Efavirenz 600 mg once daily
3TC: Lamivudine 150 mg twice daily or 300 mg once daily
TDF: Tenofovir 300 mg once daily
Chart 3.4

Option B: ART for women with HIV during pregnancy and breastfeeding

Pregnant and breastfeeding women with HIV

Initiate the following recommended ART:
TDF + 3TC (or FTC) + EFV
(assess eligibility (WHO clinical stage 3 or 4 or CD4<500 cells/mm3) for treatment for her own health)

HIV-exposed infants

Breastfeeding
Daily NVP for 6 weeks

Replacement feeding
4-6 weeks of NVP or twice daily AZT

MTCT risk period

Cessation of MTCT risk

Eligible for treatment for her own health at baseline assessment

YES
continue ART

NO
Stop ART after 1 week of complete cessation of breastfeeding and refer to care for reassessment

Early infant diagnosis

Final infant diagnosis

Linkage to treatment and care for both woman and infant

FTC: Emtricitabine 200 mg once daily
NVP: Nevirapine
TDF: Tenofovir 300 mg once daily

EFV: Efavirenz 600 mg once daily
3TC: Lamivudine 150 mg twice daily or 300 mg once daily
Table 3.8. Dosage schedule and side effects with ARV drugs

<table>
<thead>
<tr>
<th>Name of ARV</th>
<th>Dose schedule</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenofovir (TDF)</td>
<td>300 mg OD</td>
<td>Nephrotoxicity, hypophosphatemia</td>
</tr>
<tr>
<td>Lamivudine (3TC)</td>
<td>300 mg OD</td>
<td>Rarely pancreatitis</td>
</tr>
<tr>
<td>Lopinavir/Ritonavir (LPV/r)</td>
<td>400/100 mg BD</td>
<td>Gastrointestinal disturbance, glucose intolerance, Lipodystrophy, dyslipidemia</td>
</tr>
<tr>
<td>Efavirenz (EFV)</td>
<td>600 mg HS</td>
<td>CNS toxicity: Vivid dreams, nightmare, insomnia, dizziness, headache, impaired concentration, depression, hallucination, exacerbation of psychiatric disorders (usually subsides by 2-6 weeks)</td>
</tr>
</tbody>
</table>

3.5.5 PPTCT scenarios

Pregnant woman newly initiating ART

- Start ART as soon as possible after proper preparedness, counselling and continue ART throughout pregnancy, delivery, and thereafter lifelong.

- Even if the pregnant woman presents very late in pregnancy (including those who present after 36 weeks of gestation), ART should be initiated promptly.

Pregnant woman already receiving ART

- Pregnant women who are already receiving a NVP-based ART regimen should continue receiving the ART regimen

- Pregnant women who are already receiving EFV-based ART regimens:
  - ART should be continued. DO NOT STOP
There is no indication for abortion/termination of pregnancy in women exposed to EFV in the first trimester of pregnancy.

**ART regimen for pregnant women having prior exposure to NNRTI for PPTCT**

- A small number of HIV-positive pregnant women have had previous exposure to Single Dose NVP for PPTCT prophylaxis in prior pregnancies
- Because of the risk of resistance to NNRTI drugs in this population, an NNRTI-based ART regimen such as TDF/3TC/EFV may not be effective
- Thus, these women will require a protease inhibitor-based ART regimen, e.g. TDF (300mg) + 3TC (300mg) + LPV/r (600mg)

**Women presenting directly in labour**

- **Women on lifelong ART** should continue to receive ART as per the usual schedule including during labour and delivery. Women do not require any other additional ARV dosing.
- If the patient comes to labour room without HIV testing during pregnancy, testing is done and if it is tested positive, ART (TDF(300+3TC(300)+EFV)(600)) is initiated immediately and diagnosis should be confirmed later.

**General management:**

- Treat STIs or TB according to the national guidelines on treatment of STI/RTI and HIV-TB co-infection, respectively.
- Initiate Co-trimoxazole Prophylactic Therapy (CPT) if CD4 ≤ 250 cells/mm³, for prevention against pneumocystis carinii pneumonia (PCP), toxoplasmosis, diarrhoea as well as other bacterial infections.
- Initiate adherence counselling (antiretroviral treatment for mother and ARV prophylaxis for infant).
- Nutritional counselling for the mother: good food, rest and exercise.
- Adherence to iron-folate and vitamin/mineral supplements.
- Counsel for regular ante natal check-up and institutional delivery.
Mode of delivery is decided as per obstetric indication. Vaginal delivery preferred for the safety of both mother and infant if the risk of transmission of HIV is low.

### 3.5.6 Safer delivery techniques

**During vaginal delivery:**

- Standard/Universal Work Precautions (UWP)
- Continue ART during labour.
- Do NOT rupture membranes artificially (keep membranes intact for as long as possible).
- Minimize vaginal examination and use aseptic techniques
- Avoid invasive procedures like fetal blood sampling, fetal scalp electrodes.
- Avoid instrumental delivery as much as possible - if indicated, low-cavity outlet forceps is preferable to ventouse.
- Avoid routine episiotomy as far as possible.

**Use of ARV drugs during Caesarean sections (CS):**

- Planned CS - Women on lifelong ART should continue their standard ART Regimen
- In case of emergency CS – (who are not on ART – ensure women receives TDF + 3TC + EFV prior to the procedure)
- CS should be performed for obstetric indications only
- HIV-infected women who undergo CS should receive the standard prophylactic antibiotics.

### 3.5.7 Newborn care

- Suctioning the newborn with a nasogastric tube should be avoided unless there is meconium staining of the liquor.
► Counsel for exclusive breastfeeding within an hour of delivery, especially in countries where not breastfeeding may increase infant mortality.

► No MIXED FEEDING (No breastfeeding if other milk feeds given during the first 6 months) under any circumstances.

► Those women who choose not to breast feed, single dose of cabergoline 1 mg is given to suppress lactation and cold compresses are advised to relieve breast engorgement.

► Give Syrup Niverapine (or twice-daily AZT) to baby for a minimum of 6 weeks and another 6 weeks continuation if mother received antenatal ART for <24 weeks.

The dose of syrup Niverapine is given in Table 3.9 below.

### Table 3.9. Dose of syrup Nevirapine (NVP) in newborns

<table>
<thead>
<tr>
<th>Birth Weight</th>
<th>NVP daily dose (mg)</th>
<th>NVP daily dose (ml)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt; 2 Kg</td>
<td>2 mg /kg once daily (on consultation with paediatrician trained in HIV care)</td>
<td>0.2 ml /kg once daily</td>
<td>• Up to 6 weeks irrespective of exclusive breastfeeding or exclusive replacement feeding</td>
</tr>
<tr>
<td>• 2-2.5 Kg</td>
<td>10 mg once daily</td>
<td>1 ml once a day</td>
<td></td>
</tr>
<tr>
<td>• &gt; 2.5 Kg</td>
<td>15 mg once daily</td>
<td>1.5 ml once a day</td>
<td></td>
</tr>
</tbody>
</table>

#### 3.5.8 Follow-up

Women diagnosed as HIV infected during pregnancy who do not return for results should be actively traced back and brought to the continuum of care. The laboratory tests and their frequency are shown in the table 3.10.

Baseline laboratory investigations are done as per national adult guidelines.
Table 3.10. Baseline laboratory investigations

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Baseline</th>
<th>2 wks</th>
<th>4 wks</th>
<th>8 wks</th>
<th>12 wks</th>
<th>Every 6 months</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical evaluation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Every month</td>
</tr>
<tr>
<td>Adherence counselling</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Every month</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Every month</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ALT (LFT)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>As and when required clinically</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>specifically for TDF-based regimen.</td>
</tr>
</tbody>
</table>

3.5.9. Supportive care

- Wherever possible, include family counselling (of husband, in-laws, direct family members) to support care of the HIV-infected mother and HIV-exposed infant.

- Postpartum depression and psychosis is common in HIV-infected women. Involvement of husband or close family members is important so that the family support to the HIV-infected mother and infant is optimal. Husband’s support to the mother baby pair should be encouraged so as to:
  - Remind the HIV positive mother to take ART regularly.
  - Support administration of daily infant NVP prophylaxis medications for 6 weeks to the baby.
- Be involved in care and follow-up of the infant including clinic visits and
  immunization follow-up; EID and CPT initiation and continuation up to 18
  months at least.

- Be involved in care of mother for ART centre visits

### 3.5.10 Follow-up for infants

- Reinforce Exclusive Breastfeeding for the first 6 months (Continuation of breastfeeds
  with introduction of complementary feeds thereafter) continuation of breastfeeds
  for 1 year in EID negative babies, and up to 2 years in EID positive babies with
  initiation of Paediatric ART.

- Complementary feeding should be introduced from 6 months onwards in all babies
  whether breast fed or replacement feeds fed.

- Do Early Infant Diagnosis testing.

- Immunize the baby.

- CPT (Co-trimoxazole) is initiated and continued until baby is 18 months old or longer
  if baby is confirmed HIV positive.

- Stop NVP Prophylaxis for baby at 6 weeks (if maternal ART is of adequate duration
  i.e. >24 weeks).

### 3.6 Tuberculosis in pregnancy

#### 3.6.1 Background

- The greatest burden of pregnant women with tuberculosis is in Africa and South-
  east Asia.

- In settings where the TB prevalence in the general population is 100/100 000
  population, or higher, systematic screening for active TB should be considered
  among people who are seeking health care or who are in health care and who
  belong to selected risk groups.
- Options for the initial screening include screening for symptoms (either for cough lasting for longer than 2 weeks, or any symptoms compatible with TB, including a cough of any duration, haemoptysis, weight loss, fever, or night sweats) or screening with chest radiography. The use of chest radiography in pregnant women poses no significant risk but the national guidelines for the use of radiography during pregnancy should be followed.

- During pregnancy, pulmonary tuberculosis is the most common lesion while lymphadenitis is the most common extra pulmonary manifestation.

- Pregnant women with tuberculosis are more prone to develop obstetrical complications like prematurity, fetal growth restriction and increased perinatal morbidity. Pregnancy, however, does not alter the course of the disease.

- TRIAGE: Only pregnant women with acute exacerbation of pulmonary tuberculosis with dyspnoea, massive haemoptysis or pneumothorax will need triage.

3.6.2 History

- Unexplained weight loss
- Unexplained fever, for longer than 2 weeks
- Chronic cough (i.e., cough for > 14 days), haemoptysis
- Chest pain, tiredness, shortness of breath
- Contact with probable or definite infectious pulmonary TB
- HIV infection (self/partner)
- Generalised weakness, loss of appetite, night sweats

3.6.3 Examination

The following findings may be present.

- General Physical examination:
  
  Cachexia, tachycardia, tachypnoea, febrile, Cervical or inguinal lymphadenopathy

- Respiratory system examination
Fine crepts, chest movements are decreased on affected side, decreased breath sounds on one side or may be both sides, tactile vocal fremitus is altered.

### 3.6.4 Diagnosis

The main tools for diagnosing pulmonary TB are

- Sputum smear microscopy - minimum 1 sputum sample should be positive
- Chest X ray (with abdominal shield) only in smear negative cases
- Culture of *Mycobacterium tuberculosis* bacilli and sensitivity testing for diagnosis and management of drug resistant tuberculosis
- Tuberculin test has no role in diagnosing a pulmonary TB disease in endemic countries
- Women with tuberculosis in pregnancy should be offered HIV testing
- GeneXpert has a role in the diagnosis for HIV Positive mother with TB symptoms in addition to sputum smear examination

### 3.6.5 Treatment

Tuberculosis in pregnancy is not an indication for termination of pregnancy.

- Obstetric management is same as any other pregnant woman once antitubercular drugs (ATT) are started. Streptomycin is contraindicated in pregnancy
- Monitor fetal growth

**Obstetrical**

- For pulmonary TB (newly diagnosed) the treatment is same as a nonpregnant patient.
- Women requiring retreatment or suspected multidrug resistant TB and with coexistent HIV infection should be referred to higher centre.
- New patients with pulmonary TB should receive a regimen containing 6 months of rifampicin: 2HRZE/4HR. Isoniazid (H); Rifampicin (R); Pyrazinamide (Z); Ethambutol (E) for 4 months followed by Isoniazid (H); Rifampicin (R) for 2 months
Table 3.11. Standard regimen for new patients with pulmonary TB

<table>
<thead>
<tr>
<th>Intensive phase</th>
<th>Continuation phase</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 2 months of HRZE</td>
<td>• 4 months of HR</td>
<td>• Applies only in countries with high levels of isoniazid resistance in new TB patients, and where isoniazid drug susceptibility testing in new patients is not done (or results are unavailable) before the continuation phase begins</td>
</tr>
<tr>
<td>• 2 months of HRZE</td>
<td>• 4 months of HRE</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3.13. Dosing table

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose (daily)</th>
<th>3 times per week</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid (H)</td>
<td>5mg/kg up to 300mg</td>
<td>10 mg/kg up to 900 mg</td>
<td>Hepatitis, febrile reactions, peripheral neuropathy</td>
</tr>
<tr>
<td>Rifampacin (R)</td>
<td>10 mg/kg up to 600 mg</td>
<td>10 mg/kg up to 600 mg</td>
<td>Nausea, vomiting, hepatitis and orange coloured urination</td>
</tr>
<tr>
<td>Ethambotol (E)</td>
<td>15mg/kg up to 2.5 gm</td>
<td>30mg/kg</td>
<td>Optic neuritis</td>
</tr>
<tr>
<td>Pyrazinamide (Z)</td>
<td>25 mg/kg up to 2 gm</td>
<td>35 mg/kg</td>
<td>Hepatotoxicity, arthralgia and skin rash</td>
</tr>
</tbody>
</table>

- Pyridoxine 10mg/kg is to be given with Isoniazid to prevent peripheral neuropathy
- Vitamin K is to be given to neonate (single dose 1mg IM) and mother (p.o 10mg/day 15 days before EDD) receiving rifampacin to prevent postnatal haemorrhage.

### 3.6.6 Monitoring

For smear-positive pulmonary TB patients treated with first-line drugs, sputum smear microscopy may be performed at completion of the intensive phase of treatment

- If Smear positive, Sputum smear should be done at end of 2 months of intensive phase and 3rd month if the sputum smear is still positive at the end of 2 months of intensive phase and then at the 5th month and end of the treatment.
- If at the end of month 3 if smear-positive, sputum culture and drug susceptibility testing (DST) should be performed.

### 3.6.7 Breastfeeding

- A breastfeeding woman who has TB should receive a full course of TB treatment.
Mother and baby should stay together and the baby should continue to breastfeed.

After active TB in the baby is ruled out, the baby should be given 6 months of isoniazid preventive therapy (10 mg/kg/day), followed by BCG vaccination in sputum smear-positive mother. In smear negative mothers BCG vaccination done as routine.

Advise the mother to cover her mouth, if she is smear-positive, while breastfeeding the baby.

3.6.8 Supportive therapy

Good nutritional back-up is mandatory as supportive therapy for tuberculosis as well as pregnancy.

- Public health measures
  - Notify the case to the responsible health authorities. Ensure that treatment is monitored. Check all household contacts.

3.7 Fever During Pregnancy and Labour

3.7.1 Diagnosis

A woman has a temperature 38°C or more during pregnancy or labour.

General Management

- Encourage bed rest.
- Encourage increased fluid intake by mouth.
- Use a fan or tepid sponge to help decrease temperature.
- Paracetamol can be given.
- Establish cause of fever and provide specific treatment.
Table 3.14. Diagnosis of fever during pregnancy and labour

<table>
<thead>
<tr>
<th>Symptoms and Signs Typically Present</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Probable Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysuria</td>
<td>Retropubic/suprapubic pain</td>
<td>Cystitis (see table 3.15)</td>
</tr>
<tr>
<td>Increased frequency and urgency of urination</td>
<td>Abdominal pain</td>
<td></td>
</tr>
<tr>
<td>Dysuria</td>
<td>Retropubic/suprapubic pain</td>
<td>Acute pyelonephritis (see table 3.15)</td>
</tr>
<tr>
<td>Spiking fever/chills</td>
<td>Loin pain/tenderness</td>
<td></td>
</tr>
<tr>
<td>Increased frequency and urgency of urination</td>
<td>Tenderness in rib cage</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>Anorexia</td>
<td>Septic abortion (table 1.4)</td>
</tr>
<tr>
<td>Foul-smelling vaginal discharge in first 22 weeks</td>
<td>Lower abdominal pain</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>Rebound tenderness</td>
<td>Amnionitis (see 3.9.4)</td>
</tr>
<tr>
<td>Tender uterus</td>
<td>Prolonged bleeding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exantema</td>
<td>Pneumonia (table 3.15)</td>
</tr>
<tr>
<td></td>
<td>Light vaginal bleeding</td>
<td></td>
</tr>
<tr>
<td>Fever/chills</td>
<td>History of loss of fluid</td>
<td></td>
</tr>
<tr>
<td>Foul-smelling watery discharge</td>
<td>Tender uterus</td>
<td></td>
</tr>
<tr>
<td>After 22 weeks</td>
<td>Rapid uterine</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>Rapid fetal heart rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Light vaginal bleeding</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>Consolidation</td>
<td></td>
</tr>
<tr>
<td>Difficulty in breathing</td>
<td>Congested throat</td>
<td></td>
</tr>
<tr>
<td>Cough with expectoration</td>
<td>Rapid breathing Rhonchi/rales</td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symptoms and Signs</strong></td>
<td><strong>Symptoms and Signs</strong></td>
<td><strong>Probable Diagnosis</strong></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Typically Present</strong></td>
<td><strong>Sometimes Present</strong></td>
<td></td>
</tr>
<tr>
<td>• Fever</td>
<td>• Enlarged spleen</td>
<td>• Uncomplicated malaria (see 3.7.2)</td>
</tr>
<tr>
<td>• Chills/rigours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Headache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Muscle/joint pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Symptoms and signs of uncomplicated malaria</td>
<td>• Convulsions</td>
<td>• Severe/complicated malaria (see 3.7.2)</td>
</tr>
<tr>
<td>• Coma</td>
<td>• Jaundice</td>
<td></td>
</tr>
<tr>
<td>• Anaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sudden high grade fever</td>
<td>• Petechiae</td>
<td>• Dengue (see 3.7.3)</td>
</tr>
<tr>
<td>• Facial flushing</td>
<td>• Mucosal membrane bleeding</td>
<td></td>
</tr>
<tr>
<td>• Skin erythema</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Generalised body ache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Myalgia, arthralgia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Headache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fever</td>
<td>• Confusion</td>
<td>• Typhoid (table 3.15)</td>
</tr>
<tr>
<td>• Headache</td>
<td>• Stupor</td>
<td></td>
</tr>
<tr>
<td>• Dry cough</td>
<td>• Enlarged spleen</td>
<td></td>
</tr>
<tr>
<td>• Malaise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Anorexia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fever</td>
<td>• Muscle/joint pain</td>
<td>• Hepatitis (see 3.7.4)</td>
</tr>
<tr>
<td>• Malaise</td>
<td>• Urticaria</td>
<td></td>
</tr>
<tr>
<td>• Anorexia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Nausea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dark urine and pale stool</td>
<td>• Jaundice</td>
<td></td>
</tr>
<tr>
<td>• Jaundice</td>
<td>• Enlarged liver</td>
<td></td>
</tr>
<tr>
<td>• Enlarged liver</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.15. Management of fever in pregnancy

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Investigations</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cystitis</strong>&lt;br&gt; (Infection of urinary bladder)</td>
<td>• Dipstick leucocyte esterase to detect WBCs and a nitrate reductase test to detect nitrites&lt;br&gt;• Urine microscopy (showing white cells in clumps, bacteria and RBCs) and culture sensitivity if available</td>
<td>• Antibiotics&lt;br&gt;- Amoxicillin 500 mg by mouth tds x 3 days&lt;br&gt;- OR Trimethoprim Sulfamethoxazole one tablet (160/800 mg) per oral bd x 3 days&lt;br&gt;- If treatment fails, check urine culture sensitivity, give appropriate antibiotics&lt;br&gt;- For prophylaxis against recurrent infections (≥2 episodes) antibiotic throughout pregnancy and 2 weeks postpartum once daily (Amoxicillin 250mg/Trimethoprim/Sulfamethoxazole one tablet (160/800 mg) per oral od</td>
</tr>
<tr>
<td><strong>Pyelonephritis</strong>&lt;br&gt; (Infection of renal pelvis&lt;br&gt;May involve renal parenchyma)</td>
<td>• Dipstick leucocyte esterase to detect WBCs and a nitrate reductase test to detect nitrites&lt;br&gt;• Urine microscopy (showing white cells in clumps, bacteria and RBCs) and culture sensitivity if available</td>
<td>• If shock is present or suspected, initiate immediate management&lt;br&gt;- Infuse IV fluids at 150 mL per hour&lt;br&gt;- Start iv antibiotics without waiting for culture report&lt;br&gt;- Ampicillin 2 g IV 6-hourly;&lt;br&gt;- PLUS Gentamicin 5 mg/kg body weight IV every 24 hours&lt;br&gt;- When fever-free for 48 hours, Amoxicillin 1 g oral tds x 14 days</td>
</tr>
<tr>
<td>Typhoid</td>
<td>Pneumonia (Inflammation of lung parenchyma)</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Diagnosed by Widal, blood culture</td>
<td>• CXR</td>
<td></td>
</tr>
<tr>
<td>• Ampicillin 1g by mouth qid or Amoxicillin for all drugs Artemisinin, Artemether, Lumefantrine, Quinine, Clindamycin, Chloroquine, Artesunate, etc. 1g tds orally for 14 days</td>
<td>• Erythromycin 500mg PO for 7 days</td>
<td></td>
</tr>
<tr>
<td>• Alternatively, in women with severe or MDR disease use Ceftriaxone 100 mg/kg/24 hours of (maximum of 4 g/24 hours), divided into 1-2 doses</td>
<td>• Steam inhalation</td>
<td></td>
</tr>
<tr>
<td>• If there are palpable contractions and blood-stained mucus discharge, suspect preterm labour</td>
<td>• Consider possibility of tuberculosis in endemic areas</td>
<td></td>
</tr>
</tbody>
</table>

- If no clinical response in 72 hours, reevaluate
- For prophylaxis, antibiotic at bedtime for remainder of pregnancy and 2 weeks postpartum
- Ensure adequate hydration by mouth or IV
- Give Paracetamol 500 mg by mouth as needed for pain and to lower temperature

CXR

Typhoid

Pneumonia
3.7.2 Malaria

- Two species of malaria parasites, Plasmodium falciparum and Plasmodium vivax, account for the majority of cases.

- Symptomatic falciparum malaria in pregnant women may cause severe disease and death if not recognized and treated early. When malaria presents as an acute illness with fever, it cannot be reliably distinguished from many other causes of fever on clinical grounds.

- Women without pre-existing immunity to malaria (living in non-malarial area) are susceptible to the more severe complications of malaria.

- Women with acquired immunity to malaria are at high risk for developing severe anaemia and delivering low birth weight babies.

- Malaria should be considered the most likely diagnosis in a pregnant woman with fever who has been exposed to malaria.

3.7.2.1 Diagnosis

- Diagnosis is established when parasites are found on examination of peripheral blood smear by a microscope or a rapid diagnostic test (RDT) shows a positive result.

- Parasite-based diagnosis is carried out to confirm clinical diagnosis before treatment is given to pregnant women.

- Where available, the following tests will confirm the diagnosis:
  - Microscopy of a thick and thin blood film
  - Thick blood film is more sensitive at detecting parasites (absence of parasites does not rule out malaria)
  - Thin blood film helps to identify the parasite species
  - Rapid antigen detection tests
  - Supporting tests for severe malaria:
    - Haemoglobin and haematocrit
    - Leukocyte and thrombocyte count
- Other blood chemistry (blood sugar, serum bilirubin, SGOT and SGPT, alkaline phosphatase, albumin/globulin, urea, creatinine, sodium and potassium, blood gas analysis, lactate) Urinalysis.

### 3.7.2.2 Management

**Table 3.16. Treatment regimens for malaria in pregnancy**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Second /Third Trimester</th>
<th>First Trimester</th>
</tr>
</thead>
</table>
| 1. Uncomplicated P. falciparum Malaria | Artemisinin-based combination therapies (ACT) for 3 days  
• Artemether + Lumefantrine  
• Artesunate + amodiaquine  
• Artesunate + mefloquine  
• dihydroartemisinin + piperaquine  
• Artesunate + sulfadoxine–pyrimethamine (SP) |  
| | • 7 days of quinine + clindamycin  
• Monotherapy if clindamycin unavailable/unaffordable | |
| 2. Uncomplicated P. vivax, P. ovale, P. malariae or P. knowlesi | Chloroquine-susceptible infections: ACT/ Chloroquine  
Chloroquine-resistant infections: ACT |  
| | Chloroquine-susceptible infections: Chloroquine  
Chloroquine-resistant quinine. | |
| 3. Chemoprophylaxis (to prevent recurrence /relapse) | Chloroquine until delivery and breastfeeding are completed |  
| |  | |
| 4. Severe malaria (pregnant women in all trimesters) | Intravenous or intramuscular artesunate for at least 24 hr and until they can tolerate oral medication |  
| |  | |
and lactating women)

- Once a patient has received at least 24 hours of parenteral therapy and can tolerate oral therapy, complete treatment with 3 days of ACT.
- If artesunate is not available, use Artemether in preference to quinine.

5. Intermittent preventive treatment (IPTp) in pregnancy (Endemic areas)

- SP to all women in their pregnancy (SP-IPTp) as part of antenatal care.
- Dosing should start in the second trimester and doses should be given at least 1 month apart, with the objective of ensuring that at least three doses are received.

6. Pre-referral treatment

- Where complete treatment of severe malaria is not possible but injections are available, a single intramuscular dose of artesunate can be given and referred to an appropriate facility for further care. Where intramuscular artesunate is not available use intramuscular artemether or, if that is not available, use intramuscular quinine.

Table 3.17. Dosage regimens of ACT

<table>
<thead>
<tr>
<th>Act</th>
<th>Weight range</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artemether + lumefantrine (mg) given twice daily for 3 days</td>
<td>≥ 35kgs</td>
<td>80 + 480</td>
</tr>
<tr>
<td>Artesunate + amodiaquine dose (mg) given daily for 3 days</td>
<td>≥ 36kgs</td>
<td>200 + 540</td>
</tr>
</tbody>
</table>
### Table 3.18. Drugs for monotherapy

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chloroquine base</strong></td>
<td>10 mg/kg body weight by mouth once daily for 2 days followed by 5 mg/kg body weight on day 3 (safe in all trimesters)</td>
<td></td>
</tr>
<tr>
<td><strong>Quinine</strong></td>
<td>10 mg/kg body orally tds for 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Clindamycin</strong></td>
<td>300 mg qid for 7 days</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** If clindamycin is unavailable or unaffordable, then the monotherapy should be given.

**Note:** Pharmacovigilance programmes need to be established to continually monitor safety of antimalarial medicines in all trimesters, including inadvertent exposures in the early first trimester.

**Note:** Do NOT give primaquine, tetracycline, doxycycline and halofantrine to pregnant women.

**Note:** Do NOT use sulfadoxine/pyrimethamine if the woman is allergic to sulfonamides.

**Note:** The quinine/clindamycin combination can be used in areas of quinine resistance.
Oral therapy

- Medications are taken after meals or on an empty stomach.
- If possible, supervise patients directly by the time of drug-taking.
- Instruct patients to continue taking iron and folic acid tablets and consume iron-containing foods.
- Instruct patients to use mosquito nets every night at home and in the garden.
- Make sure that all drugs given are taken completely, even though pregnant women have started to feel better.
- Record information in antenatal card and medical record.
- Inform the patient to return immediately if she does not improve after completing treatment.
- Inform the patient and her family to return immediately if there is one or more of the following danger signs during treatment:
  - Inability to eat/drink
  - Unconsciousness
  - Seizures
  - Repeated vomiting
  - Extreme weakness (inability to sit or stand).

3.7.2.3 Severe/complicated malaria

Perform stabilization and refer mother immediately if she indicates symptoms of severe malaria. Where complete treatment of severe malaria is not possible but injections are available, a single intramuscular dose of artesunate can be given and referred to an appropriate facility for further care.

- Assessment that should be performed: determine gestational age and check vital signs (temperature, blood pressure, respiration, pulse rate).
- Stabilization that should be carried out in case of seizures:
  - Call for help immediately
- Do not leave mother alone
- Protect mother from injury but do not curb her actively
- If mother is unconscious:
  - Check the airway.
  - Tilt mother to the left with two pillows propping her back.
  - Check for stiff neck.
- Distinguish whether the seizures are caused by malaria or by eclampsia. The general recommendation is to treat first for eclampsia as there can be overlap of symptoms and signs. Perform the following checks to determine the cause of seizures.

**Table 3.19. Differential diagnosis severe malaria and eclampsia**

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>Severe Malaria</th>
<th>Eclampsia</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of fever and chills</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Temperature</td>
<td>$&gt;38^\circ C$</td>
<td>$&lt;38^\circ C$</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Diastolic of $&lt;90$ mmHg</td>
<td>Diastolic of $&gt;90$ mmHg</td>
</tr>
<tr>
<td>Enlargement of spleen</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Icterus</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

If, after examination, mother is suspected of suffering from eclampsia, perform the appropriate management. If cerebral malaria is the cause, treat it with antimalarials.

- If convulsions occur, give diazepam 10 mg IV slowly over 2 minutes.
- If eclampsia is diagnosed in addition to malaria, prevent subsequent convulsions with magnesium sulfate (see 3.1.2).
- If eclampsia is excluded, infuse phenytoin 1 g (approximately 18 mg/kg body weight) in 50–100 mL normal saline over 30 minutes (final concentration not to exceed 10 mg per mL) to prevent subsequent convulsions.
- Flush IV line with normal saline before and after infusing phenytoin.
- Complete administration within 1 hour of preparation.

**Note:** Do NOT infuse phenytoin at a rate exceeding 50 mg per minute due to the risk of irregular heart beat, hypotension and respiratory depression.

- Give phenytoin maintenance dose: 100 mg IV slowly over 2 minutes or by mouth every 8 hours beginning at least 12 hours after the loading dose.
- Maintain a strict fluid balance chart and monitor the amount of fluids administered and urine output to ensure that there is no fluid overload.

**Table 3.20. Parenteral therapy for severe malaria**

<table>
<thead>
<tr>
<th>Artesunate</th>
<th>2.4 mg/kg body weight IV/IM as a single bolus</th>
<th>Repeat 2.4 mg/kg body weight IV/IM until she can accept orally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artemether</td>
<td>3.2 mg/kg bw intramuscularly (to the anterior thigh). The maintenance dose is 1.6 mg/kg bw intramuscularly daily.</td>
<td></td>
</tr>
<tr>
<td>Quinine</td>
<td>Loading dose of 20 mg salt/kg bw provides therapeutic plasma concentrations within 4 hours. The maintenance dose of quinine (10 mg salt/kgbw) is administered at 8-hour intervals, starting 8 hours after the first dose. If there is no improvement in the patient's condition within 48 hour, the dose should be reduced by one third, i.e., to 10 mg salt/kg bw every 12 hours.</td>
<td>Slow, rate-controlled infusion, usually diluted In 5% dextrose and infused over 4 hour Infusion rate should not exceed 5 mg Salt/kg bw per hour</td>
</tr>
</tbody>
</table>
Monitoring

- Assess clinical status regularly.
- Monitor blood glucose levels for hypoglycaemia every hour while the woman is receiving quinine IV.

**Note:** Women with severe malaria are prone to fluid overload.

If pulmonary oedema develops:

- Prop up the woman
- Give oxygen at 4 L per minute by mask or nasal cannulae
- Give frusemide 40 mg IV as a single dose.

If urine output is poor (less than 30 mL per hour):

- Measure serum creatinine.
- Rehydrate with IV fluids (normal saline, Ringer’s lactate)
- If urine output does not improve, give frusemide 40 mg IV as a single dose and continue to monitor urine output
- If urine output is still poor (less than 30 mL per hour over 4 hours) and the serum creatinine is more than 2.9 mg/dL, refer the woman to a tertiary care centre, if possible, for management of renal failure.

**Note:** Hypoglycaemia is common and occurs at any time during the illness, especially after initiation of quinine therapy. There may be no symptoms.

- If hypoglycaemia is detected, give 50% dextrose 50 mL IV followed by dextrose (5 or 10%) 500 mL infused over 8 hours.
- Monitor blood glucose levels and adjust infusion accordingly.

**Note:** Complicated malaria is often accompanied by anaemia.

- Monitor haemoglobin levels daily.
- Transfuse as necessary (see 3.2).
- Give frusemide 20 mg IV or by mouth with each unit of blood.
- Give ferrous sulfate or ferrous fumerate (60 mg elemental iron) by mouth PLUS folic acid 400 mcg by mouth once daily upon discharge.

### 3.7.3 Dengue fever

#### 3.7.3.1 Effects of dengue fever on pregnancy and delivery
- Based on the clinical symptoms of the disease, intrauterine fetal death can occur.
- If infection occurs before delivery, there can be vertical transmission and baby may have symptoms of thrombocytopenia, fever, hepatomegaly and circulatory disorders.
- At the time of delivery, bleeding can occur due to thrombocytopenia. Give platelets or blood only if there is bleeding.

#### 3.7.3.2 Diagnosis

**Figure 3.1. Diagnosis of dengue**

- **Presumptive Diagnosis**
  - Live in / travel to dengue endemic area
  - Fever and two of the following criteria:
    - Anorexia and nausea
    - Rash
    - Aches and pains
    - Warning signs
    - Leucopenia
    - Tourniquet test positive
  - Laboratory confirmed dengue (Important when no sign of plasma leakage)

- **Warning Signs**
  - Abdominal pain or tenderness
  - Persistent vomiting
  - Clinical fluid accumulation
  - Mucosal bleed
  - Lethargy, restlessness
Laboratory tests should be performed to confirm the diagnosis. However, it is not necessary for the acute management of patients.

### 3.7.3.3 Management during delivery

- Avoid delivery during the critical phase, if possible.
- Monitor carefully.

#### Patients Requiring in-Hospital Care

**Laboratory tests:**

- Complete blood count
- Haematocrit (Hct)

**Treatment:**

- Encourage intake of oral fluids. If not tolerated, start intravenous fluid therapy NS or RL at maintenance rate.

**Monitor:**

- Temperature pattern
- Volume of fluid intake and losses
- Urine output
- Warning signs
- Hct, WBCs and platelet counts
Severe Dengue (requiring emergency treatment)

Features:

► Severe plasma leakage with shock and/or fluid accumulation with respiratory distress
► Severe bleeding
► Severe organ impairment

Laboratory tests:

► Complete blood counts
► Haematocrit
► Other organ function tests as indicated

Treatment of compensated shock:

► Start IV fluid resuscitation with isotonic crystalloid solutions at 5-10 ml/kg/hr over 1 hour.
► Reassess patient’s condition:
  ▪ If patient improves, IV fluids should be reduced gradually and maintained for up to 24-48 hours
  ▪ If patient is still unstable:
    - Check Hct after first bolus
    - If Hct increases/still high (>50%) - repeat a second bolus of crystalloid sol.
    - If there is improvement - reduce rate of IV fluids
    - If Hct decreases, this indicates bleeding — transfuse blood

Treatment of hypotensive shock:

► Initiate IV fluid resuscitation with crystalloid or colloid solution
► Reduce fluids gradually if patient improves
► If patient remains unstable:
  ▪ Review the Hct - if low — transfuse; if high - change to colloids
► Treatment of haemorrhagic complications:
  - Give 5-10ml/kg of fresh packed red cells or 10-20ml/kg of fresh whole blood
If possible, deliver vaginally. Patients who will undergo delivery usually require platelet transfusions to improve platelet counts to at least 50,000/mm³.

If a Caesarean section is required, give platelet concentrates pre-operatively, peri-operatively, as well as post-operatively, if necessary. Keep platelet count above 75,000/mm³.

Prior to surgery, perform consultations with a team of anaesthesiologist, neonatologist and cardiologist.

3.7.4 Hepatitis
Viral hepatitis is the commonest cause of jaundice / hepatic dysfunction in pregnancy. This can be caused by Hepatitis A, B, C, D and E.

3.7.4.1 Effect on pregnancy
- P-Abortions
- Preterm delivery (PTD)
- Maternal mortality increased
- Fulminant Hepatitis (FH)
- Postpartum haemorrhage (PPH)
- Coagulation Disorders

3.7.4.2 Effect on fetus
- IUGR
- Perinatal mortality, still birth
- Vertical transmission

3.7.4.3 Management
- Most patients can be managed on an outpatient basis with emphasis on rest and normal diet.
Avoid hepatotoxic drugs. Hospitalization is indicated if:

- Unable to take orally
- Severe anaemia
- Diabetes
- Prolonged PT
- Low serum albumin
- Bilirubin > 15
- FH, coagulopathy and encephalopathy

**Hepatitis B**

- If maternal HBsAg and HBeAg are positive, give the infant HBIG and HB vaccine at a dose of 10 mcg on day 0, age of 1 month and 2 months.

- If maternal HBsAg is negative but HBeAg is negative, give 10 mcg of HB vaccine alone with timing of administration as above.

- Mother does not need to be prohibited from breastfeeding, especially if the baby has been vaccinated immediately after birth.

### 3.8 Abdominal Pain in Early Pregnancy

The woman is experiencing abdominal pain in the first 22 weeks of pregnancy. Abdominal pain may be the first presentation in serious complications such as abortion or ectopic pregnancy.

#### 3.8.1 General management

- Perform a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature).

- If shock is suspected, immediately begin treatment. Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.
Table 3.21. Diagnosis of abdominal pain in early pregnancy

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Abdominal pain</td>
<td>• Palpable, tender discrete mass in lower abdomen</td>
<td>• Ovarian cyst&lt;sup&gt;a&lt;/sup&gt; (see 3.8.2)</td>
</tr>
<tr>
<td>• Adnexal mass on vaginal examination</td>
<td>• Light&lt;sup&gt;b&lt;/sup&gt; vaginal bleeding</td>
<td></td>
</tr>
<tr>
<td>• Lower abdominal pain</td>
<td>• Abdominal distension</td>
<td>• Appendicitis (see 3.8.3)</td>
</tr>
<tr>
<td>• Low-grade fever</td>
<td>• Anorexia</td>
<td></td>
</tr>
<tr>
<td>• Rebound tenderness</td>
<td>• Nausea/vomiting</td>
<td></td>
</tr>
<tr>
<td>• Right upper quadrant pain</td>
<td>• Paralytic ileus</td>
<td></td>
</tr>
<tr>
<td>• Right upper quadrant tenderness</td>
<td>• Increased white blood cells</td>
<td></td>
</tr>
<tr>
<td>• Dysuria</td>
<td>• No mass in lower abdomen</td>
<td></td>
</tr>
<tr>
<td>• Increased frequency and urgency of urination</td>
<td>• Site of pain higher than Expected</td>
<td></td>
</tr>
<tr>
<td>• Abdominal pain</td>
<td>• Retropubic/suprapubic pain</td>
<td>• Cholecystitis (see 3.8.4)</td>
</tr>
<tr>
<td>• Dysuria</td>
<td>• Nausea, vomiting</td>
<td></td>
</tr>
<tr>
<td>• Increased frequency and urgency of urination</td>
<td>• Fever</td>
<td></td>
</tr>
<tr>
<td>• Abdominal pain</td>
<td>• Retropubic/suprapubic pain</td>
<td>• Cystitis (see table 3.14,3.15)</td>
</tr>
<tr>
<td>• Spiking fever/chills</td>
<td>• Loin pain/tenderness</td>
<td></td>
</tr>
<tr>
<td>• Increased frequency and urgency of urination</td>
<td>• Tenderness in rib cage</td>
<td></td>
</tr>
<tr>
<td>• Abdominal pain</td>
<td>• Anorexia</td>
<td></td>
</tr>
<tr>
<td>• Dysuria</td>
<td>• Nausea/vomiting</td>
<td>• Acute pyelonephritis (see table 3.14,3.15)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Ovarian cyst is a common cause of abdominal pain during early pregnancy. A palpable, tender discrete mass in the lower abdomen is a key symptom.

<sup>b</sup> Light vaginal bleeding can also be a symptom of early pregnancy and abdominal pain.

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- Low-grade fever/chills
- Lower abdominal pain
- Absent bowel sounds

- Rebound tenderness
- Abdominal distension
- Anorexia
- Nausea/vomiting
- Shock

- Peritonitis (see 5.1.3)

- Abdominal pain
- Light bleeding
- Closed cervix
- Uterus slightly larger than normal
- Uterus softer than normal

- Fainting
- Tender adnexal mass
- Amenorrhoea
- Cervical motion tenderness

- Ectopic pregnancy (see 1.2.3.1.3)

\(^a\) Ovarian cysts may be asymptomatic and are sometimes first detected on physical examination.

\(^b\) Light bleeding: takes longer than 5 minutes for a clean pad or cloth to be soaked.

Woman may need surgical evaluation.

### 3.8.2 Ovarian cysts

Ovarian cysts in pregnancy may cause abdominal pain due to torsion or rupture. Ovarian cysts most commonly undergo torsion and rupture during the first trimester.

**Management**

- If the woman is in severe pain, suspect torsion or rupture.
  - Perform immediate laparotomy and cystectomy or ovariotomy as appropriate.

**Note:** If findings at laparotomy are suggestive of malignancy (solid areas in the tumour, growth extending outside the cyst wall), the specimen should be sent for immediate histological examination and the woman should be referred to a tertiary care centre for evaluation and management.
If the cyst is more than 10 cm and is asymptomatic:

- If it is detected during the first trimester, observe for growth or complications
- If it is detected during the second trimester, remove by laparotomy to prevent complications.

If the cyst is between 5 and 10 cm:

- Ensure close follow-up. Laparotomy may be required if the cyst increases in size or fails to regress.

If the cyst is less than 5 cm:

- Reassure the woman. The cyst will usually regress on its own and does not require treatment.

### 3.8.3 Appendicitis

**Management**

- Give a combination of antibiotics before surgery and continue until the woman is postoperative and fever-free for 48 hours
  - Give ampicillin 2 g IV every 6 hours
  - Gentamicin 5 mg/kg body weight IV every 24 hours
  - Metronidazole 500 mg IV every 8 hours
- Perform an immediate surgical exploration (regardless of stage of gestation) and perform appendectomy, if required.

**Note:** Delaying diagnosis and treatment can result in rupture of the appendix, which may lead to generalized peritonitis.

- If there are signs of peritonitis (fever, rebound tenderness, abdominal pain), give antibiotics as for peritonitis (see 5.1.3.
**Note:** The presence of peritonitis increases the likelihood of abortion or preterm labour.

- If the woman is in severe pain, give pethidine 1 mg/kg body weight (but not more than 100 mg) IM or (25-50 mg) IV slowly OR
- Give morphine 0.1 mg/kg body weight IM.
- Tocolytic drugs may be needed to prevent preterm labour (see 3.9.3).

### 3.8.4 Cholecystitis

- **Management**
  - Conservative management can be tried
    - Intravenous fluids
    - Nasogastric suction
    - Analgesics
    - Antibiotics — if local or systemic disease is prominent
  - Surgery — cholecystectomy — if there are recurrent bouts of cholecystitis or not responding to supportive treatment

### 3.9 Abdominal Pain in Later Pregnancy

#### 3.9.1 Diagnosis

The woman is experiencing abdominal pain after 22 weeks of pregnancy.
Table 3.22. Diagnosis of abdominal pain in later pregnancy

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Symptoms and Signs Sometimes Present</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Palpable contractions</td>
<td>• Cervical dilatation and effacement</td>
<td>• Possible preterm labour (see 3.9.3)</td>
</tr>
<tr>
<td>• Blood-stained mucus</td>
<td>• Light vaginal bleeding</td>
<td></td>
</tr>
<tr>
<td>• Discharge (show) or watery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Discharge before 37 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Intermittent or constant abdominal pain</td>
<td>• Shock</td>
<td>• Abruptio placentae (see 1.2.3.2.2)</td>
</tr>
<tr>
<td>• Bleeding after 22 weeks of gestation (may be concealed in the uterus)</td>
<td>• Tense/tender uterus</td>
<td></td>
</tr>
<tr>
<td>• Tense/tender uterus</td>
<td>• Decreased/absent fetal movements</td>
<td></td>
</tr>
<tr>
<td>• Decreased/absent fetal heart sounds</td>
<td>• Fetal distress or absent fetal heart sounds</td>
<td></td>
</tr>
<tr>
<td>• Light vaginal bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Shock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Abdominal distension/ free fluid</td>
<td>• Abdominal distension/ free fluid</td>
<td>• Ruptured uterus (see 1.2.3.2.3)</td>
</tr>
<tr>
<td>• Abnormal uterine contour</td>
<td>• Abnormal uterine contour</td>
<td></td>
</tr>
<tr>
<td>• Tender abdomen</td>
<td>• Tender abdomen</td>
<td></td>
</tr>
<tr>
<td>• Easily palpable fetal parts</td>
<td>• Easily palpable fetal parts</td>
<td></td>
</tr>
<tr>
<td>• Severe abdominal pain (may decrease after rupture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bleeding (intra-abdominal and/or vaginal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Severe abdominal pain (may decrease after rupture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bleeding (intra-abdominal and/or vaginal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"Sometimes Present" indicates symptoms that may not be definitively diagnosed without further medical assessment.
| Abdominal pain | • Absent fetal movements and fetal heart sounds  
|               | • Rapid maternal pulse |
| Fever/chills | • History of loss of fluid  
| Foul-smelling watery discharge | • Tender uterus  
| After 22 weeks | • Rapid fetal heart rate  
|               | • Light b vaginal bleeding |
| Abdominal pain | • Palpable, tender discrete mass in lower abdomen  
| Adnexal mass on vaginal examination | • Light b vaginal bleeding |
| Lower abdominal pain | • Abdominal distension  
| Low-grade fever | • Anorexia  
| Rebound tenderness | • Nausea/vomiting  
|               | • Paralytic ileus  
|               | • Increased white blood cells  
|               | • No mass in lower abdomen  
|               | • Site of pain higher than expected |
| Lower abdominal pain and distension | • Poor response to antibiotics  
| Persistent spiking fever/chills | • Swelling in adnexa or pouch of Douglas  
| Tender uterus | • Pus obtained upon culdocentesis |
| Dysuria | • Retropubic/suprapubic pain |
| Increased frequency and urgency of urination | • Absent fetal movements and fetal heart sounds  
| Abdominal pain | • Rapid maternal pulse |

- **Amnionitis** (see 3.9.4)
- **Ovarian cyst** (see 3.8.2)
- **Appendicitis** (see 3.8.3)
- **Pelvic abscess** (see 5.1.2)
- **Cystitis** (see table 3.14,3.15)
3.9.2 Management

- Perform a rapid evaluation of the general condition of the woman, including vital signs (pulse, BP, respiration, temperature).

- If shock is suspected, immediately begin treatment (see 1.1). Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.

**Note:** Appendicitis should be suspected in any woman having abdominal pain. Appendicitis can be confused with other more common problems in pregnancy which cause abdominal pain. If appendicitis occurs in late pregnancy, the infection may be walled off by the gravid uterus. The size of the uterus rapidly decreases after delivery, allowing the infection to spill into the peritoneal cavity. In these cases, appendicitis presents as generalized peritonitis.
3.9.3 Preterm labour

Preterm delivery is associated with higher perinatal morbidity and mortality.

3.9.3.1 Diagnosis

- Labour occurring before 37 weeks of gestation.
  - Palpable regular contractions
  - Blood-stained mucus discharge (show) or watery discharge before 37 weeks
- And sometimes
  - Cervical dilatation and effacement
  - Light vaginal bleeding
  - Confirm the diagnosis of preterm labour by documenting cervical effacement or dilatation over 2 hours.

3.9.3.2 Management

Management of preterm labour consists of giving corticosteroids, tocolysis (trying to stop uterine contractions) and or allowing labour to progress. Maternal problems are chiefly related to interventions carried out to stop contractions (see below).

3.9.3.2.1 Attempt tocolysis if:

- Confirmed gestational age is less than 37 weeks
- The cervix is less than 3 cm dilated
- There is no amnionitis, preeclampsia or active bleeding
- There is no fetal distress

Note: This intervention aims to delay delivery until the effect of corticosteroids has been achieved (see below).

- Give a tocolytic drug (see table below 3.23) and monitor maternal and fetal condition (pulse, blood pressure, signs of respiratory distress, uterine contractions, loss of amniotic fluid or blood, fetal heart rate, fluid balance, blood glucose, etc.).
3.9.3.2.2  **Corticosteroids**

Antenatal Corticosteroids given to the mother

- To improve fetal lung maturity and chances of neonatal survival
- Considerable reduction in the risks of complications of prematurity such as:
  - Respiratory distress syndrome
  - Intraventricular haemorrhage
  - Perinatal death

Antenatal corticosteroid therapy (within 7 days of starting treatment, including within the first 24 hours) is recommended for women at risk of preterm birth from 24 weeks to 34 weeks of gestation when the following conditions are met:

- Gestational age assessment can be accurately undertaken.
- Preterm birth is considered imminent.
- There is no clinical evidence of maternal infection.
- Adequate childbirth care is available (including the capacity to recognize and safely manage preterm labour and birth).
- The preterm newborn can receive adequate care if needed (including resuscitation, thermal care, feeding support, infection treatment and safe oxygen use).

- A single repeat course of antenatal corticosteroid is recommended if preterm birth does not occur within 7 days after the initial dose, and a subsequent clinical assessment demonstrates that there is a high risk of preterm birth in the next 7 days.

- Give betamethasone 12 mg IM, two doses 24 hours apart OR
- Dexamethasone 6 mg IM, four doses 12 hours apart.

**Note:** Corticosteroids should not be used in the presence of frank infection. If preterm labour continues despite use of tocolytic drugs, arrange for the baby to receive care at the most appropriate service with neonatal facilities. If needed and possible, refer the woman before she gives birth.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Initial dose</th>
<th>Subsequent dose</th>
<th>Side effects and precautions</th>
</tr>
</thead>
</table>
| Nifedipine         | 10-30 mg stat                     | Followed by 10-20 mg every 4-8 hours (titrate according to uterine activity) for up to 48 hours or until transfer is completed, whichever comes first. | **Contraindications:** hypersensitivity to drug, CHF, Hypotension  
**Side effects:** flushing, dizziness, palpitations |
| Indomethacin       | 100 mg loading dose by mouth or rectum | Give 25 mg every six hours for 48 hours | If gestation is more than 32 weeks, avoid use to prevent premature closure of fetal ductus arteriosus. Do not use for more than 48 hours. |
| Salbutamol         | 10 mg in 1L IV fluids. Start IV infusion at 10 drops per minute. | **If contractions persist,** increase infusion rate by 10 drops per minute every 30 minutes until contractions stop or maternal pulse exceeds 120 per minute.  
**If contractions stop,** maintain the same infusion rate for at least 8 hours after the last contraction. | If maternal pulse increases (more than 120 per minute), reduce infusion rate; If the woman is anaemic, use with caution.  
If steroids and salbutamol are used, maternal pulmonary oedema may occur.  
Restrict fluids, maintain fluid balance and stop drug. |

*Alternative drug: ritodrine.*
When tocolysis is considered in this context, nifedipine (a calcium channel blocker) is the preferred today.

Although betamimetics do appear effective in delaying birth for more than 48 hours, they should not be used for tocolysis because of the higher risk of adverse drug reactions, which may sometimes be life-threatening.

**Note:** Prophylactic antibiotic treatment for preterm labour with intact membranes is not recommended.

### 3.9.3.2.3 Role of Magnesium Sulphate

The use of magnesium sulfate is recommended for women at risk of imminent preterm birth before 32 weeks of gestation for prevention of cerebral palsy in the infant and child.

- There are three dosing regimens:
  - IV 4 g over 20 minutes, then 1 g/hour until delivery or for 24 hours, whichever came first
  - IV 4 g over 30 minutes or IV bolus of 4 g given as single dose
  - IV 6 g over 20–30 minutes, followed by IV maintenance of 2 g/hour

There is insufficient evidence to recommend one specific dosing regimen over others.

- Allow labour to progress if:
  - Gestation is more than 37 weeks
  - The cervix is more than 3 cm dilated
  - There is active bleeding
  - The fetus is distressed, dead or has an anomaly incompatible with survival
  - There is amnionitis or preeclampsia
  - Monitor progress of labour using the partogram

**Note:** Avoid delivery by vacuum extraction, as the risks of intracranial bleeding in the preterm baby are high.

- Prepare for management of preterm or low birth weight baby and anticipate the need for resuscitation.
3.9.4 Prelabour rupture of membranes

Prelabour rupture of membranes (PROM) is rupture of the membranes before labour has begun. PROM can occur either when the fetus is immature (preterm or before 37 weeks) or when it is mature (term).

**Diagnosis**

The typical odour of amniotic fluid confirms the diagnosis. If membrane rupture is not recent or when leakage is gradual, confirming the diagnosis may be difficult:

- Place a vaginal pad over the vulva and examine it (visually and by odour) 1 hour later.
- Use a high-level disinfected speculum for vaginal examination:
  - Fluid may be seen coming from the cervix or forming a pool in the posterior fornix
  - Ask the woman to cough; this may cause a gush of fluid.

**Note:** Do NOT perform a digital vaginal examination as it does not help establish the diagnosis and can introduce infection.

- If available, perform nitrazine and/or ferning tests:
  - The nitrazine test depends upon the fact that vaginal secretions and urine are acidic while amniotic fluid is alkaline.
  - Hold a piece of nitrazine paper in a haemostat and touch it against the fluid pooled on the speculum blade. A change from yellow to blue indicates alkalinity (presence of amniotic fluid).

**Note:** Blood and some vaginal infections give false positive results.

- For the ferning test, spread some fluid on a slide and let it dry. Examine it with a microscope. Amniotic fluid crystallizes and may leave a fern-leaf pattern.

**Note:** False negatives are frequent.
Check for signs of infection:
- Fever
- Foul-smelling vaginal discharge
- Fetal tachycardia
- Leukocytes of >15,000/mm3

Management

► If there are no signs of infection and the pregnancy is less than 37 weeks

- Consider transfer to the most appropriate service for care of the newborn, if possible.
- Give antibiotics to reduce maternal and neonatal infective morbidity and to delay delivery:
  - Give erythromycin 250 mg orally thrice a day for 7 days PLUS
  - Amoxicillin 500 mg orally four times a day for 10 days
  - The use of a combination of amoxicillin and clavulanic acid (“co-amoxiclav”) is not recommended for women with preterm prelabour rupture of membranes. In conditions where erythromycin is not available, penicilllin (such as amoxicillin) can be used.
- Give corticosteroids to the mother to improve fetal lung maturity (gestation <34 weeks):
  - Betamethasone 12 mg IM, two doses 24 hours apart OR
  - Dexamethasone 6 mg IM, four doses 12 hours apart

Note: Corticosteroids should not be used in the presence of frank infection.

Note: If gestation is more than 34 weeks induce labour with oxytocin after administering prophylactic antibiotics.

► If there are no signs of infection and the pregnancy is 37 weeks or more:
If the membranes have been ruptured for more than 18 hours, give prophylactic penicillin or ampicillin to help reduce Group B streptococcus infection in the neonate.

- Give penicillin G 2 million units IV every 6 hours until delivery OR
- Ampicillin 2 g IV every 6 hours until delivery

If allergic to penicillin, give clindamycin 900mg every 8 hours or vancomycin 1gm every 12 hours.

If there are no signs of infection after delivery, discontinue antibiotics.

Assess the cervix.

- If the cervix is favourable (soft, thin, partly dilated), induce labour using oxytocin.
- If the cervix is unfavourable (firm, thick, closed), ripen the cervix using prostaglandins and infuse oxytocin or deliver by Caesarean section.

If suspected amnionitis give a combination of antibiotics until delivery:

- Ampicillin 2 g IV every 6 hours PLUS
- Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
- If the woman delivers vaginally, discontinue antibiotics.
- If the woman has a caesarean section, continue antibiotics and give metronidazole 500 mg IV every 8 hours until the woman is fever-free for 48 hours.

If metritis is suspected (fever, foul-smelling vaginal discharge), give antibiotics (see 5.1.1).

If newborn sepsis is suspected, arrange for a blood culture and antibiotics.
3.10 Intrauterine Growth Restriction

3.10.1. Background

- Intrauterine growth restriction (IUGR), also referred to as fetal growth restriction (FGR), accounts for a high proportion of fetuses categorized as ‘small for gestational age’ (SGA). Included in the SGA fetuses are ‘constitutionally small’ fetuses.

- In practice, fetuses with IUGR will be encountered as ‘small for dates babies’ – that is, their size will be below what is expected for the period of gestation.

- In developing countries, the lack of agreed symphysio fundal height (SFH) charts and ultrasound confirmation of dating being the exception than the rule, special approaches will be needed for their management.

- The group that has a SFH below the normal range includes:
  - Fetus IUGR
  - Wrong dates
  - Constitutionally small babies (see fig 3.3)

- An IUGR fetus is defined as one that has failed to achieve its genetically determined growth potential.

- This is caused primarily by placental insufficiency, resulting in a failure to allow gas exchange and nutrient delivery.

- It is important to differentiate IUGR from other causes for a SGA fetus, since this has implications for management.

- IUGR fetuses carry a higher risk of stillbirth and of other perinatal complications compared to those that are grown normally.
The common causes of IUGR are smoking, low pre-pregnancy body mass index, pregnancy induced hypertension, chronic hypertension, thrombophilia, diabetes mellitus with micro/macrovascular changes, autoimmune disease, cyanotic heart disease, abnormalities of the placenta, chronic abruption and multiple pregnancy.

Fetuses with IUGR carry a higher risk of intrauterine death, intrapartum, neonatal and even problems in adulthood. It is preferable that they are referred to a higher centre for delivery.

3.10.2. Diagnosis

- The initial step in diagnosis is the recognition that the fetus is SGA, by measuring the SFH.
- The use of a tape measure is encouraged.
- In the absence of a WHO SFH chart it is suggested that a norm of POG± 2 cm from 20 to 34 weeks and ± 3 cm from then onwards is used.
- If the SFH is 4 cm or more below the expected, especially in the presence of reduced liquor on clinical examination, immediate referral is warranted.
- If the SFH is 3 or less cm below the expected, review dating of the pregnancy.
- Recall the mother in 2 weeks.
- Recheck the SFH and if there is no further growth, IUGR is suspected.
- If there is corresponding growth, it is likely to be a ‘constitutionally small’ fetus or a case of wrong dates. These babies will not require referral.

3.10.3. Management

When IUGR is diagnosed, it is recommended that the woman be referred for further assessment by ultrasound.
- Depending on the degree of IUGR determined by ultrasound, a decision could be made to either offer care in a higher centre or to refer her back to the primary care centre.
- This decision is made based on the time of onset of IUGR, assessment of fetal well-being and underlying maternal conditions.
- Constitutionally small fetus category could be offered close monitoring as required.

Figure 3.2: Management algorithm for IUGR
Measure SFHa using a measuring tape

Discordance between expected and actual 3cm or less

Determine dates review LMP & USGb

Discordance between expected and actual 4cm or more

Clinical diagnosis of oligohydramnios

Immediate referral

USGb not available

Review in 2 weeks

Growth + according to SFHa

Routine

Constitutionally small baby

Routine

IUGRc confirmed

Decision regarding management by a referral centre

Fetal anomaly

Individualized management

Assess fetal growth and wellbeing

No growth

Refer for USGb

SFH: Symphysio fundal height
USG: Ultrasound
IUGR: Intrauterine growth restriction
3.11 Epilepsy in Pregnancy

Women with epilepsy can have convulsions during pregnancy. Like many chronic diseases, epilepsy worsens in some women during pregnancy but improves in others. In the majority of women, however, epilepsy is unaffected by pregnancy.

- In general, pregnant women with epilepsy have an increased risk of:
  - Pregnancy-induced hypertension
  - Preterm labour
  - Infants with low birth weights
  - Infants with congenital malformations
  - Perinatal mortality

- Aim to control epilepsy with the smallest dose of a single drug. Avoid drugs in early pregnancy which are associated with congenital malformations (e.g. valproic acid).

- If the woman is convulsing, give diazepam 10 mg IV slowly over 2 minutes. Repeat if convulsions recur after 10 minutes.

- If convulsions continue (status epilepticus), infuse phenytoin 1 g (approximately 18 mg/kg body weight) in 50–100 mL normal saline over 30 minutes (final concentration not to exceed 10 mg per mL):
  
  **Note:** Only normal saline can be used to infuse phenytoin. All other IV fluids will cause crystallization of phenytoin.

  - Flush IV line with normal saline before and after infusing phenytoin
  - Do not infuse phenytoin at a rate exceeding 50 mg per minute due to the risk of irregular heart beat, hypotension and respiratory depression
  - Complete administration within 1 hour of preparation.
► If the woman is known to be epileptic, give her the same medication that she had been taking. Follow up with her regularly and adjust the dose of medication according to the response.

► If the woman is known to be epileptic but cannot recall details of her medication, give her phenytoin 100 mg by mouth three times per day. Follow up with her regularly and adjust the dose of medication according to her response.

► Folic acid deficiency may be caused by anticonvulsive drugs. Give folic acid 600 mcg by mouth once daily along with antiepileptic treatment in pregnancy.

► Phenytoin can cause neonatal deficiency of vitamin K-dependent clotting factors. This can be minimized by giving vitamin K 1 mg IM to the newborn.

► Evaluation for underlying causes of convulsions is indicated if convulsions are of recent onset. This may be possible only at the tertiary care level.
# Labour with Problems

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4.1 Unsatisfactory Progress of Labour

Diagnosis

- Cervix not dilated beyond 4 cm after 8 hours of regular contractions
- Cervical dilatation is to the right of the alert line on the partograph
- The woman has been experiencing labour pains for 12 hours or more without delivery (prolonged labour)

Table 4.1. Diagnosis of unsatisfactory progress in labour

<table>
<thead>
<tr>
<th>Findings</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervix not dilated. No palpable contractions or infrequent contractions</td>
<td>• False labour</td>
</tr>
<tr>
<td>Cervix not dilated beyond 4 cm after 8 hours of regular contractions</td>
<td>• Prolonged latent phase</td>
</tr>
<tr>
<td>Cervical dilatation to the right of the alert line on the partograph</td>
<td>• Prolonged active phase</td>
</tr>
<tr>
<td>• Secondary arrest of cervical dilatation and descent of presenting part in presence of good contractions</td>
<td>• Cephalopelvic disproportion</td>
</tr>
<tr>
<td>• Secondary arrest of cervical dilatation and descent of presenting part with large caput, third degree moulding, cervix poorly applied to presenting part, oedematous cervix, ballooning of lower uterine segment, formation of retraction band or maternal and fetal distress</td>
<td>• Obstruction</td>
</tr>
<tr>
<td>• Two contractions or less in 10 minutes, each lasting less than 40 seconds</td>
<td>• Inadequate uterine activity</td>
</tr>
<tr>
<td>• Presentation other than vertex with occiput anterior</td>
<td>• Malpresentation or malposition</td>
</tr>
<tr>
<td>Cervix fully dilated and woman has urge to push, but no descent</td>
<td>• Prolonged expulsive phase</td>
</tr>
</tbody>
</table>
Management

- Perform a rapid evaluation of the condition of the woman and fetus and provide supportive care.
- Test urine for ketones and treat with IV fluids if ketotic.
- Review partograph.

4.1.1 False labour

- Examine for urinary tract or other infection or ruptured membranes and treat accordingly. If none of these are present, discharge the woman and encourage her to return if signs of labour recur.

4.1.2 Prolonged latent phase

The diagnosis of prolonged latent phase is made retrospectively. When contractions cease, the woman is said to have had false labour. When contractions become regular and dilatation progresses beyond 4 cm, the woman is said to have been in the latent phase.

**Note:** Misdiagnosing false labour or prolonged latent phase leads to unnecessary induction or augmentation, which may fail. This may lead to unnecessary Caesarean section and amnionitis.

- If a woman has been in the latent phase for more than 8 hours and there is little sign of progress, reassess the situation by assessing the cervix:
  - If there has been no change in cervical effacement or dilatation and there is no fetal distress, review the diagnosis. The woman may not be in labour.
  - If there has been a change in cervical effacement or dilatation, rupture the membranes with an amniotic hook or a Kocher clamp and induce labour using oxytocin.
- Reassess every 4 hours.
- If the woman has not entered the active phase after 8 hours of oxytocin infusion, deliver by Caesarean section.
If there are signs of infection (fever, foul-smelling vaginal discharge):

- Augment labour immediately with oxytocin.
- Give a combination of antibiotics until delivery:
  - Ampicillin 2 g IV every 6 hours
  - Gentamicin 5 mg/kg body weight IV every 24 hours

If the woman delivers vaginally, discontinue antibiotics postpartum.

If the woman has a Caesarean section, continue antibiotics PLUS give metronidazole 500 mg IV every 8 hours until the woman is fever-free for 48 hours.

### 4.1.3 Prolonged active phase

- Assess uterine contractions:
  - If contractions are inefficient (less than three contractions in 10 minutes, each lasting less than 40 seconds), suspect inadequate uterine activity (see 4.1.5).
  - If contractions are efficient (three or more contractions in 10 minutes, each lasting more than 40 seconds) suspect cephalopelvic disproportion, obstruction, malposition or malpresentation (see 4.2).

- If there are no signs of cephalopelvic disproportion or obstruction and the contractions are regular and strong and the membranes are intact, rupture the membranes with an amniotic hook or a Kocher clamp.

- Provide labour support as general methods of supportive care during labour may improve contractions and accelerate progress.

### 4.1.4 Cephalopelvic disproportion

Cephalopelvic disproportion occurs because the fetus is too large or the maternal pelvis is too small. If labour persists with cephalopelvic disproportion, it may become arrested or obstructed. The best test to determine if a pelvis is adequate is a trial of labour. Clinical pelvimetry is of limited value.
Management

- If cephalopelvic disproportion is confirmed, deliver by Caesarean section.
- If the fetus is dead, deliver by craniotomy.

Obstruction

**Note:** Rupture of an unscarred uterus is usually caused by obstructed labour.

Management

- Hydrate the patient with normal saline or Ringer’s lactate.
- Keep record of fluid input and urinary output.
- If there are signs of infection or membranes have been ruptured for 18 hours or more or gestation is less than 37 weeks give IV antibiotics:
  - Ampicillin 2gm every 6 hours and
  - Gentamycin 5mg/kg body weight IV every 24 hours.
- If cephalopelvic disproportion is confirmed, deliver by Caesarean section.
- If the fetus is dead
  - Deliver by craniotomy.
- If the fetus is alive, the cervix is fully dilated and the fetal head is at 0 station or below, deliver by vacuum extraction.
- If the fetus is alive and the cervix is fully dilated and there is evidence of indication for symphysiotomy for relatively minor obstruction (if safe Caesarean section is not possible) and the fetal head is at -2 station, then delivery should be by symphysiotomy and vacuum extraction. This can be a life-saving action. If the operator is not proficient in symphysiotomy, deliver by Caesarean section.
- If the fetus is alive but the cervix is not fully dilated or if the fetal head is too high for vacuum extraction, deliver by Caesarean section.
4.1.5 Inadequate uterine activity

If contractions are inefficient and cephalopelvic disproportion and obstruction have been excluded, the most probable cause of prolonged labour is inadequate uterine activity.

- Rupture the membranes with an amniotic hook or a Kocher clamp and augment labour using oxytocin.
- Reassess progress by vaginal examination 2 hours after a good contraction pattern with strong contractions has been established.
- If there is no progress between examinations, deliver by Caesarean section.
- If progress continues, continue oxytocin infusion and re-examine after 2 hours. Continue to follow progress carefully.

**Note:** Inefficient contractions are less common in a multigravida than in a primigravida. Hence, every effort should be made to rule out disproportion in a multigravida before augmenting with oxytocin.

4.1.6 Prolonged expulsive phase

Maternal expulsive efforts increase fetal risk by reducing the delivery of oxygen to the placenta.

Allow spontaneous maternal “pushing,” but do not encourage prolonged effort and holding the breath.

- If malpresentation and obvious obstruction have been excluded, augment labour with oxytocin.

If there is no descent after augmentation:
If the fetal head is not more than 1/5 above the symphysis pubis or the leading bony edge of the fetal head is at 0 station, deliver by vacuum extraction.

If the fetal head is between 1/5 and 3/5 above the symphysis pubis or the leading bony edge of the fetal head is between 0 station and −2 station: deliver by vacuum extraction and symphysiotomy only if operator is experienced and proficient in symphysiotomy, Caesarean section is not immediately available and there is no major degree of disproportion. If the operator is not proficient in symphysiotomy, deliver by Caesarean section.

If the fetal head is more than 3/5 above the symphysis pubis or the leading bony edge of the fetal head is above −2 station, deliver by Caesarean section.

4.2 Malpositions and Malpresentations

Malpositions are abnormal positions of the vertex of the fetal head (with the occiput as the reference point) relative to the maternal pelvis. Malpresentations are all presentations of the fetus other than vertex.

Problem

- The fetus is in an abnormal position or presentation that may result in prolonged or obstructed labour. Malpresentations increase the risk for uterine rupture because of potential for obstructed labour.

Diagnosis

- Determine the presenting part
  - The most common presentation is the vertex of the fetal head.
  - If the vertex is the presenting part, use landmarks of the fetal skull to determine the position of the fetal head.
### Table 4.2. Diagnosis of malposition

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occiput posterior position <strong>occurs when the fetal occiput is posterior in relation to the maternal pelvis.</strong></td>
<td><img src="image1" alt="Figure 4.1. Occiput posterior" /></td>
</tr>
<tr>
<td>• <strong>On abdominal examination, the lower part of the abdomen is flattened, fetal limbs are palpable anteriorly and the fetal heart may be heard in the flank.</strong></td>
<td><img src="image2" alt="Figure 4.1. Occiput posterior" /></td>
</tr>
<tr>
<td>• <strong>On vaginal examination, the posterior fontanelle is towards the sacrum and the anterior fontanelle may be easily felt if the head is deflexed.</strong></td>
<td><img src="image3" alt="Figure 4.2. Left occiput posterior" /></td>
</tr>
<tr>
<td>• Occiput transverse position <strong>occurs when the fetal occiput is transverse to the maternal pelvis. If an occiput transverse position persists into the later part of the first stage of labour, it should be managed as an occiput posterior position.</strong></td>
<td><img src="image4" alt="Figure 4.3. Left occiput transverse" /></td>
</tr>
</tbody>
</table>

### 4.2.1 Management: Occiput posterior position

Spontaneous rotation to the anterior position occurs in 90% of cases. Arrested labour may occur when the head does not rotate and/or descend. Delivery may be complicated by perineal tears or extension of an episiotomy.

Check for signs of obstruction.

- If there are signs of obstruction and the fetal heart rate is abnormal (less than 100 or more than 180 beats per minute) at any stage, deliver by Caesarean section.
If the membranes are intact, rupture the membranes with an amniotic hook or a Kocher clamp.

If the cervix is not fully dilated and there are no signs of obstruction, augment labour with oxytocin.

If the cervix is fully dilated but there is no descent in the expulsive phase, assess for signs of obstruction.

If there are no signs of obstruction, augment labour with oxytocin.

If the cervix is fully dilated and if prolonged expulsive phase manage as above.

### Table 4.3. Diagnosis of malpresentations

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Brow presentation is caused by partial extension of the fetal head so that the occiput is higher than the sinciput.</td>
<td>![Figure 4.4. Brow presentation]</td>
</tr>
<tr>
<td>• On abdominal examination, more than half the fetal head is above the symphysis pubis and the occiput is palpable at a higher level than the sinciput.</td>
<td></td>
</tr>
<tr>
<td>• On vaginal examination, the anterior fontanelle and the orbits are felt.</td>
<td></td>
</tr>
<tr>
<td>• Face presentation is caused by hyper-extension of the fetal head so that neither the occiput nor the sinciput are palpable on vaginal examination.</td>
<td>![Figure 4.5. Face presentation]</td>
</tr>
<tr>
<td>• On abdominal examination, a groove may be felt between the occiput and the back.</td>
<td></td>
</tr>
<tr>
<td>• On vaginal examination, the face is palpated, the examiner’s finger enters the mouth easily and the bony jaws are felt.</td>
<td></td>
</tr>
</tbody>
</table>
• Compound presentation occurs when an arm prolapses alongside the presenting part. Both the prolapsed arm and the fetal head present in the pelvis simultaneously.

• Breech presentation occurs when the buttocks and/or the feet are the presenting parts.

• On abdominal examination, the head is felt in the upper abdomen and the breech in the pelvic brim. Auscultation locates the fetal heart higher than expected with a vertex presentation.

• On vaginal examination during labour, the buttocks and/or feet are felt; thick, dark meconium is normal.

• Complete (flexed) breech presentation occurs when both legs are flexed at the hips and knees.

• Frank (extended) breech presentation occurs when both legs are flexed at the hips and extended at the knees.

• Footling breech presentation occurs when a leg is extended at the hip and the knee.
Transverse lie and shoulder presentation occur when the long axis of the fetus is transverse. The shoulder is typically the presenting part.

On abdominal examination, neither the head nor the buttocks can be felt at the symphysis pubis and the head is usually felt in the flank.

On vaginal examination, a shoulder may be felt, but not always. An arm may prolapse and the elbow, arm or hand may be felt in the vagina.

**4.2.2 Management: Brow presentation**

In brow presentation, engagement is usually impossible and arrested labour is common. Spontaneous conversion to either vertex presentation or face presentation can rarely occur, particularly when the fetus is small or when there is fetal death with maceration. It is unusual for spontaneous conversion to occur with an average-sized live fetus once the membranes have ruptured.

- If the fetus is alive, deliver by Caesarean section.
- If the fetus is dead and the cervix is not fully dilated, deliver by Caesarean section.
- If the fetus is dead the cervix is fully dilated: Deliver by craniotomy.

**4.2.3: Face presentation**

The chin serves as the reference point in describing the position of the head. It is necessary to distinguish only chin-anterior positions, in which the chin is anterior in relation to the maternal pelvis, from chin-posterior positions.
Prolonged labour is common. Descent and delivery of the head by flexion may occur in the chin-anterior position. In the chin-posterior position, however, the fully extended head is blocked by the sacrum. This prevents descent and labour is arrested.

**Chin-anterior position**

- If the cervix is fully dilated
  - Allow to proceed with normal childbirth.
  - If there is slow progress and no sign of obstruction, augment labour with oxytocin.
  - If descent unsatisfactory, deliver by forceps.

- If the cervix is not fully dilated and there are no signs of obstruction, augment labour using oxytocin. Review progress as with vertex presentation.

**Chin-posterior position**

- If the cervix is fully dilated, deliver by Caesarean section.

- If the cervix is not fully dilated, monitor descent, rotation and progress. If there are signs of obstruction, deliver by Caesarean section.

- If the fetus is dead:
  - Deliver by craniotomy.
  - If the operator is not proficient in craniotomy, deliver by Caesarean section.

**Note**: Do not deliver brow presentation by vacuum extraction, outlet forceps or symphysiotomy.
4.2.4 Compound presentation

Spontaneous delivery can occur only when the fetus is very small or dead and macerated. Arrested labour occurs in the expulsive stage.

Replacement of the prolapsed arm is sometimes possible:

- Assist the woman to assume the knee-chest position.
- Push the arm above the pelvic brim and hold it there until a contraction pushes the head into the pelvis.
- Proceed with management for normal childbirth.
- If the procedure fails or if the cord prolapses, deliver by Caesarean section.

Figure 4.12. Knee-chest position

4.2.5 Breech presentation

Prolonged labour with breech presentation is an indication for urgent Caesarean section. Failure of labour to progress must be considered a sign of possible cephalopelvic disproportion.

Note: The frequency of breech presentation is high in preterm labour.

Management of breech presentation during early labour

Every breech delivery should take place in a hospital with surgical capability.

- Attempt external version (see A.2) if:
  - Breech presentation is present at or after 37 weeks (before 37 weeks, a successful version is more likely to spontaneously revert back to breech presentation)
  - Vaginal delivery is possible
  - Facilities for emergency Caesarean section are available
Membranes are intact and amniotic fluid is adequate

There are no complications (e.g., fetal growth restriction, uterine bleeding, previous Caesarean delivery, fetal abnormalities, twin pregnancy, hypertension, fetal death)

If external version is successful, proceed with normal childbirth.

If external version fails, proceed with vaginal breech delivery or Caesarean section.

**Vaginal breech delivery**

- A vaginal breech delivery by a skilled health care provider (refer if inexperienced provider) is safe and feasible under the following conditions:
  - Complete or frank breech;
  - Adequate clinical pelvimetry;
  - Fetus is not too large;
  - No previous Caesarean section for cephalopelvic disproportion;
  - Flexed head.

- Review for indications. Ensure that all conditions for safe vaginal breech delivery are met.

- Provide emotional support and encouragement. If necessary, use a pudendal block.

- Perform all manoeuvres gently and without undue force.

- Examine the woman regularly and record progress on a partograph.

- If the membranes rupture, examine the woman immediately to exclude cord prolapse.

**Note:** Do not rupture the membranes.
If the cord prolapses and delivery is not imminent, deliver by Caesarean section.

If there are fetal heart rate abnormalities (less than 100 or more than 180 beats per minute) or prolonged labour, deliver by Caesarean section.

**Note:** Meconium is common with breech labour and is not a sign of fetal distress if the fetal heart rate is normal.

- Confirm full dilatation by vaginal examination.

**Note:** The woman should not push until the cervix is fully dilated.

**Figure 4.13. Complete or frank breech**

A. Complete (flexed) breech

B. Frank (extended) breech

**Delivery of the buttocks and legs**

- Once the buttocks have entered the vagina and the cervix is fully dilated, tell the woman she can bear down with the contractions.

- The guiding principle at this time is “keep your hands off the breech, be patient and await the appearance of the critical anatomical landmarks.”

- With maternal efforts the anterior buttock of the fetus ‘climbs up’ the perineum until the fetal anus is visible; this is the point where the episiotomy is performed.
Let the buttocks deliver until the lower back and then the shoulder blades are seen.

Gently hold the buttocks in one hand, but do not pull.

If the legs do not deliver spontaneously, deliver one leg at a time:

- Push behind the knee to bend the leg.
- Grasp the ankle and deliver the foot and leg.

**Note:** Do not pull the baby while the legs are being delivered

The remainder of the abdomen and the lower thorax will usually deliver with maternal effort alone.

At this point gently bring down a loop of umbilical cord so it is not under tension for the remainder of the delivery.

Ensure that the fetal back remains anterior.

Hold the baby by the hips. Do not hold the baby by the flanks or abdomen as this may cause kidney or liver damage.

**Delivery of the arms**

With maternal effort alone the lower border of the more anterior scapula will become visible under the pubic arch.

If the arms are felt on the chest:

- Let arms deliver spontaneously one after another. Only assist if necessary.
- After spontaneous delivery of the first arm, lift the buttocks towards the mother’s abdomen to enable the second arm to deliver spontaneously.
If the arm does not spontaneously, deliver using two fingers pass them over the fetal shoulder and down along the humerus, splinting and sweeping it across the chest to deliver the forearm.

The fetus is then rotated 90 degrees to bring the other scapula into view and the same procedure is repeated. When rotating avoid gripping the fetal abdomen. The obstetrician’s hand should grasp the thighs with the thumb over the sacrum and the index fingers around the iliac crest.

Figure 4.15. Delivery of the arms

If the arms are stretched above head or folded around neck

Use Lovset’s manoeuvre.
Lovset's manoeuvre

- Using the pelvic grip on the fetus the trunk is gently drawn downwards with its back in oblique ant position. The baby is then lifted to cause upward and lateral flexion, which promotes descent of the post shoulder below the sacral promontory.

- Using gentle traction and rotation the posterior shoulder is rotated through 180 degrees to become the anterior shoulder.

- At this point the anterior shoulder would be easily accessible below the symphisis pubis and the arm can be swept down across the fetal chest and delivered.

Figure 4.16. Lovset's manoeuvre

- To deliver the second arm, turn the baby back half a circle, keeping the back uppermost and applying downward traction, and deliver the second arm in the same way under the pubic arch.

If the baby's body cannot be turned: Bringing down the posterior arm It is an alternative to Loveset's manoeuvre. Requires full regional or general anaesthesia.

- If the baby's body cannot be turned, deliver the arm that is anterior first, deliver the shoulder that is posterior.

- Hold and lift the baby up by the ankles.
- Move the baby’s chest towards the woman’s inner leg. The shoulder that is posterior should deliver.
- Deliver the arm and hand.
- Lay the baby back down by the ankles.
- The shoulder that is anterior should now deliver.
- Deliver the arm and hand.

**Delivery of the head**

The Burns-Marshall method (feet are grasped and with gentle traction swept in a slow arc over the maternal abdomen).

**Figure 4.17. Delivery of posterior shoulder**

**Figure 4.18. The Burns-Marshall manoeuvre**
Deliver the head by the Mauriceau Smellie Veit manoeuvre:

- Lay the baby face down with the length of its body over your hand and arm.
- Place the first and third fingers of this hand on the baby's cheekbones and place the second finger in the baby's mouth to pull the jaw down and flex the head.
- Use the other hand to grasp the baby's shoulders.
- With two fingers of this hand, gently flex the baby's head towards the chest while pulling on the jaw to bring the baby's head down until the hairline is visible.
- Pull gently to deliver the head.

**Note:** Ask an assistant to push above the mother's pubic bone as the head delivers. This helps to keep the baby's head flexed.

- Raise the baby, still astride the arm, until the mouth and nose are free.

**If the head is entrapped (stuck)**

- Catheterize the bladder.
- Have an assistant available to hold the baby while applying Piper or long forceps.
- Be sure the cervix is fully dilated.
- Wrap the baby’s body in a cloth or towel and hold the baby up.
- Place the left blade of the forceps.
- Place the right blade and lock handles.
- Use the forceps to flex and deliver the baby’s head.
- If unable to use forceps, apply firm pressure above the mother’s pubic bone to flex the baby’s head and push it through the pelvis.

**Footling breech**

A footling breech baby should usually be delivered by Caesarean section.

Single footling breech presentation, with one leg extended at hip and knee.

- Limit vaginal delivery of a footling breech baby to:
  - Advanced labour with fully dilated cervix
  - Preterm baby that is not likely to survive after delivery
  - Delivery of additional baby(s) in multiple gestation
- To deliver the baby vaginally:
  - Grasp the baby’s ankles with one hand.
  - If only one foot presents, insert a hand into the vagina and gently pull the other foot down.
  - Gently pull the baby downwards by the ankles.
  - Deliver the baby until the back and shoulder blades are seen.
  - Proceed with delivery of the arm.
Complications

Fetal complications of breech presentation include:

- Cord prolapse
- Birth trauma as a result of extended arm or head, incomplete dilatation of the cervix or cephalopelvic disproportion
- Asphyxia from cord prolapse, cord compression, placental detachment or entrapped head
- Damage to abdominal organs
- Broken neck

Caesarean section for breech presentation

A Caesarean section is safer than vaginal breech delivery and recommended in cases of:

- Footling breech
- Small or malformed pelvis
- Very large fetus
- Previous Caesarean section for cephalopelvic disproportion;
- Hyperextended or deflexed head

**Note:** Elective Caesarean section does not improve the outcome in preterm breech delivery.

4.2.6 Transverse lie and shoulder presentation

- If the woman is in early labour and the membranes are intact, attempt external version *(see A.2).*
- If external version is successful, proceed with normal childbirth.
- If external version fails or is not advisable, deliver by Caesarean section.
Monitor for signs of cord prolapse. If the cord prolapses and delivery is not imminent, deliver by Caesarean section.

**Note:** Ruptured uterus may occur if the woman is left unattended.

In modern practice, persistent transverse lie in labour is delivered by Caesarean section whether the fetus is alive or dead.

### 4.3 Shoulder Dystocia (Stuck Shoulders)

The fetal head has been delivered but the shoulders are stuck and cannot be delivered.

- Be prepared for shoulder dystocia at all deliveries, especially if a large baby is anticipated.
- Have several persons available to help.

**Note:** Shoulder dystocia cannot be predicted.

### Diagnosis

- The fetal head is delivered but remains tightly applied to the vulva.
- The chin retracts and depresses the perineum.
- Traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis.
- In shoulder dystocia, usually head-to-body delivery time is >60 seconds.

### Management

- Shout for help. Urgently mobilize all available personnel.
- Make an adequate episiotomy to reduce soft tissue obstruction and to allow space for manipulation.
- With the woman on her back, ask her to flex both thighs, bringing her knees as far up as possible towards her chest.
- Ask two assistants to push her flexed knees firmly up onto her chest.
Wear sterile gloves.

Apply firm, continuous traction downwards on the fetal head to move the shoulder that is anterior under the symphysis pubis.

Note: Avoid excessive traction on the fetal head as this may result in brachial plexus injury.

Have an assistant simultaneously apply suprapubic pressure downwards to assist delivery of the shoulder.

Note: Do not apply fundal pressure. This will further impact the shoulder and can result in uterine rupture.

If the shoulder still is not delivered:

• Insert a hand into the vagina along the baby’s back.

• Apply pressure to the shoulder that is anterior in the direction of the baby’s sternum to rotate the shoulder and decrease the diameter of the shoulders.
If needed, apply pressure to the shoulder that is posterior in the direction of the sternum.

If the shoulder still is not delivered despite the above measures:

- Insert a hand into the vagina.
- Grasp the humerus of the arm that is posterior and, keeping the arm flexed at the elbow, sweep the arm across the chest. This will provide room for the shoulder that is anterior to move under the symphysis pubis.

If all of the above measures fail to deliver the shoulder, other options include:

- All manoeuvres can be repeated on all fours. Often the change of position already frees the shoulder and there will be more space for all the posterior intra-vaginal manoeuvres.
- Be prepared for PPH after shoulder dystocia.

### 4.4 Labour with an Over Distended Uterus

A woman in labour has an over distended uterus or symphysis-fundal height more than expected for the period of gestation.

- Prop up the woman.
- Confirm accuracy of calculated gestational age, if possible.
Diagnosis

- If only one fetus is felt on abdominal examination, consider wrong dates, a single large fetus or an excess of amniotic fluid.
- If multiple fetal poles and parts are felt on abdominal examination, suspect multiple pregnancy. Other signs of multiple pregnancy include:
  - Fetal head small in relation to the uterus
  - Uterus larger than expected for gestation
  - More than one fetal heart heard with Doppler fetal stethoscope

**Note:** An acoustic fetal stethoscope cannot be used to confirm the diagnosis, as one heart may be heard in different areas.

- Use ultrasound examination, if available, to:
  - Identify the number, presentations and sizes of fetuses.
  - Assess the volume of amniotic fluid.

If ultrasound service is not available, perform radiological examination (anterio-posterior view) for number of fetuses and presentations.

Management

*Single large fetus*

- Manage as for normal labour.
- Anticipate and prepare for prolonged and obstructed labour, shoulder dystocia and postpartum haemorrhage.

*Excess amniotic fluid*

- Allow labour to progress and monitor progress using a partogram.
- If the woman is uncomfortable because of uterine distension, aspirate excess amniotic fluid.
- Palpate for location of fetus.
Prepare the skin with an antiseptic.

Under aseptic conditions, insert a 20-gauge spinal needle through the abdominal and uterine walls and withdraw the stylet.

Aspirate the fluid using a large syringe. Alternatively, attach an infusion set to the needle and allow the fluid to slowly drain into a container.

When the woman is no longer uncomfortable because of over distension, replace the stylet and remove the needle.

If rupture of membranes is indicated for other reasons, controlled ARM should be done. Rupture the membranes with an amniotic hook or a Kocher clamp keeping a hand pervaginally and allow the amniotic fluid to drain slowly.

Check for cord prolapse when membranes rupture. If the cord prolapses and delivery is not imminent, deliver by Caesarean section.

Multiple pregnancy

First baby

Start an IV infusion and slowly infuse IV fluids.

Prepare equipment for neonatal resuscitation and care.

Monitor fetuses by intermittent auscultation of the fetal heart rates. If there are fetal heart rate abnormalities (less than 100 or more than 180 beats per minute), suspect fetal distress.

Check presentation.

If a vertex presentation, allow labour to progress as for a single vertex presentation and monitor progress in labour using a partograph.

If a breech presentation, apply the same guidelines as for a singleton breech presentation and monitor progress in labour using a partograph.

If a transverse lie, deliver by Caesarean section.
Second or additional baby (s)

Immediately after the first baby is delivered:

- Leave a clamp on the maternal end of the umbilical cord and do not attempt to deliver the placenta until the last baby is delivered.
- Palpate the abdomen to determine lie of additional baby.
- Correct to longitudinal lie by external version.
- Check fetal heart rate (s).
- Perform a vaginal examination to determine if:
  - the cord has prolapsed
  - the membranes are intact or ruptured
  - the presentation of other baby (s)

In case of vertex presentation:

- If the fetal head is not engaged, manoeuvre the head into the pelvis manually (hands on abdomen), if possible.
- If the membranes are intact, rupture the membranes with an amniotic hook or a Kocher clamp.
- Check fetal heart rate between contractions.
- If contractions are inadequate after birth of first baby, augment labour with oxytocin using rapid escalation (*Table 4.4*) to produce good contractions (three contractions in 10 minutes, each lasting more than 40 seconds).
- If spontaneous delivery does not occur within 2 hours of good contractions or if there are fetal heart rate abnormalities (less than 100 or more than 180 beats per minute), deliver by Caesarean section.

In case of breech presentation:

- If the baby is estimated to be no larger than the first baby, and if the cervix has not contracted, consider breech extraction or vaginal breech delivery.
Table 4.4. Rapid escalation: Oxytocin infusion

Oxytocin should be diluted only in ringers lactate not in 5% dextrose.

<table>
<thead>
<tr>
<th>Time Since Induction (hours)</th>
<th>Oxytocin Concentration</th>
<th>Drops per Minute</th>
<th>Approximate Dose (mIU/minute)</th>
<th>Volume Infused</th>
<th>Total Volume Infused</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>2.5 units in 500 mL dextrose or normal saline (5 mIU/mL)</td>
<td>15</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.50</td>
<td>Same</td>
<td>30</td>
<td>8</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>1.00</td>
<td>Same</td>
<td>45</td>
<td>11</td>
<td>45</td>
<td>68</td>
</tr>
<tr>
<td>1.50</td>
<td>Same</td>
<td>60</td>
<td>15</td>
<td>68</td>
<td>135</td>
</tr>
<tr>
<td>2.00</td>
<td>5 units in 500 mL dextrose or normal saline (10 mIU/mL)</td>
<td>30</td>
<td>15</td>
<td>90</td>
<td>225</td>
</tr>
<tr>
<td>2.50</td>
<td>Same</td>
<td>45</td>
<td>23</td>
<td>45</td>
<td>270</td>
</tr>
<tr>
<td>3.00</td>
<td>Same</td>
<td>60</td>
<td>30</td>
<td>68</td>
<td>338</td>
</tr>
<tr>
<td>3.50</td>
<td>10 units in 500 mL dextrose or normal saline (20 mIU/mL)</td>
<td>30</td>
<td>30</td>
<td>90</td>
<td>428</td>
</tr>
<tr>
<td>4.00</td>
<td>Same</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>473</td>
</tr>
<tr>
<td>4.50</td>
<td>Same</td>
<td>60</td>
<td>60</td>
<td>68</td>
<td>540</td>
</tr>
<tr>
<td>5.00</td>
<td>Same</td>
<td>60</td>
<td>60</td>
<td>90</td>
<td>630</td>
</tr>
</tbody>
</table>

- If there are inadequate or no contractions after birth of first baby, escalate oxytocin infusion at a rapid but controlled rate (table 4.4) to produce good contractions (three contractions in 10 minutes, each lasting more than 40 seconds).

- If the membranes are intact and the breech has descended, rupture the membranes with an amniotic hook or a Kocher clamp.
Check fetal heart rate between contractions. If there are fetal heart rate abnormalities (less than 100 or more than 180 beats per minute), deliver by breech extraction.

**Breech extraction**

- Wear high-level disinfected or sterile gloves (wear long gloves if available).
- Insert a hand into the uterus and grasp the baby’s foot.
- Hold the foot and pull it out through the vagina.
- Gently pull on the foot until the back and shoulder blades are seen.
- Proceed with delivery of the arms.
- Give a single dose of prophylactic antibiotics after breech extraction:
  - Ampicillin 2 g IV PLUS metronidazole 500 mg IV OR
  - Cefazolin 1 g IV PLUS metronidazole 500 mg IV
- In case of transverse lie:
  - If the membranes are intact, attempt external version (reference).
  - If external version fails and the cervix is fully dilated and membranes are still intact, attempt internal podalic version:

**Note:** Do not attempt internal podalic version if the provider is untrained, the membranes have ruptured and the amniotic fluid has drained, or if the uterus is scarred. Do not persist if the baby does not turn easily.

**Internal podalic version**

- Wear high-level disinfected or sterile gloves.
- Insert a hand into the uterus and grasp the baby’s foot.
- Gently rotate the baby down.
- Proceed with breech extraction (see above).
Check fetal heart rate between contractions.

If external version fails and internal podalic version is not advisable or fails, deliver by Caesarean section.

Give oxytocin 10 units IM or give ergometrine 0.2 mg IM within 1 minute after delivery of the last baby and continue active management of the third stage to reduce postpartum blood loss.

If vaginal delivery is not possible, deliver by Caesarean section.

Complications

Maternal complications of multiple pregnancy include:

- Anaemia
- Abortion
- Pregnancy-induced hypertension and pre-eclampsia
- Excess amniotic fluid
- Poor contractions during labour
- Retained placenta
- Postpartum haemorrhage
- Placental/fetal complications include:
  - Placenta praevia
  - Abruptio placentae
  - Placental insufficiency
  - Preterm delivery
  - Low birth weight
  - Malpresentations
- Cord prolapse
- Congenital anomalies

## 4.5 Labour with a Scarred Uterus

A woman in labour has a scarred uterus from a previous uterine surgery.

### Management

- Women with a scarred uterus should be managed at a centre where facility for emergency Caesarean section is available.
- Start an IV infusion and infuse IV fluids.
- If possible, identify the reason for the uterine scar. Caesarean section and other uterine surgeries (e.g. repair of a previous uterine rupture, excision of an ectopic pregnancy implanted in the cornua) leave a scar in the uterine wall. This scar can weaken the uterus, leading to uterine rupture during labour.
- Studies have shown that more than 50% of cases with low transverse Caesarean scars can deliver vaginally. The frequency of rupture of low transverse scars during a careful trial of labour is reported as less than 1%.

### Rupture of uterine scar

**Note:** Vertical scars from a previous Caesarean section may rupture before labour or during the latent phase.

Transverse scars typically rupture during active labour or during the expulsive phase.

The rupture may extend only a short distance into the myometrium with little pain or bleeding. The fetus and placenta may remain in the uterus and the fetus may survive for minutes or hours.

### Trial of Labour

In order to proceed with vaginal delivery, ensure that conditions are in place:

- The previous surgery was a low-transverse Caesarean incision.
- The fetus is in a normal vertex presentation.
- Emergency Caesarean section can be carried out immediately if required.

- If these conditions are not met or if the woman has a history of two lower uterine segment Caesarean sections or ruptured uterus, deliver by Caesarean section.
- If these conditions are met, monitor progress of labour using a partograph.
- If cervical dilatation crosses the alert line of the partograph, diagnose the cause of slow progress and take appropriate action.
- If there is slow progress in labour due to inefficient uterine contractions, rupture the membranes with an amniotic hook or a Kocher clamp and augment labour using oxytocin.
- If there are signs of cephalopelvic disproportion or obstruction, deliver immediately by Caesarean section.
- If there are signs of impending uterine rupture (rapid maternal pulse, persistent abdominal pain and suprapubic tenderness, fetal distress), deliver immediately by Caesarean section.
- If uterine rupture is suspected, deliver immediately by Caesarean section and repair the uterus or perform hysterectomy.

4.6 Fetal Distress in Labour (refer to Chapter 1.3)

4.7 Prolapsed Cord

Diagnosis
- Cord prolapse: descent of the umbilical cord through the cervix alongside (occult) or past (overt) the presenting part in the presence of ruptured membranes.
Cord presentation: presence of the umbilical cord between the fetal presenting part and the cervix, with or without intact membranes.

Management

Cord presentation or prolapse should be excluded at every vaginal examination in labour and after spontaneous rupture of membranes if risk factors are present.

- Assistance should be immediately called for.
- Give oxygen at 4–6 L per minute by mask or nasal cannulae.

Pulsating cord

If the cord is pulsating, the fetus is alive.

- Diagnose stage of labour by an immediate vaginal examination.
- If the woman is in the first stage of labour, in all cases:
  - Wear high-level disinfected or sterile gloves.
  - Insert a hand into the vagina and push the presenting part up to decrease pressure on the cord and dislodge the presenting part from the pelvis.
  - To prevent cord compression, it is recommended that the presenting part be elevated either manually or by filling the urinary bladder with 500–750 ml of normal saline.
  - Place the other hand on the abdomen in the suprapubic region to keep the presenting part out of the pelvis.
  - Once the presenting part is firmly held above the pelvic brim, remove the other hand from the vagina. Keep the hand on the abdomen until Caesarean section.
  - Give salbutamol 0.5 mg IV slowly over 2 minutes to reduce contractions, if available.
- Perform immediate Caesarean section.

  - If the woman is in the second stage of labour:
    - Expedite delivery with episiotomy and vacuum extraction or forceps or a Caesarean section as appropriate.
    - If breech presentation, perform breech extraction and apply Piper or long forceps to the after-coming head.
    - Prepare for resuscitation of the newborn.

*Cord not pulsating*

If the cord is not pulsating, the fetus is dead. Deliver in the manner that is safest for the woman.

**How to avoid cord prolapse?**

- Elective admission to hospital after 37+0 weeks of gestation in case of transverse, oblique or unstable lie and women should be advised to present urgently if there are signs of labour or suspicion of membrane rupture.

- Women with non-cephalic presentations and preterm prelabour rupture of membranes should be recommended inpatient care.

- Artificial membrane rupture should be avoided whenever possible if the presenting part is mobile and/or high.

- If it becomes necessary to rupture the membranes with a high presenting part, this should be performed with arrangements in place for immediate Caesarean section.

- Upward pressure on the presenting part should be kept to a minimum in women during vaginal examination and other obstetric interventions in the context of ruptured membranes because of the risk of upward displacement of the presenting part and cord prolapse.
Rupture of membranes should be avoided if on vaginal examination the cord is felt below the presenting part. When cord presentation is diagnosed in established labour, Caesarean section is usually indicated.

4.8 Preterm Labour (refer to chapter 3.9.3 on page 185)

4.9 Prelabour Rupture of Membranes (refer to chapter 3.9.4 on page 189)
# Abnormal Puerperium

## 5.1 Fever after Childbirth

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5.1  Fever After Childbirth (Puerperal Pyrexia)

Fever (temperature 38°C or more) occurring more than 24 hours after delivery.

Table 5.1. Diagnosis of fever after childbirth

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fever/chills</td>
<td>• Subinvolution of uterus</td>
<td>• Metritis</td>
</tr>
<tr>
<td>• Lower abdominal pain</td>
<td>• Tender uterus</td>
<td></td>
</tr>
<tr>
<td>• Purulent, foul-smelling lochia</td>
<td>• Swelling in adnexa or pouch of Douglas</td>
<td></td>
</tr>
<tr>
<td>• Excessive vaginal bleeding</td>
<td>• Pus obtained upon culdocentesis</td>
<td></td>
</tr>
<tr>
<td>• Lower abdominal pain and distension</td>
<td>• Tender and Subinvoluted uterus</td>
<td>• Pelvic abscess</td>
</tr>
<tr>
<td>• Persistent spiking Fever/chills</td>
<td>• Swelling in adnexa or pouch of Douglas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pus obtained upon culdocentesis</td>
<td></td>
</tr>
<tr>
<td>• Fever/chills</td>
<td>• Abdominal distension</td>
<td>• Peritonitis</td>
</tr>
<tr>
<td>• Lower abdominal pain</td>
<td>• Rebound tenderness</td>
<td></td>
</tr>
<tr>
<td>• Anorexia</td>
<td>• Shock</td>
<td></td>
</tr>
<tr>
<td>• Nausea/vomiting</td>
<td>• Absent bowel sounds</td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>Diagnosis</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Breast pain and feeling of tenseness and heaviness, painful feeding 3–5 days after delivery</td>
<td>Breast engorgement</td>
<td></td>
</tr>
<tr>
<td>Breast pain preceded by engorgement</td>
<td>Mastitis</td>
<td></td>
</tr>
<tr>
<td>Painful swelling in the breast/draining pus</td>
<td>Breast abscess</td>
<td></td>
</tr>
<tr>
<td>Fever/chills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unusually painful wound with bloody/serous/purulent discharge</td>
<td>Wound seroma/haematoma/abscess</td>
<td></td>
</tr>
<tr>
<td>Painful and tender wound</td>
<td>Wound cellulitis</td>
<td></td>
</tr>
</tbody>
</table>
- Dysuria
- Increased frequency and urgency of urination
- Retropubic/suprapubic pain
- Abdominal pain
- Cystitis

- Fever with chills
- Dysuria
- Increased frequency or urgency
- Abdominal/loin pain
- Anorexia, nausea vomiting
- Loin tenderness
- Tenderness in rib cage
- Acute Pyelonephritis

- Pain and swelling in one or both lower limbs
- Warm, red or discoloured skin
- Calf muscle tenderness
- Deep vein thrombosis

**Other causes for fever after childbirth could be**

Chest infections (such as pneumonia, bronchitis, pulmonary tuberculosis)

Malaria, Typhoid, Dysentery, Hepatitis, Meningitis, Acquired immune deficiency syndrome (AIDS).
Management

Investigations (as appropriate)

- Complete blood count
- Blood sugar
- Mid-stream specimen of urine
- High vaginal swab
- Blood cultures in the presence of chills or evidence of severe infection
- Wound swab culture e.g., perineal or abdominal
- Ultrasonography (USG) is recommended to rule out the possibility of a retained placenta in the uterine cavity or intra-abdominal or pelvic mass. (see APPENDIX B)

Treatment

General treatment

- Triage whereby patients need admission to health-care facility.
- Encourage bed rest.
- Ensure adequate hydration by mouth or IV.
- Use antipyretics, fan or tepid sponge to help decrease temperature.
- If shock is suspected, immediately begin treatment. Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately.
- Principals of monitoring and prescribing broad spectrum antibiotics:
  - Check the temperature every 4 hours.
  - Check the general condition: vital signs, malaise, abdominal pain or vaginal discharge every 4 hours for improvement or worsening.
- Repeat white blood cells count after 48 hours if required.
- Receive, record and follow-up on the results of culture.
- Start antibiotics at the earliest as per clinical diagnosis.
- If broad spectrum antibiotics required give:
  - Ampicillin 2g iv AST every 6 hours PLUS
  - Gentamycin 5 mg/kg body weight every 24 hours PLUS
  - Metronidazole 500 mg iv every 8 hours
- Allow the patient to go home if the temperature is <37.5°C for at least 48 hours and results of leukocyte test is <11,000/mm3.
- Record all results of patient monitoring in the medical record.

**Treatment of Individual Cause**

**5.1.1 Metritis**

Metritis is infection of the uterus after delivery and is a major cause of maternal death. Delayed or inadequate treatment of metritis may result in pelvic abscess, peritonitis, septic shock, deep vein thrombosis, pulmonary embolism, chronic pelvic infection with recurrent pelvic pain and dyspareunia, tubal blockage and infertility.

**Management**

- Give broad spectrum antibiotics until the woman is fever-free for 48 hours. If fever is still present 72 hours after starting antibiotics, re-evaluate and revise diagnosis.

**Note:** Oral antibiotics are not necessary after stopping IV antibiotics.

- If retained placental fragments are suspected, perform a digital exploration of the uterus to remove clots and large pieces. Use ovum forceps or a wide curette if required.
If there is no improvement with conservative measures and there are signs of general peritonitis (fever, rebound tenderness, abdominal pain), perform a laparotomy to drain the pus.

If the uterus is necrotic and septic, perform subtotal hysterectomy.

5.1.2 Pelvic abscess

Management

- Give a combination of broad spectrum antibiotics before draining the abscess and continue until the woman is fever-free for 48 hours.
- If the abscess is fluctuant in the cul-de-sac, drain the pus through the cul-de-sac. If the spiking fever continues, perform a laparotomy.
- Ultrasonography can help to identify whether culdotomy can be used as treatment modality because pelvic abscess which have loculi or are organized are better managed by laparotomy.

5.1.3 Peritonitis

Management

- Provide nasogastric suction.
- Start an IV infusion and infuse IV fluids.
- Give a combination of broad spectrum antibiotics until the woman is fever-free for 48 hours.
- If necessary, perform laparotomy for peritoneal lavage (wash-out).
- During treatment, no response to the antibiotics within 48 hours is a call for shifting to higher antibiotics or surgical intervention.
5.1.4 Breast engorgement

Breast engorgement is an exaggeration of the lymphatic and venous engorgement that occurs prior to lactation. It is not the result of over distension of the breast with milk.

Management

If the woman is breastfeeding

► If the woman is breastfeeding and the baby is not able to suckle, encourage the woman to express milk by hand or with a pump.

► If the woman is breastfeeding and the baby is able to suckle:
  ▪ Encourage the woman to breastfeed more frequently, using both breasts at each feeding.
  ▪ Show the woman how to hold the baby and help it attach.

► Counsel the woman on relief measures.

► Give paracetamol 500 mg by mouth as needed.

► Follow up in 3 days to ensure response.

► Relief measures before feeding may include:
  ▪ Apply warm compresses to the breasts just before breastfeeding, or encourage the woman to take a warm shower.
  ▪ Massage the woman’s neck and back.
  ▪ Have the woman express some milk manually before breastfeeding and wet the nipple area to help the baby latch on properly and easily.

► Relief measures after feeding may include:
  ▪ Support breasts with a binder or brassiere.
  ▪ Apply cold compress to the breasts between feedings to reduce swelling and pain.
If the woman is not breastfeeding:

- Support breasts with a binder or brassiere.
- Apply cold compresses to the breasts to reduce swelling and pain.
- Avoid massaging or applying heat to the breasts.
- Avoid stimulating the nipples.
- Give paracetamol 500 mg by mouth as needed.
- Follow up in 3 days to ensure response.

5.1.5 Mastitis

Diagnosis

Tests/investigations: A sample of breast milk should be sent for bacteriological examination, including culture and sensitivity to confirm diagnosis.

Management

- Give cloxacillin 500 mg by mouth four times per day for 10 days; OR erythromycin 250 mg by mouth three times per day for 10 days.

- Encourage the woman to:
  - Continue breastfeeding.
  - Support breasts with a binder or brassiere.
  - Apply cold compresses to the breasts between feedings to reduce swelling and pain.

- Give paracetamol 500 mg by mouth as needed.
- Follow up in 3 days to ensure response.
5.1.6 Breast abscess

Management

► Give cloxacillin 500 mg by mouth four times per day for 10 days. OR erythromycin 250 mg by mouth three times per day for 10 days.

► Drain the abscess:
  - General anaesthesia (e.g. ketamine) is usually required.
  - Wear high-level disinfected gloves.
  - Make the incision radially, extending from near the areolar margin towards the periphery of the breast to avoid injury to the milk ducts.
  - Use a finger or tissue forceps to break up the pockets of pus.
  - Loosely pack the cavity with gauze.
  - Remove the gauze pack after 24 hours and replace with a smaller gauze pack.
  - If there is still pus in the cavity, place a small gauze pack in the cavity and bring the edge out through the wound as a wick to facilitate drainage of any remaining pus.

► Encourage the woman to:
  - Continue breastfeeding even when there is collection of pus.
  - Support breasts with a binder or brassiere.
  - Apply cold compresses to the breasts between feedings to reduce swelling and pain.
  - Give paracetamol 500 mg by mouth as needed.
  - Follow up in 3 days to ensure response.
5.1.7 Wound abscess, wound seroma and wound haematoma

Management

- If there is pus or fluid, open and drain the wound.
- Remove infected skin or subcutaneous sutures and debride the wound.
- Do NOT remove fascial sutures.

**Note:** If there is an abscess without cellulitis, antibiotics are not required.

- Place a damp dressing in the wound.
- Advise the woman on the need for good hygiene and to wear clean pads or clothes that she changes often.
- Have the woman return to change the dressing every 24 hours.

5.1.8 Wound cellulitis

Management

- If there is fluid or pus, open and drain the wound.
- Remove infected skin or subcutaneous sutures and debride the wound.

**Note:** Do NOT remove fascial sutures.

- If infection is superficial and does not involve deep tissues, monitor for development of an abscess and give a combination of antibiotics.
  - Give ampicillin 500 mg by mouth four times per day for 5 days PLUS
  - Metronidazole 400 mg by mouth three times per day for 5 days
- If the infection is deep, involves muscles and is causing necrosis (necrotizing fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours.
  - Give penicillin G 2 million units IV every 6 hours PLUS
- Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
- Metronidazole 500 mg IV every 8 hours.

► Once the woman is fever-free for 48 hours:
- Give ampicillin 500 mg by mouth four times per day for 5 days PLUS
- Metronidazole 400 mg by mouth three times per day for 5 days

**Note:** Necrotizing fasciitis requires wide surgical debridement.

► Perform delayed primary closure 2 to 4 weeks later, depending on resolution of infection.

► If the woman has a severe infection or necrotizing fasciitis, admit her to the hospital for management and change wound dressing twice daily.

### 5.1.9 Cystitis and pyelonephritis

Treatment discussed with fever during pregnancy and labour *(see Table 3.15)*

### 5.1.10 Deep vein thrombosis

► Deep vein thrombosis can lead to pulmonary embolism which is often fatal

► DVT has the following common risk factors:
  - Age over 35 years
  - High parity
  - Obesity
  - Caesarean section
  - Trauma to the legs
  - Immobility
- Dehydration and exhaustion
- Smoking
- Administration of oestrogens
- Previous history of thromboembolism

**Management**

- Patient should be referred to higher centre for diagnosis and management.
- Anticoagulants are required for treatment.

### 5.2 Psychological Morbidity

Postpartum emotional distress is fairly common after pregnancy and ranges from mild postpartum blues (affecting about 80% of women) to postpartum depression or psychosis. Postpartum psychosis (PP) is a medical emergency and needs urgent treatment. Postpartum psychosis can pose a threat to the life of the mother or baby.

- A two-question screening method for postpartum depression is recommended. The screen is considered positive if a woman answers yes to either of the two following questions:
  - Over the past 2 weeks have you ever felt down, depressed or hopeless?
  - Over the past 2 weeks have you felt little interest or pleasure in doing things?

- Before diagnosis of Postpartum Psychological Disturbances (PPPD) exclude the following somatic conditions:
  - Postpartum infections and septicemia
  - Cerebral vein thrombosis
  - Uncontrolled diabetes
Table 5.2. Postpartum psychological disturbances

<table>
<thead>
<tr>
<th></th>
<th>Estimated Incidence</th>
<th>Onset</th>
<th>Frequent Symptoms</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postpartum “blues”</td>
<td>Nearly 50%</td>
<td>3-5 days postpartum</td>
<td>Emotional lability, mood swings, anxiety</td>
<td>Self-limited, emotional support</td>
</tr>
<tr>
<td>Postpartum depression</td>
<td>10%–34%</td>
<td>Variable window: during pregnancy up to 1 year postpartum</td>
<td>Low mood, feelings of guilt, impaired feelings of bonding with the child, refuse breastfeeding</td>
<td>Psychotherapy, antidepressant medication, mother-baby therapy</td>
</tr>
<tr>
<td>Postpartum psychosis</td>
<td>0.1–0.2%</td>
<td>Within 2-4 weeks postpartum</td>
<td>Agitation, irritability, euphoric mood, depression, delusions, hallucinations, confusion, cognitive symptoms</td>
<td>Hospitalization, medical workup, lithium, antipsychotics, Electroconvulsive Therapy (ECT)</td>
</tr>
</tbody>
</table>

- Postpartum psychosis (PP) can happen to any woman. Personal or family history of PP is important. Even before delivery, the at-risk patient is encouraged to consult with a psychiatrist to help her consider treatment options or treatment prophylaxis at delivery to avoid illness.

- The physician must consider difficulty in caring for her children or poor self-care as red flags and arrange a psychiatric referral quickly.
Treatment

- **Psycho-education and psychotherapy**

Once the diagnosis has been established, the physician should:

- Educate the patient and her family about the illness.
- Rule out organic causes, initiate pharmacotherapy and supportive therapy, and repeatedly assess the patient’s function and safety status.

Physicians will contribute greatly by informing patients and their families about the symptoms, treatments, expected outcomes, and strategies to prevent recurrence of PP. The process of psycho-education is essential. It will enhance the therapeutic alliance; furthermore, it will strengthen the patient’s decision-making process about treatment and her feelings of self-efficacy and mastery over illness.

- **Drugs – Lithium or antiepileptic drugs**

  - **Breastfeeding**

    The mother’s breastfeeding preference and the associated benefits and risks must be considered by the patient and her physician.

    Mothers on pharmacotherapy must be instructed to observe for behavioural changes indicative of infant toxicity, such as poor hydration, sedation, poor feeding, and weight gain, as well as signs of hepatic and haematological impairment. They should contact their paediatricians immediately when they notice these symptoms. Breast milk exposure can be limited by (1) the use of the lowest effective dose, (2) the use of fewer drugs to achieve response and (3) dividing daily doses to avoid high-peak serum concentrations.

- **Plan discharge**

  Before release from hospital, the treatment team must work with the patient and her family to devise a discharge plan that will bolster her supports, incorporate close follow-up, and reduce stressors that contribute
to relapse risk. For future pregnancies, her primary care physician is advised to collaborate with the obstetrician, endocrinologist and other specialists providing her care in consideration of antimanic prophylaxis during pregnancy or after childbirth.

5.3 Common Puerperal Ailments

Cracked nipple

It is the formation of raw area or a fissure due to poor hygiene, wrong suckling mechanism or attachment.

Treatment

- Encourage the mother to continue breastfeeding.
- Correct attachment
- Reassess after 2 feeds or 1 day; if not better, teach the mother to express breast milk from affected side and feed the baby by cup and continue breastfeeding on healthy side.
- Mother’s hind breast milk application on nipple which has soothing effect
- If severe, use breast pump and feed the baby with expressed milk.

Retracted and flat nipple

Treatment

- Attachment is possible and baby is able to feed
- Lactation may be initiated by milk expression and then baby may be attached
- Manually stretch and roll out nipple several times
- Corrected by suction with syringe or breast pump
Lactation failure

Lactation failure is a condition when lactation is insufficient or fails due to an inadequate breast milk production and/or failure of the milk let-down reflex in response to suckling following childbirth, resulting in an inability to properly breastfeed.

Treatment

- Reassurance
- Encourage adequate fluid intake
- Nurse the baby regularly in correct position regularly
- Painful local lesion to be treated
- Metoclopramide 10 mg thrice daily

Retention of urine

Treatment

- Simple measures
- Indwelling catheter for 24 to 48 hours
- After removing catheter if residual urine is more than 100 ml continuous drainage is resumed
- Urinary antiseptics for 5-7 days
Notes
Contraception

6.1 Family Planning 256
6.2 Types of Contraception 256
6.3 Counselling 264
6.4 Postpartum Contraception 271
6.5 Emergency Contraception 273
6.1 **Family Planning**

It is important that anyone who is sexually active has access to family planning and that there are trained midwives or health workers who provide locally available and culturally acceptable contraceptive methods.

To secure the well-being and autonomy of a woman can ensure her ability to choose if and when to become pregnant.

**Table 6.1. Benefits of family planning**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to preferred method of contraception is essential to securing</td>
<td>Access to preferred method of contraception is essential to securing the well-being of women and families.</td>
</tr>
<tr>
<td>the well-being of women and families</td>
<td>Reinforces couples’ rights to make informed choices and determine spacing and number of their children.</td>
</tr>
<tr>
<td>Reinforces couples’ rights to make informed choices and determine</td>
<td>Contributes significantly to the prevention of maternal and child mortality.</td>
</tr>
<tr>
<td>spacing and number of their children</td>
<td>Prevents pregnancy-related health risks (for young/old mothers and multipara).</td>
</tr>
<tr>
<td>Contributes significantly to the prevention of maternal and child</td>
<td>Some methods provide dual protection against STI/HIV.</td>
</tr>
<tr>
<td>mortality</td>
<td>Increases opportunity for women and leads to healthier families and communities</td>
</tr>
<tr>
<td>Prevents pregnancy-related health risks (for young/old mothers and</td>
<td>One of the most cost-effective investments in national development.</td>
</tr>
<tr>
<td>multipara)</td>
<td></td>
</tr>
</tbody>
</table>

6.2 **Types of Contraception**

There are several types of contraceptive methods available. It is important to counsel the woman and her partner by providing objective information to make a conscious decision of the contraception method, which combines health aspects, suitability and couples’ desires.
Table 6.2. Types of contraception

<table>
<thead>
<tr>
<th>Method</th>
<th>Mechanism</th>
<th>Pearl Index/Effectiveness to prevent pregnancy</th>
<th>Benefits</th>
<th>Limitations and Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined estrogen and progesterone contraceptives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined oral contraceptives (COCs)</td>
<td>• Ovulation inhibition&lt;br&gt;• Thickened cervical mucus to prevent sperm penetration&lt;br&gt;• Thin endometrium to prevent implantation</td>
<td>0.3&lt;br&gt;&gt;99% with correct use&lt;br&gt;92% Missed pills</td>
<td>• Control of painful, heavy and irregular periods&lt;br&gt;• Regulating and controlling menstrual cycle&lt;br&gt;• Improvement of skin conditions (acne vulgaris)&lt;br&gt;• Cancer risk reduction (Ovarian, Endometrial)&lt;br&gt;• High efficacy, easy to use</td>
<td>• Side effects: Nausea, breast tenderness spotting, dizziness, weight gain&lt;br&gt;• Serious side effects (thrombosis, hypertension)&lt;br&gt;• Lack of protection against STIs&lt;br&gt;• Compliance essential&lt;br&gt;• Missed pills&lt;br&gt;• Effect on quantity and quality of breast milk</td>
</tr>
<tr>
<td>Progesterone-only contraceptives</td>
<td></td>
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<td></td>
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<tr>
<td>Progesterone-only pills (POPs) or &quot;the minipill&quot;</td>
<td>Thickened cervical mucus to prevent sperm penetration</td>
<td>0.3</td>
<td>Useful where COCs are contraindicated</td>
<td>Must be taken every day at the same time</td>
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<td>---------------------------------------------</td>
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<td>--------------------------------------</td>
<td>----------------------------------------</td>
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<tr>
<td>Thin endometrium to prevent implantation</td>
<td></td>
<td>99%</td>
<td></td>
<td>Menstrual irregularities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90–97% Missed pills</td>
<td>Higher risk of ectopic pregnancy</td>
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<tr>
<td>Progesterone implants</td>
<td>Inserted subdermally into upper arm</td>
<td>0.05</td>
<td>Highly effective</td>
<td>Involves a small procedure under local anaesthesia</td>
</tr>
<tr>
<td></td>
<td>Same as POPs</td>
<td>99%</td>
<td></td>
<td>Irregular bleeding</td>
</tr>
<tr>
<td>DMPA</td>
<td>Same as POPs</td>
<td>0.7</td>
<td>High efficacy</td>
<td>Delayed return to fertility</td>
</tr>
<tr>
<td></td>
<td>Given im/sc every 12 weeks</td>
<td></td>
<td></td>
<td>Menstrual irregularities</td>
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<tr>
<td><strong>Physical barrier methods</strong></td>
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<tr>
<td>Male condoms</td>
<td>Made out of rubber</td>
<td>2</td>
<td>Inexpensive with minimal side effects</td>
<td>High rate of failure if not used properly</td>
</tr>
<tr>
<td></td>
<td>Placed over the erected penis</td>
<td>98%</td>
<td>Preventing transmission of STIs/HIV</td>
<td>Leak</td>
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<tr>
<td></td>
<td>Preventing sperms entering the vagina</td>
<td>85% incorrect use</td>
<td>No hormonal side effects</td>
<td>No interruption of sexual intercourse</td>
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<tr>
<td><strong>Diaphragm</strong></td>
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<tr>
<td></td>
<td>Convex-shaped rubber hood</td>
<td>4-8</td>
<td>92-96%</td>
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<tr>
<td></td>
<td>Inserted into vagina before intercourse to cover the cervix</td>
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<tr>
<td><strong>Female condoms</strong></td>
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<tr>
<td></td>
<td>Sheath, which can be inserted at any time before intercourse into vagina to act as a barrier for sperms reaching cervix</td>
<td>5</td>
<td>90% with correct use</td>
<td>79% as commonly used</td>
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<tr>
<td><strong>Intrauterine device contraceptives</strong></td>
<td><strong>Side Effects</strong></td>
<td><strong>Disadvantages</strong></td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------------</td>
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<td></td>
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</tr>
<tr>
<td>• Copper containing IUD</td>
<td>• Changes in the menstrual cycle (typically the first 3 months)</td>
<td>• Improper for use in women with STIs or those frequently</td>
<td></td>
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<tr>
<td>• T-shaped device with spermicidal copper component</td>
<td>• Longer menstrual period and excessive discharges</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Creates inflammatory response in endometrium to prevent implantation</td>
<td>• Spotting in between menstruations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Very effective method</td>
<td>• Improper for use in women with STIs or those frequently</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Effective immediately after insertion</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Not affecting sexual intercourse</td>
<td></td>
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<tr>
<td></td>
<td>• Not affecting quality and volume of breast milk</td>
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<tr>
<td></td>
<td>• Can be inserted immediately after delivery or after abortion.</td>
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<tr>
<td></td>
<td>• IUDs may be removed at any time by the will of the client</td>
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<tr>
<td></td>
<td>• 0.6</td>
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<tr>
<td></td>
<td>&gt;99%</td>
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<tr>
<td></td>
<td>Long-term efficacy</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Lack of hormonal side effects</td>
<td></td>
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<tr>
<td></td>
<td>Effective immediately after insertion</td>
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<td></td>
<td>Not affecting sexual intercourse</td>
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<td></td>
<td>Not affecting quality and volume of breast milk</td>
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</tr>
<tr>
<td></td>
<td>Can be inserted immediately after delivery or after abortion.</td>
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<tr>
<td></td>
<td>IUDs may be removed at any time by the will of the client</td>
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</tr>
</tbody>
</table>

**Side Effects**
- Changes in the menstrual cycle (typically the first 3 months)
- Longer menstrual period and excessive discharges
- Spotting in between menstruations
- More painful menstruation
- Pain or cramps of the lower abdomen for 3–5 days after insertion
- Uterine wall perforation (extremely rare if insertion is correct).

**Disadvantages**
- Improper for use in women with STIs or those frequently
<table>
<thead>
<tr>
<th>Combined injectable contraceptives (CIC)</th>
<th>Given by intramuscular injection every 4 weeks</th>
<th>0.05</th>
<th>High efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Same mechanism as COCs</td>
<td>&gt;99% correct use</td>
<td>No need to remember</td>
</tr>
<tr>
<td></td>
<td></td>
<td>97% missed pills</td>
<td>No delayed return to fertility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>changing partners (risk of PID)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Risk of spontaneous expulsion, especially during the first few months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pelvic examination is required in IUD insertion. Have to check the position of IUD threads from time to time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clients cannot remove IUDs by themselves but has to be done by trained health personnel</td>
</tr>
</tbody>
</table>
### Permanent methods

<table>
<thead>
<tr>
<th>Levonorgestrel-releasing IUD</th>
<th>Intrauterine T-shaped plastic frame</th>
<th>0.6</th>
<th>0.06 &gt;99%</th>
<th>Reduces dysmenorrhoea and bleeding</th>
<th>Irregular bleeding in the first 3 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male sterilization (vasectomy)</td>
<td>Division of the vas deferens to achieve azoospernia</td>
<td>0.1</td>
<td>0.1 &gt;99% after 3 months with semen evaluation</td>
<td>Efficacy and permanence</td>
<td>Alternative contraception until at least 3 months</td>
</tr>
<tr>
<td>Female sterilization (tubal ligation)</td>
<td>Block or cut of the fallopian tubes to prevent fusion of gametes</td>
<td>0.5</td>
<td>0.5 &gt;99%</td>
<td>Simple procedure</td>
<td>Careful counselling prior to procedure</td>
</tr>
</tbody>
</table>

### Lactational amenorrhoea method

<table>
<thead>
<tr>
<th>Lactational amenorrhoea (LAM)</th>
<th>Relies on amenorrhoea during breastfeeding</th>
<th>0.5</th>
<th>0.5 99% with correct</th>
<th>Temporary method</th>
<th>Infant needs to be less than 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calendar-based</strong></td>
<td><strong>Monitoring fertile days</strong></td>
<td><strong>2-6</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symptom-based</strong></td>
<td><strong>Cervical mucus</strong></td>
<td><strong>95-97% with correct use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Withdrawal</strong></td>
<td><strong>Body temperature</strong></td>
<td><strong>75% as commonly used</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coitus interruptus</strong></td>
<td><strong>Withdraw penis before ejaculation</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

- Absence of chemicals or hormones
- Cultural acceptance
- Altered by stress, illness
- Both need to be committed to periodic abstinence

One of the least effective methods, because of proper timing. But still commonly used even though there are better and more effective ways for contraception.

**Fertility awareness methods/ natural family planning**

- Mother needs to breastfeed exclusively (more effectively if breastfeeding is ≥8 times a day and 2 night feeds)

**The Pearl Index:** number of women who will become pregnant if 100 women use same form of contraception properly for 1 year.

- 98% as commonly used
- 95-97% with correct use
- 75% as commonly used
6.3 Counselling

6.3.1 General counselling

GATHER technique can be used as a guide in the process and steps of counselling for family planning.

Table 6.3. Steps of GATHER technique

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>G — Greet</td>
<td>• Greet clients, smile, introduce yourself, and use verbal and nonverbal communication as a beginning of 2-way interaction.</td>
</tr>
<tr>
<td>A — Ask</td>
<td>• Ask client’s identity and about her desire to visit.</td>
</tr>
<tr>
<td>A — Assess</td>
<td>• During communication, assess needs, choice of desired contraceptive method and client’s knowledge about her own health status, contraceptive types/methods.</td>
</tr>
<tr>
<td>T — Tell</td>
<td>• Provide objective and complete information on the various contraceptive methods, adverse-effects and complications encountered and attempts to eliminate or mitigate such adverse effects (including the referral system).</td>
</tr>
<tr>
<td>H — Help</td>
<td>• Help client to choose the most secure and suitable method of contraception for her. Do not force decision to be made on the first visit. Give client a chance to consider her choice. If she wants to get more information, recommend the client to consult again or refer her to a counsellor or more skilled medical personnel.</td>
</tr>
<tr>
<td></td>
<td>• The foregoing is crucially important since the client has the following rights:</td>
</tr>
<tr>
<td></td>
<td>- Freedom to use or not use contraceptives.</td>
</tr>
<tr>
<td></td>
<td>- Freedom to choose the contraceptive method she wants.</td>
</tr>
<tr>
<td></td>
<td>- Served as private and confidential.</td>
</tr>
</tbody>
</table>
**E – Explain**

- Explain again completely and objectively about contraceptive method chosen by the client. Explain also the time, place, personnel and procedures of insertion/use of contraceptives, follow-up observation after insertion, efforts to recognize adverse effects/complications, family planning (FP) clinic/place of service for repeat visits when needed, and the timing of contraceptive replacement/removal.

**R – Refer**

- Refer client to a more skilled counsellor if in the family planning clinic the client has not received satisfactory information.
- Refer client to skilled medical personnel when the client wants more detailed explanation on medical aspects.
- Refer client to a more complete contraceptive/health care facility when the local family planning clinic is incapable of coping with the adverse effects/complications or patient’s desires.

**R – Return visit**

- Follow-up care after the client is sent back by the referral facility or follow-up care after insertion (post-insertion revisit).

### 6.3.2 Special counselling

**Male Condoms**

- Consideration in the use of condoms:
  - Assess risk of STIs (frequently changing sex partners, more than one sex partner, having a high-risk sex partner).
  - Is there a known Latex allergy (condom material)
  - Men’s cooperation in using this contraceptive method

---

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How To Use

- Give the client instructions regarding how to use the condom:
  - Use a condom in every sexual intercourse.
  - Do not use a condom if the packaging is torn or looks fragile.
  - Should be worn when the penis erects, before being penetrated into the vagina prior to ejaculation.
  - Use each condom only once and then dispose it off: use a new condom for every sexual intercourse.
  - Do not store condoms in hot/soft places including wallets, because latex is soft and can break/leak during an intercourse.
  - Do not use cooking oil, baby oil, or lubricants made of petroleum materials to lubricate condoms as this will make the latex soft and can break/Leak while having sex.
  - The date on condom wrapper is the date of manufacture; condoms will be durable for 5 years when stored properly.

Demonstrate by using a model:

- Open the condom wrapper using the easy-tear edges. Don’t use teeth or any sharp instrument to open it.

- Determine which way the condom is rolled and make sure that the tip of the condom points in the right direction.

- Pinching the reservoir shut with one hand, place the condom on the tip of the erected penis.

- Gently roll the condom to the base of the penis.

- After ejaculation, withdraw penis while holding the bottom of the condom to prevent spilling of semen.

- Dispose of the condom after tying the open end in a knot and wrapping it into tissue into a bin.
Explain what to do if the condom is leaking/damaged during intercourse:

- Immediately replace with a new condom.
- Immediately go to the nearest family planning clinic for emergency contraception.

**Combined Pills**

**Contraindications**

- Ask health problems associated with the use of the pills, including medical problems prohibiting the client from using combined pills:
  - Pregnancy or suspected pregnancy
  - Idiopathic vaginal bleeding
  - Breastfeeding
  - On rifampicin for tuberculosis or drugs for epilepsy (phenytoin and barbiturates)
  - Smoker (age >35 years)
  - Hepatitis
  - Breast cancer or suspected breast cancer
  - History of heart disease, stroke, or systolic blood pressure of >160 or diastolic of >90 mmHg
  - History of blood clotting factor disorders or diabetes for >20 years
  - Migraine and focal neurologic symptoms (epilepsy/history of epilepsy).

**How to Use**

- Give the client instructions regarding how to use the combined contraceptive pills:
  - Take 1 pill every day.
- Take the pill at the same time every day.
- Start taking the first pill on days 1 to 5 of the menstrual cycle (highly recommended for use on the first day of menstruation).
- One pill daily for 21 days followed by 7 pill-free days. Some packs have 7 ‘dummy pills’ without active drug to prevent missing pills.
- If vomiting or diarrhoea use extra contraception.

**Missed pill rules:**

- When missed 1 or 2 pills, take a pill immediately after remembering (taking 2 pills on the same day is allowed). Continue the rest of the pack as usual.
- When missed 3 pills or more, take the most recent pill as soon as possible. Continue the rest of the pack as normal. Additional contraception (condoms) is needed until 7 consecutive pills have been taken.
  - If the missed pills are within day 1-7; emergency contraception should be considered.
  - If the missed pills are within day 8-14; no need for emergency contraception if she has taken at least 7 consecutive days of the pill.
  - If the missed pills are within day 15-21; the current pack should be finished and the next pack should be started avoiding the pill-free interval.

**The ‘7 day rule’:**

- It takes 7 days of continuous pills to suppress ovulation.
- It takes 7 days without pills for ovarian activity to resume.

**Revisit to the clinic is required, if:**

- Severe abdominal pain
- Severe chest pain
- Cough with shortness of breath
Severe headache
Visual disturbances
Severe leg pain
Bleeding after taking one pack of pills.

Point out that the client can stop taking pills anytime when not in need of contraception.

**Intra-uterine Devices (IUDs)**

**Contraindications**

- Explain medical problems preventing the client from using IUDs:
  - Pregnancy or suspected pregnancy
  - Idiopathic vaginal bleeding
  - Genital infections
  - Experiencing or frequently suffering from pelvic inflammatory disease or septic abortion in last 3 months
  - Abnormal uterine congenital malformations or benign uterine tumours capable of affecting uterine cavity
  - Malignant trophoblastic disease
  - TB of pelvic organs
  - Genital cancers
  - Uterine cavity less than 5 cm in size

**How to Use**

- Explain to the client that IUD can be started for use
  - Anytime during the menstrual cycle (confirmed not pregnant)
- Until the first 7 days of menstrual cycle
- Immediately after delivery, during the first 48 hours, or after 4 weeks post-natally; after 6 months when using LAM method
- Post-abortion (immediately or within 7 days) in the absence of infection
- One to 5 days after an unprotected intercourse

**Instruction to Patients:**
- Check threads themselves 4 to 6 weeks after IUD insertion
- During the first few months of IUD use, check the IUD threads regularly, especially after menstruation.
- After the first few months of insertion, check only the existence of the threads after menstruation when experiencing:
  - Lower abdominal cramps
  - Spotting between menstruations or after intercourse
  - Pain after intercourse or when the spouse experiencing discomfort during sexual intercourse
- Copper T-380A should be removed after 10 years of insertion

**Re-visit the clinic if:**
- Unable to feel IUD threads
- Feeling the hard part of IUD
- Interrupted/missed cycles
- Suspicious vaginal discharges
- Presence of infection

**Lactational amenorrhoea method**
- To safely use lactational amenorrhoea method (LAM), mother be exclusively breastfeeding for up to 6 months.
To support successful breastfeeding and LAM, there are some important things to know concerning how to breastfeed correctly, including positioning, attachment and effective breastfeeding (see 2.3.9).

6.4 Postpartum Contraception

There are several options of postpartum contraception. Here’s an explanation of several contraceptive options, uses, life span, and advantages.

Table 6.4. Options of postpartum contraception

<table>
<thead>
<tr>
<th>No</th>
<th>Contraception</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Permanent contraception</td>
</tr>
<tr>
<td>2</td>
<td>Postpartum IUDs/Post-abortion IUDs</td>
</tr>
<tr>
<td>3</td>
<td>Implants</td>
</tr>
<tr>
<td>4</td>
<td>Progesterone injections</td>
</tr>
<tr>
<td>5</td>
<td>Minipill</td>
</tr>
<tr>
<td>6</td>
<td>Condoms</td>
</tr>
</tbody>
</table>

Postpartum IUDs

IUDs are safe and effective contraceptive options for postpartum women who want to space or limit pregnancies.

Although the expulsion rate of IUD insertion immediately after delivery is higher compared to the interval period insertion (more than 4 weeks after delivery), the rate of expulsion can be minimized if:

- IUD is inserted within 10 minutes of placental delivery
- IUD is placed high enough on the uterine fundus
- IUD is inserted by specially trained personnel
IUDs can also be inserted after Caesarean section. The rate of expulsion for insertion after Caesarean (intra-Caesarean) section is roughly equal to interval insertion.

Inserting a postpartum IUD can be done manually or by using a ring forceps (see A14 a, b, c).

Table 6.5. Advantages and risks of post-placental IUDs

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Risks and Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Usable in sexually active women</td>
<td>• Tear may occur on the uterine wall during IUD insertion</td>
</tr>
<tr>
<td>• If inserted directly after delivery, no interference with production of breast milk in breastfeeding mothers</td>
<td>• Possible failure of IUD insertion</td>
</tr>
<tr>
<td>• Fewer complaints of bleeding when insertion immediately after delivery than after an interval of few days/weeks</td>
<td>• IUDs do not protect women against contracting STIs including HIV</td>
</tr>
<tr>
<td>• When inserted immediately after delivery, no need to worry about the possibility of getting pregnant while breastfeeding.</td>
<td>• Pain (explain that the patient may have pain after giving birth up to a few days)</td>
</tr>
<tr>
<td>• Capable of spacing children’s ages better leading to better children development</td>
<td>• Possible infection after IUD insertion (patients should know that fever, fishy/rancid smells from vaginal discharges and persistent abdominal pain are not normal)</td>
</tr>
</tbody>
</table>

Post-abortion IUDs

Generally, IUDs can be safely inserted after spontaneous or induced abortions. Contraindications to post-abortion IUD insertion include pelvic infection, septic abortion, or other serious complications of abortion. Interval IUD insertion technique is used for
first-trimester abortions. If abortion occurs over 16 weeks of gestation, IUD insertion should be performed by specially trained personnel.

6.5 Emergency Contraception

- Emergency contraception (EC) is a method to give consistent contraception after:
  - An unprotected sexual intercourse
  - A contraceptive failure or incorrect use of contraceptives
  - Sexual assault.
- The earlier the EC is taken, the more effective it will be.
- Keep in mind that emergency contraception is temporary and should not be used routinely.
- Emergency contraception is effective only in the first few days following intercourse before the ovum is released from the ovary and before the sperm fertilizes the ovum. Emergency contraceptive pills cannot interrupt an established pregnancy or harm a developing embryo.
- There are two different types of EC recommended
  - Emergency contraceptive pills (ECP): Levornogestrel
  - Copper- bearing IUD

<table>
<thead>
<tr>
<th>Table 6.6. Types of emergency contraception</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dosage</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Mode of action</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

---
Table 6.7. WHO categories for contraceptive usage

<table>
<thead>
<tr>
<th>Category</th>
<th>With clinical judgement</th>
<th>With limited clinical judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• A condition for which there is no restriction for the use of the contraceptive method</td>
<td>• Use method in any circumstances</td>
</tr>
<tr>
<td>2</td>
<td>• A condition where the advantages of using the method generally outweigh the theoretical or proven risks</td>
<td>• Generally use the method</td>
</tr>
</tbody>
</table>

- **Effectiveness**
  - It will prevent 95% of pregnancies
  - Woman can continue to use the IUD as an ongoing method
  - Risk of infection, expulsion or perforation very low
  - Should never be used when confirmed pregnant
  - Same as for ongoing use
  - More effective the sooner it is taken
  - Will prevent 50% of pregnancies

- **Advantages**
  - Does not harm future fertility
  - Woman can continue to use the IUD as an ongoing method

- **Side effects**
  - Nausea
  - Lower abdominal pain
  - Risk of infection, expulsion or perforation very low

- **Contraindications**
  - None, but for emergency use only
  - Should never be used when confirmed pregnant
  - Same as for ongoing use
  - Not effective once implantation has begun, will not cause abortion
  - Change that is toxic to sperms

- More effective the sooner it is taken
- Will prevent 50% of pregnancies
- It will prevent 95% of pregnancies

- Does not harm future fertility
- Woman can continue to use the IUD as an ongoing method

- Nausea
- Lower abdominal pain
- Risk of infection, expulsion or perforation very low

- None, but for emergency use only
- Should never be used when confirmed pregnant
- Same as for ongoing use
- Not effective once implantation has begun, will not cause abortion
- Change that is toxic to sperms
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>• A condition where the theoretical or proven risks usually outweigh the advantages of using the method</td>
<td>• Use of method not usually recommended unless other more appropriate methods are not available or not acceptable</td>
<td>• No (Do not use method)</td>
</tr>
<tr>
<td>4</td>
<td>• A condition which represents an unacceptable health risk if the contraceptive method is used</td>
<td>• Method not to be used</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.8. Quick reference chart For WHO MEC (Medical Eligibility Criteria) 2015

<table>
<thead>
<tr>
<th>Age</th>
<th>COC</th>
<th>DMPA</th>
<th>Cu-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menarche to 39 years</td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>40 years or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menarche to 17 year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 years to 45 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 45 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 20 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 years or more</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nulliparous</th>
<th>COC</th>
<th>DMPA</th>
<th>Cu-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6 weeks postpartum</td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>6 weeks to 6 months postpartum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months postpartum or more</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smoking</th>
<th>COC</th>
<th>DMPA</th>
<th>Cu-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt;35 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥35 yrs, &lt;15 cigarettes/day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age ≥35 yrs, ≥15 cigarettes/day</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *
<table>
<thead>
<tr>
<th>Hypertension</th>
<th>History of hypertension where BP CANNOT be evaluated</th>
<th>Controlled and CAN be evaluated</th>
<th>SBP 140-159 or DBP 90-99</th>
<th>SBP ≥ 160 or DBP ≥ 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>Non-migrainous, mild or severe</td>
<td>Migraine without focal neurological symptoms</td>
<td>Age &lt;35 years</td>
<td>Age ≥ 35 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Migraine with focal neurological symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of deep vein thrombosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superficial thrombophlebitis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated valvular disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic heart disease/stroke</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

| Diabetes                         | Non-vascular disease                                | Vascular disease or diabetes of >20 years |                          |                        |
| Known hyperlipidemias            |                                                     |                                 |                          |                        |
| Cancers                          | Cervical                                           |                                 |                          |                        |

<table>
<thead>
<tr>
<th>COC</th>
<th>DMPA</th>
<th>Cu-IUD</th>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast disease</td>
<td>Endometria</td>
<td>Ovarian</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Undiagnosed mass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history of cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine fibroids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endometriosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trophoblast disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding patterns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irregular without heavy bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy/prolonged, regular/irregular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexplained bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current symptomatic gall bladder disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholestasis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related to pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Related to oral contraceptive pills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The client is a carrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver tumours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD/PID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current or within last 3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased risk of STI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non pelvic TB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of Rifampicin and some anticonvulsants</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Category 1: There are no restrictions for use

Category 2: Generally use

Category 3: Usually not recommended, clinical judgement & access to clinical services required for use

Category 4: The method should not be used

**Postpartum IUD use by breastfeeding & non breastfeeding women is category 1 up to 48 hours, category 3 from 48 hours to 4 weeks and category 1 4 weeks and after.

SBP=Systolic blood pressure, DBP=Diastolic blood pressure
CHAPTER 7

Essential Newborn Care, Recognition of Danger Signs and Appropriate Referral

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7.6 Supportive Care for Sick Neonates 291
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7.7 Infants of Mothers with Infectious Diseases 292
   7.7.1 Congenital syphilis 292
   7.7.2 Infants of mothers with tuberculosis 293
This chapter provides guidance on essential newborn care and the management of problems in neonates and young infants, from birth to 2 months of age. It includes neonatal resuscitation, the recognition and management of neonatal sepsis and other bacterial infections, and the management of preterm and low-birth-weight infants. A table giving the doses of commonly used drugs for neonates and young infants is included at the end of this chapter, which also lists the dosages for low-birth-weight and premature infants.

7.1 Essential Newborn Care at Delivery

Most newborns require only simple supportive care at and after delivery.

► Dry the infant with a clean towel.

► Observe the infant while drying (see Chart 7.1).

► Maintain the infant in skin-to-skin contact position with the mother.

► Cover the infant to prevent heat loss.

► Clamp and cut the cord at least 1 minute after birth.

► Encourage the mother to initiate breastfeeding within the first hour.

Skin-to-skin contact and early breastfeeding are the best ways to keep an infant warm and prevent hypoglycaemia. Term and low-birth-weight neonates weighing > 1200 g who do not have complications and are clinically stable should be put in skin-to-skin contact with the mother soon after birth after they have been dried thoroughly to prevent hypothermia.

7.2 Neonatal Resuscitation

Resuscitation may be required for some infants, such as those born to mothers with chronic illness, to mothers who had a previous fetal or neonatal death, to mothers with pre-eclampsia, in multiple pregnancies, in preterm delivery, in abnormal presentation of the fetus, infants with a prolapsed cord, or after prolonged labour, rupture of membranes or meconium-stained liquor.
For many infants, resuscitation cannot be anticipated before delivery. Therefore:

- be prepared for resuscitation at every delivery,
- follow the assessment steps in Chart 7.2.

**Chart 7.1. Neonatal resuscitation: Flow chart**

- Dry the infant immediately with a clean cloth.
- Keep warm by skin-to-skin contact and covered.

<table>
<thead>
<tr>
<th>Look for</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing or crying</td>
<td>Routine care (see section 7.1)</td>
<td>Routine care and closely observe breathing</td>
</tr>
<tr>
<td>Good muscle tone or vigorous movements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Not breathing, or gasping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call For Help</td>
<td></td>
</tr>
<tr>
<td>Transfer newborn to the resuscitation area</td>
<td></td>
</tr>
<tr>
<td>Position the head/neck slightly extended</td>
<td></td>
</tr>
<tr>
<td>Start positive pressure ventilation with mask and self-inflating bag within 1 min of birtha</td>
<td></td>
</tr>
<tr>
<td>Make sure the chest is moving adequately</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>Breathing Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulate by rubbing the back 2 to 3 times</td>
<td></td>
</tr>
<tr>
<td>Suction only if had meconium stained liquor or the mouth or nose is full of secretions</td>
<td></td>
</tr>
</tbody>
</table>
After 30-60 sec

- Check the heart rate (HR) with a stethoscope

If HR ≥ 60/min

- HR < 100/min:
  - Take ventilation corrective steps.
  - Continue to ventilate at 40 breaths per min.
  - Consider higher oxygen concentration.
  - Suction, if necessary.
  - Reassess every 1-2 min.

- HR > 100/min:
  - Continue to ventilate at 40 breaths per min
  - Every 1-2 min stop to see if breathing spontaneously
  - Stop ventilating when respiratory rate is > 30 breaths per min
  - Give post-resuscitation care. (see 7.2.1)

If HR < 60/min

- Chest compressions until HR ≥ 60/min (see fig 7.2)
- Give higher oxygen concentration.
- If HR remains at < 60/min, consider:
  - Other ventilatory support
  - IV adrenaline
  - Refer where possible
- If no HR for > 10 min or < 60/min for 20 min, discontinue (see 7.2.2)

If HR > 60/min

C

*Positive pressure ventilation should be initiated with air for infants with gestation > 32 weeks. For very preterm infants, it is preferable to start with 30% oxygen if possible. A and B are basic resuscitation steps.
Chart 7.2 Neonatal resuscitation: Steps and process

There is no need to slap the infant; rubbing the back two or three times in addition to thorough drying is enough for stimulation.

A. Airway

▶ Keep the infant’s head in a slightly extended position to open the airway.

▶ Do not suction routinely. Suction the airway if there is meconium-stained fluid and the infant is not crying and moving limbs. When the amniotic fluid is clear, suction only if the nose or mouth is full of secretions.

▪ Suck the mouth, nose and oropharynx by direct vision; do not suck right down the throat, as this can cause apnoea or bradycardia.

B. Breathing

▶ Choose a mask size that fits over the nose and mouth (see below): size 1 for normal-weight infant, size 0 for small (< 2.5 kg) infants

▶ Ventilate with bag and mask at 40–60 breaths/min.

▪ Make sure the chest moves up with each press on the bag; in a very small infant, make sure the chest does not move too much (danger of causing pneumothorax).

C. Circulation

▶ Give chest compressions if the heart rate is < 60/min after 30–60 sec of ventilation with adequate chest movements: 90 compressions coordinated with 30 breaths/min (three compressions: one breath every 2 sec).

▶ Place thumbs just below the line connecting the nipples on the sternum (see below).

▶ Compress one third the anterior–posterior diameter of the chest.
Figure 7.1: Correct head position to open up airway and for bag ventilation. Do not hyperextend the neck.

Figure 7.2: Correct position of hands for cardiac massage of a neonate. The thumbs are used for compression over the sternum.

Chart 7.3 Neonatal resuscitation

Figure 7.3: Neonatal self-inflating resuscitation bag with round mask

Figure 7.4: Fitting mask over face:
- Right size and position of mask
- Mask held too low
- Mask too small
- Mask too large

Right | Wrong | Wrong | Wrong
7.2.1 Post-resuscitation care

Infants who require resuscitation are at risk for deterioration after their vital signs have returned to normal. Once adequate ventilation and circulation has been established:

- Stop ventilation.
- Return to mother for skin-to-skin contact as soon as possible.
- Closely monitor breathing difficulties, signs of asphyxia and anticipate need for further care.

7.2.2 Cessation of resuscitation

It is appropriate to consider discontinuing after effective resuscitation efforts if:

- Infant is not breathing and heartbeat is not detectable beyond 10 minutes, stop resuscitation.
- If no spontaneous breathing and heart rate remains below 60/minute after 20 minutes of effective resuscitation, discontinue active resuscitation.
Record the event and explain to the mother or parents that the infant has died. Give them the infant to hold if they so wish.

### 7.3 Routine Care for All Newborns After Delivery

The routine care described below applies to all newborns, either born in hospital or born outside and brought to the hospital.

- Keep the baby in skin-to-skin contact on the mother’s chest or at her side, in a warm, draught-free room.
- Start breastfeeding within the first hour as soon as the baby shows signs of readiness to feed.
- Let the infant breastfeed on demand if able to suck.
- Give IM vitamin K (phytomethadione) to all newborns.
  - 1 ampoule (1 mg/0.5 ml or 1 mg/ml) once. (**Do not use 10 mg/ml ampoule.**)
  - For preterm neonates, give 0.4 mg/kg IM (maximum dose, 1 mg).
- Keep umbilical cord clean and dry.
- Apply antiseptic eye drops or ointment (e.g., tetracycline ointment) to both eyes once, according to national guidelines.
- Give oral polio, hepatitis B and bacille Calmette-Guérin (BCG) vaccines, depending on national guidelines.

Much progress has been made during the past 2 decades in coverage of births in health facilities; however, reductions in maternal and neonatal mortality remain slow. With increasing numbers of births in health facilities, attention has shifted to the quality of care, as poor quality of care contributes to morbidity and mortality. The period around childbirth is the most critical for saving the maximum number of maternal and newborn lives and preventing stillbirths. WHO sees a future in which. To realize this vision, WHO has defined “quality of care” and has prepared a framework for improving the quality of care for mothers and newborns around the time of childbirth.
7.4 Prevention of Neonatal Infections

Many early neonatal infections can be prevented by:

- avoiding unnecessary separation of the newborn from the mother, e.g., baby unit
- hand-washing before delivering and handling the infant
- good basic hygiene and cleanliness during delivery (e.g., chlorhexidine cream for all maternal vaginal examinations)
- appropriate umbilical cord care
- appropriate eye care

Give prophylactic antibiotics only to neonates with documented risk factors for infection:

- Membranes ruptured > 18 hours before delivery.
- Mother had fever > 38 °C before delivery or during labour.
- Amniotic fluid was foul-smelling or purulent.
- Give IM or IV ampicillin and gentamicin for at least 2 days and reassess; continue treatment only if there are signs of sepsis (or a positive blood culture).

Many late neonatal infections are acquired in hospitals. These can be prevented by:

- exclusive breastfeeding
- strict procedures for hand-washing or alcohol hand rubs for all staff and for families before and after handling infants
- using Kangaroo mother care and avoiding use of incubators for preterm infants. If an incubator is used, do not use water for humidification (where Pseudomonas will easily colonize) and ensure that it was thoroughly cleaned with an antiseptic.
- strict sterility for all procedures
clean injection practices
removing intravenous drips when they are no longer necessary

7.5 Danger Signs in Newborns and Young Infants

Neonates and young infants often present with non-specific symptoms and signs that indicate severe illness. These signs might be present at or after delivery or in a newborn presenting to hospital or develop during hospital stay. The aim of initial management of a neonate presenting with these signs is stabilization and preventing deterioration. The signs include:

- not feeding well
- convulsions
- drowsy or unconscious
- movement only when stimulated or no movement at all
- fast breathing (60 breaths per minute)
- grunting
- severe chest indrawing
- raised temperature, > 38 °C
- hypothermia, < 35.5 °C
- central cyanosis

Emergency management of danger signs:

- Open and maintain airway. Give oxygen by nasal prongs if the young infant is cyanosed or in severe respiratory distress or hypoxaemic (oxygen saturation ≤ 90%).
- Give bag and mask ventilation (see page 286) with oxygen (or room air if oxygen is not available) if there is apnoea, gasping or respiratory rate too slow (< 20).
Insert venous cannula.

Give ampicillin (or penicillin) and gentamicin (see below).

If drowsy, unconscious or convulsing, check blood glucose. If glucose < 2.2 mmol/l (< 40 mg/100 ml), give 10% glucose at 2 ml/kg IV. Then give a sustained IV infusion of 5 ml/kg per h of 10% glucose for the next few days while oral feeds are built up.

If you cannot check blood glucose quickly, assume hypoglycaemia and give glucose IV. If you cannot insert an IV drip, give expressed breast milk or glucose through a nasogastric tube.

Give phenobarbital if convulsing.

- Treat convulsions with phenobarbital (loading dose 20 mg/kg IV). If convulsions persist, give further doses of phenobarbital 10 mg/kg up to a maximum of 40 mg/kg. Watch for apnoea. Always have a bag-mask available. If needed, continue phenobarbital at a maintenance dose of 5 mg/kg per day.

Admit.

Give vitamin K (if not given before).

Monitor the infant frequently.

### 7.6 Supportive Care for Sick Neonates

#### 7.6.1 Maintain appropriate thermal environment

- Keep the young infant dry and well wrapped.

- A hat can reduce heat loss. Keep the room warm (at least 25 °C). Keeping a young infant in close skin-to-skin contact with the mother (Kangaroo mother care) for 24 hours/day is an effective way of keeping the infant warm. An external heating device may be needed when the mother is asleep or too ill.
Pay special attention to avoid chilling the infant during an examination or investigation.

Check regularly that the infant’s temperature is maintained in the range 36.5–37.5 °C (97.7–99.5 °F) rectal or 36.0–37.0 °C (96.8–98.6 °F) axillary. Use a low-reading thermometer to ensure detection of hypothermia.

7.7 Infants of mothers with infectious diseases

7.7.1 Congenital syphilis

Clinical signs

- often low birth weight
- palms and soles: red rash, grey patches, blisters or skin peeling
- ‘snuffles’: highly infectious rhinitis with nasal obstruction
- abdominal distension due to enlarged liver and spleen
- jaundice
- anaemia

Some very-low-birth-weight infants with syphilis have signs of severe sepsis with lethargy, respiratory distress, skin petechiae or other bleeding.

If you suspect syphilis, do a VDRL test if possible.

Treatment

- Asymptomatic neonates born to women with a positive VDRL or rapid plasma reagin test should receive 37.5 mg/kg (50 000 U/kg) of benzathine benzylpenicillin in a single IM dose.
Symptomatic infants should be treated with:

- procaine benzylpenicillin at 50 mg/kg as a single dose by deep IM injection daily for 10 days
  or
- benzylpenicillin at 30 mg/kg every 12 hours IV for the first 7 days of life and then 30 mg/kg every 8 hours for a further 3 days.

Treat the mother and her partner for syphilis and check for other sexually transmitted infections.

**7.7.2 Infants of mothers with tuberculosis**

If the mother has active lung tuberculosis (TB) and was treated for < 2 months before the birth, or TB was diagnosed after the birth:

- Reassure the mother that it is safe for her to breastfeed her infant.
- Do not give the TB vaccine (BCG) at birth.
- Give prophylactic isoniazid at 10 mg/kg by mouth once daily.
- Re-evaluate the infant at the age of 6 weeks, noting weight gain and taking an X-ray of the chest, if possible.
- If any findings suggest active disease, start full anti-TB treatment, according to national guidelines.
- If the infant is doing well and tests are negative, continue prophylactic isoniazid to complete 6 months of treatment.
- Delay BCG vaccination until 2 weeks after treatment is completed. If BCG has already been given, repeat 2 weeks after the end of isoniazid treatment.
- For infants of mothers with HIV infection, see Chapter 3.5 for guidance.

**Note:** If the baby is sick, refer to appropriate centre immediately.
Notes
This Pocket book has been published on the basis of recommendations and guidelines derived from published guidelines that are regularly reviewed and updated by the Guidelines Review Committee. These can be accessed on the WHO website at http://www.who.int/maternal_child_adolescent/en/. Other reputed country guidelines have also been incorporated.


www.aafp.org/Journals/afp Vol. 64/No. 2 (July 15, 2001)


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A.1 Labour Induction

Prerequisites

▶ Be sure induction is indicated, as failed induction is usually followed by Caesarean section.
▶ Facilities for assessing maternal and fetal well-being should be available.
▶ Whenever possible labour induction should be done in facilities where Caesarean section can be performed.

A.1.1 Assessment of cervix

The success of induction of labour (IOL) is related to the condition of the cervix at the start of induction.

▶ Perform a cervical examination to assess the favourability for induction:
  ● If the cervix is favourable (has a score of 6 or more), labour is usually successfully induced with oxytocin alone.
  ● If the cervix is unfavourable (has a score of 5 or less), ripen the cervix using prostaglandins or a Foley catheter before induction.

Table A.1. Modified BISHOP’s SCORE to assess the favourability for IOL

<table>
<thead>
<tr>
<th>Score</th>
<th>Position of cervix</th>
<th>Consistency of cervix</th>
<th>Length of cervix (cm)</th>
<th>Dilatation of cervix (cm)</th>
<th>Station of presenting part (in cm above ischial spines)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Posterior</td>
<td>Firm</td>
<td>&gt;2</td>
<td>Closed</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Central</td>
<td>Medium</td>
<td>1-2</td>
<td>1-2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Anterior</td>
<td>Soft</td>
<td>&lt;1</td>
<td>3-4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>At or Below ischial spines</td>
</tr>
</tbody>
</table>
A.1.2 Amniotomy

If the membranes are intact perform artificial rupture of membranes (ARM) or amniotomy to release local prostaglandins for stimulation. (Amniotomy is not routinely used as a method of induction)

► Review for indications.

**Note:** In areas where HIV and/or hepatitis are highly prevalent, leave the membranes intact for as long as possible to reduce perinatal transmission.

► Check and note the fetal heart rate (FHR).

► Ask the woman to lie on her back with her legs bent, feet together and knees apart.

► Wear high-level disinfected or sterile gloves.

► Use one hand to examine and assess the cervix.

► Use the other hand to insert an amniotic hook or a Kocher clamp into the vagina.

► Guide the clamp or hook towards the membranes along the index and middle fingers.

► Place the two fingers against the membranes and gently rupture it with the instrument in the other hand.

► Allow the amniotic fluid to drain slowly around the fingers.

► Note the colour (clear, greenish, bloody) and amount. If thick meconium is present, suspect fetal distress *(see 4.6).*

► After ARM, listen to the fetal heart rate during and after a contraction.

► If the fetal heart rate is abnormal (less than 100 or more than 180 beats per minute), suspect fetal distress *(see 4.6).*

► If membranes have been ruptured for 18 hours, give prophylactic antibiotics to help reduce Group B streptococcus infection in the neonate:
- Penicillin G 2 million units IV OR
- Ampicillin 2 g IV every 6 hours until delivery; if there are no signs of infection after delivery, discontinue antibiotics.

- If good labour is not established 1 hour after ARM, begin oxytocin infusion (see A.1.3).
- If labour is induced because of severe maternal disease (e.g., sepsis, preeclampsia), begin oxytocin infusion at the same time as ARM.

A.1.3 Oxytocin

- Use oxytocin with great caution, as fetal distress can occur from hyperstimulation and, rarely, uterine rupture can occur. Multiparous women are at higher risk for uterine rupture.

  Carefully observe women receiving oxytocin. They should never be left alone!

- The effective dose of oxytocin varies greatly between women. Cautiously administer oxytocin in IV fluids (RL or normal saline), gradually increasing the rate of infusion until good labour is established (three contractions in 10 minutes, each lasting more than 40 seconds). Maintain this rate until delivery. The uterus should relax between contractions.

- Monitor the woman's pulse, blood pressure and contractions, and check the fetal heart rate.

- Review for indications.

- Ensure that the woman is on her left side.
► Record all observations on a partogram every 30 minutes (see 2.2.3):
  ▪ Rate of infusion of oxytocin.

**Note:** Changes in arm position may alter the flow rate;

  ▪ Duration and frequency of contractions;
  ▪ Fetal heart rate. Listen every 30 minutes, always immediately after a contraction. If the fetal heart rate is less than 100 beats per minute, stop the infusion and manage for fetal distress (see 4.6).

► Infuse oxytocin 2.5 units in 500 mL of RL (or normal saline) at 10 drops per minute.

► Increase the infusion rate by 10 drops per minute every 30 minutes until a good contraction pattern is established.

► Maintain this rate until delivery is completed.

► If hyperstimulation occurs (any contraction lasts longer than 60 seconds) or if there are more than four contractions in 10 minutes, stop the infusion and relax the uterus using tocolytics:
  ▪ Terbutaline 250 mcg IV slowly over 5 minutes OR
  ▪ Salbutamol 10 mg in 1 L IV fluids (normal saline or Ringer's lactate) at 10 drops per minute.

► If a good contraction pattern has not been established with the infusion rate at 60 drops per minute:
  ▪ Increase the oxytocin concentration to 5 units in 500 mL of RL (or normal saline) and adjust the infusion rate to 30 drops per minute (15 mIU per minute).
  ▪ Increase the infusion rate by 10 drops per minute every 30 minutes until a good contraction pattern is established or the maximum rate of 60 drops per minute is reached.
► If a good contraction pattern still has not been established using the higher concentration of oxytocin:
  
  ▪ In multigravida and in women with previous Caesarean scars:
    - Induction has failed deliver by Caesarean section
  
  ▪ In primigravida:
    - Infuse oxytocin at higher concentration (10 units in 500 mL).

► If good contractions are not established at the maximum dose, deliver by Caesarean section

A.1.4 Foley catheter

The Foley catheter is an effective alternative to prostaglandins for cervical ripening and labour induction. It should, however, be avoided in women with obvious cervicitis or vaginitis.

► Review for indications.

► Gently insert a high-level disinfected or sterile speculum into the vagina.

► Hold the catheter with a high-level disinfected or sterile forceps and gently introduce it through the cervix. Ensure that the inflatable bulb of the catheter has passed through the internal os.

► Inflate the bulb with 30 mL of water.

► Coil the rest of the catheter and place it in the vagina.

► Leave the catheter in place until contractions begin, or for at least 12 hours.

► Deflate the bulb before removing the catheter and then proceed with oxytocin infusion.
A.2 External Version

- Review for indications.

- Do not perform this procedure before 37 weeks or if facilities for emergency caesarean section are not available.

- Have the woman lie on her back, and elevate the foot of the bed and also her to bend her knees in order to relax abdominal wall

- Check the fetal heart rate. If there are fetal heart rate is abnormal (less than 100 or more than 180 beats per minute), do not proceed with external version.

- Palpate the abdomen to determine fetal position, presentation, head position, back, and buttocks.

- To mobilize the breech, gently lift the lowest part of the fetus from the pelvic inlet by grasping above the pubic bone (see figure A.1a).

- Bring the head and buttocks of the fetus closer to each other to achieve forward rotation. Rotate the fetus slowly by guiding the head in a forward roll as the buttocks are lifted (see figure A.1b and c).

- If the procedure is successful, have the woman remain lying down for 15 minutes. Counsel her to return if bleeding or pain occurs or if she believes the baby has returned to the previous presentation.
If the procedure is unsuccessful, try again using a backward roll (see figure A.1d).

If the procedure is still unsuccessful, stop the procedure.

Anti D administration wherever required.

Role of tocolysis—Betamimetics mimetics have shown to increase the success rate.

Can be offered routinely or if one attempt has failed.

Check FHR before, in between and after the procedure.

**Complications**

Be aware of:

- Placenta abruption
- Fetal distress
- Membrane rupture

**Attention:**

Always listen to FHR when performing external version

In case of the abnormal FHR:

- Manage fetal distress
- Re-evaluate every 15 min
- If FHR is not stable in the next 30 min, perform a Caesarean section delivery (will depend on pattern of FHR)

### A.3 Vacuum Extraction

**Before Procedure**

- Review for required conditions.
- Obtain informed consent.
Check all connections and test the vacuum on a gloved hand.

Perform infection prevention.

Empty urinary bladder.

Pudendal block may be given for analgesia.

**Required conditions for VE:**

- Vertex presentation
- Term fetus
- Cervix fully dilated
- Fetal head at least at 0 station or no more than 2/5 palpable above symphysis pubis

**Procedure**

- Wearing high-level disinfected or sterile gloves, assess the position of the fetal head by feeling the sagittal suture line and the fontanelles. The correct placement of the vacuum cup is in the median position over the flexion point.

- Identify posterior fontanelle.

- The flexion point is situated 3cm in front of the posterior fontanelle.

- The cup is applied such that the rear edge is just at the posterior fontanelle *(see figure A.3).*

- An episiotomy may be needed for proper placement at this time. If an episiotomy is not
necessary for placement, delay the episiotomy until the head stretches the perineum or the perineum interferes with the axis of traction. This will avoid unnecessary blood loss.

- Check the application. Ensure there is no maternal soft tissue (cervix or vagina) within the rim.
- With the pump, create a vacuum of 0.2 kg/cm² negative pressure and check the application.
- Increase the vacuum to 0.8 kg/cm² and check the application.
- After maximum negative pressure, start traction in the line of the pelvic axis and perpendicular to the cup.
- With each contraction, apply traction in a line perpendicular to the plane of the cup rim. Place a finger on the scalp next to the cup during traction to assess potential slippage and descent of the vertex (see figure A.4).
- Between contractions check:
  - Fetal heart rate
  - Application of the cup.
- When the subocciput is already below the symphysis, direct the traction upward until the forehead, face and chin present successively. Immediately remove the cup by releasing the negative pressure.
- Subsequently, infant and placental delivery is performed as in normal labour.
- Explore the birth canal with a Sims speculum up and down to assess the birth canal laceration/episiotomy wound extension.

**Tips**

- Never use the cup to actively rotate the baby’s head. Rotation of the baby’s head will occur with traction.
The first pulls help to find the proper direction for pulling.

Do not continue to pull between contractions and expulsive efforts.

With progress, and in the absence of fetal distress, continue the “guiding” pulls for a maximum of three pulls.

**Failure**

- Fetal head does not advance with each pull
- Fetus is undelivered after three pulls with no descent, cup slips off the head twice at the proper direction of pull with a maximum negative pressure

Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull.

If vacuum extraction fails perform a Caesarean section or refer to a higher level.

**Complications**

- Fetal complication
  - Localized scalp oedema (is harmless and disappears in a few hours)
  - Cephalohaematoma (requires observation and usually will clear in 3 to 4 weeks)
  - Scalp abrasions and lacerations (harmless)
  - Intracranial haemorrhage (very rare)

- Maternal complication
  - Tears of the genital tract/birth canal

**A.4 Forceps Extraction**

**Outlet and low forceps**

**Before Procedure**

- Review for indications and prerequisites.
Obtain informed consent.

**Required conditions for Forceps Extraction:**

- Vertex presentation or face presentation with chin-anterior or entrapped after-coming head in breech delivery
- Cervix fully dilated
- Fetal head at +2 or +3 station and 0/5 palpable above the symphysis pubis
- Membranes have ruptured

**Note:** For outlet forceps head should be on perineum or scalp should be visible at the introitus without separating the labia.

- At a minimum, the sagittal suture should be in the midline and straight, or 45 degrees from midline, guaranteeing an occiput anterior or occiput posterior position.
- Assemble the forceps before application. Ensure that the parts fit together and lock well.
- Lubricate the blades of the forceps.
- Wear high-level disinfected or sterile gloves

**Procedure**

- Insert two fingers of the right hand into the vagina on the side of the fetal head. Hold the left blade in the left hand like a pencil and slide it gently between the head and fingers to rest on the side of the head. Use the fingers of your right hand to cover the infant’s head laterally (see figures A.5a & b).
- Repeat the same Manoeuvre on the other side, using the right hand and the right blade of the forceps (see figure A.5 c).
- In doing this the fingers of the left hand are placed inside the vagina and the thumb of the left hand against the heel of the blade.
The left hand holding the handle is then rotated down in an arc while the fingers and thumb of the right hand guide the blade into correct position (see figure A.5 a and b).

Depress the handles and lock the forceps (see figure A.5 c).

After locking, apply steady traction inferiorly and posteriorly with each contraction using the right hand holding the handle of forceps and the left hand holding the forceps neck (see figure A.6).

Between contractions check:
- Fetal heart rate
- Application of forceps

When the head crowns, make an adequate episiotomy, if necessary

Lift the head slowly out of the vagina between contractions. The head should descend with each pull. Only two or three pulls should be necessary.

Difficulty in locking usually indicates that the application is incorrect. In this case, remove the blades and recheck the position of the head. Reapply only if rotation is confirmed.
Continue infant and placental delivery as in a normal labour.

Explore the birth canal with a Sims speculum up and down to assess the birth canal laceration.

**Failure**

- Fetal head does not advance with each pull
- Fetus is undelivered after three pulls with no descent

Every application should be considered a trial of forceps. Do not persist if the head does not descend with every pull.

If forceps delivery fails, perform a Caesarean section.

**Complications**

- Fetal complications:
  - Injury to facial nerves (usually improves immediately)
  - Lacerations of the face and scalp
  - Fractures of the face and skull
- Maternal complications
  - Tears of the genital tract
  - Uterine rupture

### A.5 Opening and Closing the Abdomen

**Opening The Abdomen**

**Incisions:**

**Pfannensteil incision:**

- A transverse curvilinear incision is made 2-3 cms above symphysis pubis about 10-12 cms in length. *(see figure A.7)*
Skin and subcutaneous tissue is incised

Rectus fascia incised transversely on either side of linea alba

The anterior fascia and linea alba is separated from rectus and pyramidalis muscle over the entire length from below umbilicus to symphysis pubis

Rectus muscle is separated in midline using fingers or scissors

Use fingers to make an opening in peritoneum, extend incision with scissors carefully, to avoid injuring the bladder

**Midline Vertical incision**

- Make a midline vertical incision below the umbilicus to the pubic hair, through the skin and to the level of the fascia *(see figure A.7).*

- Cut through the skin and fat to reach the fascia.

- Make a 2–3 cm vertical incision in the fascia.

- Hold the fascial edge with forceps and lengthen the incision up and down using scissors.

- Use scissors to separate muscle from fascia in midline.

- Use fingers or scissors to separate the rectus muscles (abdominal wall muscles).

- Use fingers to make an opening in the peritoneum carefully, to prevent bladder injury, use scissors to separate layers and open the lower part of the peritoneum.

**Closing The Abdomen**

- Close the fascia with continuous 0 chromic catgut (or polyglycolic) suture.

**Note:** There is no need to close the bladder peritoneum or the abdominal peritoneum.
If there are signs of infection, close the subcutaneous tissue with gauze and with loose 0 catgut (or polyglycolic) sutures. Close the skin with a delayed closure after the infection has cleared.

If there are no signs of infection, close the skin with vertical mattress sutures of 3-0 nylon (or silk) and apply a sterile dressing.

A.6 Caesarean Section

This represents a surgical procedure where the fetus is delivered through an incision on the abdominal and uterine walls.

Ensure that vaginal delivery is not possible.

Table A.2. Indications

<table>
<thead>
<tr>
<th>Maternal indications</th>
<th>Fetal indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cephalopelvic disproportion</td>
<td>• Fetal macrosomia</td>
</tr>
<tr>
<td>• Malformed pelvis</td>
<td>• (weight &gt; 4.0kg)</td>
</tr>
<tr>
<td>• Caesarean section scar with an indication of cephalopelvic disproportion</td>
<td>• Fetal distress</td>
</tr>
<tr>
<td>• Uterine dysfunction</td>
<td>• Fetal malpresentation like transverse lie</td>
</tr>
<tr>
<td>• Soft tissue dystocia</td>
<td>• Breech presentation in primigravida</td>
</tr>
<tr>
<td>• Placenta previa</td>
<td></td>
</tr>
<tr>
<td>• Non-progress of labour</td>
<td></td>
</tr>
</tbody>
</table>

Types

- Lower segment caesarean section (preferable)
- Classical caesarean section (only in special circumstances)
Caesarean section followed by hysterectomy

Extraperitoneal caesarean section

Table A.3. Comparison between the two common types of caesarean

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Lower segment CS</th>
<th>Classical CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>• Transverse incision on the lower uterine segment</td>
<td>• Vertical incision on the corpus uteri to reach fundus</td>
</tr>
<tr>
<td></td>
<td>• More easy closure of incision</td>
<td>Recommended in such situations as:</td>
</tr>
<tr>
<td></td>
<td>• Incision located at the site with a minimal possibility of rupture that allows spontaneous labour in the next pregnancy</td>
<td>• Lower segment not approachable, because of adhesions</td>
</tr>
<tr>
<td></td>
<td>• Less chances of adhesion of bowel or omentum to incision site</td>
<td>• Conjoined twins</td>
</tr>
<tr>
<td></td>
<td>• Allows vaginal delivery in next pregnancy</td>
<td>• Uterine myoma of the lower uterine segment in incision line</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>• Cannot be performed in case of difficulties in opening or entering the lower uterine segment safely</td>
<td>• Cervical carcinoma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hypervascularization due to placenta previa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Vaginal delivery not possible in future pregnancies</td>
</tr>
</tbody>
</table>

Requirements and Preparation

Review indications
Perform counselling for risks and benefits of Caesarean section compared to vaginal delivery. Record indications and outcomes of counselling. Obtain an informed consent from the mother.

Perform elective caesarean section after 38 completed weeks.

Starting The Procedure

- Check for fetal life by listening to the fetal heart rate and examine for fetal presentation.
- Start an IV infusion and perform infection prevention measures.
- Offer regional anaesthesia as it is associated with least maternal and neonatal morbidity.
- General anaesthesia may be given in a need for extreme speed, such as acute fetal distress or patient preference for women in whom regional anaesthesia fails.
- In spinal anaesthesia, administer 500-1000 mL of intravenous fluids (Ringer’s lactate or NaCl) 30 min before anaesthesia to pre-load and to prevent hypotension.
- Insert a urinary catheter.
- If the baby’s head is deep down in the pelvis as in obstructed labour, prepare the vagina for assisted Caesarean delivery
- Have the operating table tilted to the left or place a pillow or folded linen under the woman’s right lower back to decrease supine hypotension syndrome.
- Preoperative shaving of the incision site is not required. If thick hair over the proposed incision site, clipping is recommended.

Opening The Abdomen

Use a transverse lower abdominal incision (Pfannensteil) if operator is familiar. If not, use midline vertical incision (see A.5).
Opening The Uterus

- Use forceps to pick up loose peritoneum covering the anterior surface of lower uterine segment and incise it with scissors.
- Extend the incision by placing the scissors between the uterus and the loose serosa and cutting about 3 cm on each side in a transverse fashion.
- Use two fingers to push the bladder downwards off the lower uterine segment.
- Place the bladder retractor over the pubic bone and bladder.
- Use a scalpel to make a 3 cm transverse incision in the lower segment of the uterus. It should be below the level where the vesicouterine serosa was incised to bring the bladder down.
- Extend the lateral incision bluntly using fingers or sharply using a scissors (see figure A.8a and A.8b).

**Figure A.8a and b**

It is important to make the uterine incision big enough to deliver the head and body of the baby without tearing the incision. (see Figure A.8b)
Delivery of The Baby and Placenta

- Rupture the amniotic membrane.
- To deliver the baby, insert one hand inside the uterine cavity between the uterus and the baby’s head.
- With the fingers, grasp and flex the head.
- Gently lift the baby’s head through the incision (taking care not to extend the incision down towards the cervix) (see figure A.9).
- With the other hand, gently press on the abdomen over the top of the uterus to help deliver the head.
- If the baby’s head is deep down in the pelvis or vagina, ask an assistant (wearing high-level disinfected or sterile gloves) to reach into the vagina and push the baby’s head up through the vagina. Then lift and deliver the head (see figure A.10).
- Deliver the shoulders and body.
- Give oxytocin 20 units in 1 L IV fluids (normal saline or Ringer’s lactate) at 60 drops per minute for 2 hours.
- Clamp and cut the umbilical cord.
- Hand the baby to the assistant for initial care.
- Give a single dose of prophylactic antibiotics after the cord is clamped and cut.
- Ampicillin 2 g IV OR
- Cefazolin 1 g IV

Deliver placenta and membranes by a careful traction on the cord. Explore the uterine cavity to make sure that no part of the placenta is left behind.

**Closing The Uterine Incision**

- Grasp the corners of the uterine incision with clamps.
- Grasp the edges of the incision with atraumatic clamps. Make sure it is separate from the bladder.
- Look carefully for any extensions or tear of the uterine incision.
- Repair the incision and any extensions with a continuous non locking stitch of 0 chromic catgut/polyglactin (vicryl) suture *(see figure A.11)*

*(Increased risk of uterine rupture in subsequent pregnancies if locking suture is used in single layer closure)*

- If there is any further bleeding from the incision site, close with figure-of-eight sutures. There is no need for a routine second layer of sutures in the uterine incision.
- Look carefully at the uterine incision before closing the abdomen.
- Make sure there is no bleeding and the uterus is firm. Use a sponge to remove any clots inside the abdomen.
- Examine carefully for injuries to the bladder and repair any found.
Close the Abdomen *(see section A.5)*

Gently push on the abdomen over the uterus to remove clots from the uterus and vagina.

**Problems During Surgery**

**Persistent bleeding**

- Massage the uterus.
- If the uterus is atonic, continue to infuse oxytocin and give ergometrine 0.2 mg IM and prostaglandins, if available.
- Transfuse as necessary.
- If bleeding is not controlled, perform uterine and utero-ovarian artery ligation or hysterectomy.

**Breech Baby**

- If buttocks present first, perform leg extraction through the incision wound and then deliver shoulders as in a breech birth.
- Deliver head using the Mauriceau Smellie Veit manoeuvre.

**Post-Procedure Care**

- If there are signs of infection, administer combined antibiotics until mother is fever-free for 48 hours:
  - Initial dose 2 g of Ampicillin IV and then 1 g every 6 hours AND
  - 80 mg of Gentamicin IV every 8 hours AND
  - 500 of Metronidazole IV every 8 hours
Give analgesics if necessary.

Check vital signs (blood pressure, pulse, respiration and general conditions), height of fundus, contractions of the uterus, bladder, and bleeding every 15 min in the first hour, 30 min in the next 1 hour and every 1 hour in the next 4 hours.

If in the 6 hours of monitoring the maternal condition is:

- Stable: Move mother to care room
- Unstable: Reevaluate for appropriate action

**Note maternal condition during the section and postpartum.**

**Complications that may arise are:**

- Bleeding
- Infection
- Injury to the fetus
- Injury to blood vessels
- Injury to the bladder or gastrointestinal tract
- Amniotic fluid embolism

### A.7 Manual Placenta Removal

Perform a manual placenta removal, if the placenta does not come out after 30 minutes and or the placenta comes out incompletely and the bleeding continues.

**Before Procedure**

- Review for indications.
- Administer as a sedative 10 mg of diazepam IM/IV or use Ketamine.
► Provide emotional support and encouragement.

► Catheterize the bladder or ensure that it is empty.

► Give a single dose of prophylactic antibiotics:
  
  ▪ Ampicillin 2 g IV PLUS Metronidazole 500 mg IV OR
  
  ▪ Cefazolin 1 g IV PLUS Metronidazole 500 mg IV.

► Wear high-level disinfected or sterile gloves (use long gloves if available).

**Procedure**

► Hold the umbilical cord with a clamp. Pull the cord gently and stretch it until it is parallel to the floor.

► Insert the other hand into the vagina and up into the uterus along the cord. *(see figure A.12 a)*

► Let go of the cord and move the hand up over the abdomen in order to support the fundus of the uterus and to provide counter-traction during removal to prevent inversion of the uterus. *(see figure A.12 a)*

**Note:** If uterine inversion occurs, reposition the uterus *(see A.8)*

► Move the fingers of the hand in the uterus laterally until the edge of the placenta is located. *(see figure A.12 b)*
Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall. Proceed slowly all around the placental bed until the whole placenta is detached from the uterine wall. (see figure A.12 b)

If the placenta does not separate from the uterine surface by gentle lateral movement of the fingertips at the line of cleavage, remove placental fragments.

If the tissue is very adherent, suspect placenta accreta and proceed to laparotomy and possible subtotal hysterectomy (see A.19).

Hold the placenta and slowly withdraw the hand from the uterus, bringing the placenta with it.

With the other hand, continue to provide counter-traction to the fundus by pushing it in the opposite direction of the hand that is being withdrawn (see figure A.12 c).

Palpate the inside of the uterine cavity to ensure that all placental tissue has been removed.

Check the placenta for completeness; if not complete, perform an exploration into the uterine cavity.

Examine the woman carefully and repair any tears to the cervix, vagina or repair episiotomy.

Problems

If the placenta is retained due to a constriction ring or if hours or days have passed since delivery, it may not be possible to get the entire hand into the uterus.

- Extract the placenta in fragments using two fingers, ovum forceps or a wide curette.
Post-Procedure Care

Observe the woman closely until the effect of IV sedation has worn off.

► Monitor vital signs (pulse, blood pressure, respiration) every 30 minutes for the next 6 hours or until stable.

► Palpate the uterine fundus to ensure that the uterus remains contracted.

► Ask an assistant to massage the fundus of the uterus to encourage a tonic uterine contraction.

► Check for excessive bleeding.

► Give oxytocin 20 units in 1 L IV fluids (normal saline or Ringer’s lactate) at 60 drops per minute.

► If there is continued heavy bleeding, give ergometrine 0.2 mg IM or prostaglandins. Perform bimanual compression or aortic compression if a more massive haemorrhage occurs. Transfuse as necessary.

A.8 Repositioning of Inverted Uterus

Before Procedure

► Review for indications.

► Review general care principles and start an IV infusion.

► Administer pethidine and diazepam IV in different syringes slowly, or general anaesthesia if necessary.

► Thoroughly cleanse the inverted uterus using antiseptic solution.

► Apply compression to the inverted uterus with a moist, warm sterile towel until ready for the procedure.
A.8.1 Manual correction

- Wearing high-level disinfected or sterile gloves, grasp the inverted uterus and push it through the cervix in the direction of the umbilicus to its normal anatomic position, using the other hand to stabilize the uterus. If the placenta is still attached, manually remove the placenta after correction (see figure A.13).

- If the manual repositioning does not work, perform hydrostatic repositioning.

A.8.2 Hydrostatic reposition

- Place the woman in deep Trendelenburg position (lower her head about 0.5 metres below the level of the perineum).

- Prepare a high-level disinfected or sterile douche system with large nozzle and long tubing (2 metres) and a warm water reservoir (3 to 5 L).

  **Note:** This can also be done using warmed normal saline and an ordinary IV administration set.

- Identify the posterior fornix. This is easily done in partial inversion when the inverted uterus is still in the vagina. In other cases, the posterior fornix is recognized by where the rugose vagina becomes the smooth vagina.

- Place the nozzle of the douche in the posterior fornix.
At the same time, with the other hand hold the labia sealed over the nozzle and use the forearm to support the nozzle.

Ask an assistant to start the douche with full pressure (raise the water reservoir to at least 2 metres). Water will distend the posterior fornix of the vagina gradually so that it stretches. This causes the circumference of the orifice to increase, relieves cervical constriction and results in correction of the inversion.

**A.8.3 Manual correction under general anaesthesia**

If hydrostatic correction is not successful, try manual repositioning under general anaesthesia using halothane. Halothane is recommended because it relaxes the uterus.

**Post Procedure Care**

Once the inversion is corrected, infuse oxytocin 20 units in 500 mL IV fluids (normal saline or Ringer’s lactate) at 10 drops per minute:

- If haemorrhage is suspected, increase the infusion rate to 60 drops per minute.
- If the uterus does not contract after oxytocin, give ergometrine 0.2mg or prostaglandins.

Give a single dose of prophylactic antibiotics after correcting the inverted uterus:

- Ampicillin 2 g IV PLUS Metronidazole 500 mg IV OR
- Cefazolin 1 g IV PLUS Metronidazole 500 mg IV.

If there are signs of infection or the woman currently has fever, give a combination of antibiotics until she is fever-free for 48 hours

- Ampicillin 2 g IV every 6 hours PLUS
- Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
- Metronidazole 500 mg IV every 8 hours.
- Give appropriate analgesic drugs.

### A.9 Bimanual Compression

Bimanual compression is performed in cases of uterine atony in order to reduce the amount of bleeding.

#### Before Procedure
- Provide emotional support.
- Perform infection prevention measures.
- Evacuate the bladder.
- Make sure that the placenta is delivered completely.
- Make sure that the bleeding is due to uterine atony.
- Promptly perform internal bimanual compression for 5 min.

#### Procedure
- Insert the hand in an obstetric position into the lumen of the vagina, change it into a fist and place the plain backs of index through little fingers on the anterior fornix and push the lower segment of the uterus toward anterior cranium (see figures A.14a, b & c).
Strive to cover the posterior corpus uteri as much as possible by the hand, per abdomen.

Perform uterine compression by closing the outer palm and the inner fist.

Keep applying compression until the bleeding stops and the uterus contracts.

If the uterus starts to contract, hold that position until the uterus contracts properly and slowly release both hands and continue with a close monitoring.

If the uterus does not contract after 5 min, perform external bimanual compression by an assistant or a family member.

- Compress the back wall of the uterus and corpus uteri in the grip of the thumb and the other four fingers and compress the front wall of the uterus using the palm of the other hand and the three fingers (see figure A.14c).

In the meantime give 20 units of oxytocin infusion in 1 L of NaCl (NS)/Ringer's lactate IV at 60 drops/ min; Add 600 mcg of misoprostol rectally if necessary.
A.10 Condom Catheter

This is a procedure that requires the following tools:

- Foley catheter no. 24/ maximum size available
- Condom
- 0.9 % NaCl (NS) solution
- Infusion tubing or 50-cc syringes

Before Procedure

- Lay mother in a lithotomy position.
- Wash hands and wear sterile gloves
- Insert the catheter into the condom.
- Tie it close to the mouth of the condom using silk suture (see figure A.15).

Procedure

- Place the condom into the uterine cavity. (see figure A.16a)
- Connect outer tip of the catheter to the saline infusion set (see figure A.16b).
- Inflate the condom with 250 to 500 ml of 0.9% NaCl solution.
- Observe the bleeding. (see figure A.16a)
- If the bleeding is reduced, discontinue further inflation of the condom. Fold and tie the outer tip of the Foley’s using a silk suture.
Maintain uterine contractions with oxytocin drips until at least 6 hours after the procedure.

Hold position of the condom with gauze rolls compressed in the vagina or inflate another condom in the vagina.

Post Procedure

Maintain the condom catheter for 24 hours and subsequently deflate it slowly (10 to 15 min) and remove it.

Administer a single dose of prophylactic antibiotics:

- 2 g of Ampicillin IV AND 500 mg of metronidazole IV OR
- 1 g of cefazolin IV AND 500 mg of metronidazole IV

If there are signs of infection, give combined antibiotics to mother until she is fever-free for 48 hours:

- 2 g of Ampicillin IV every 6 hours AND
- 5 mg/kg of body weight of gentamicin IV every 24 hours AND
- 500 mg of metronidazole IV every 8 hours

Make sure that the position of the condom balloon remains in the uterine cavity.
A.11 B-Lynch Suture

B-lynch suture is aimed to increase vertical compression on the vascular system.

Assessment prior to B-lynch suture

- Perform bimanual compression and examine whether bleeding is reduced when bimanual compression is performed.
- Reexamine uterine cavity for presence of placental remnants or blood clots.

Procedure (Figure A. 17a,b,c,d)

- Perform suturing by the use of No. 2 chromic catgut
Starting 3 cm below the incision from the left side of the uterus through the cavity and exiting 3 cm above the incision, approximately 4 cm from the left lateral border of anterior uterus.

Pass suture over posterior uterine surface and enter the posterior cavity on the same level as the upper anterior entry point.

Continue suturing horizontally by exiting cavity on the right posterior surface on the same level as on the left side.

Go on suturing by passing over the posterior surface back to the side of the incision, entering cavity on the same level approximately 4 cm from the right lateral border and exiting 3 cm below the incision.

Perform bimanual compression again on uterus and pull both ends of the suture tightly.

A.12 Manual Vacuum Aspiration

Before Procedure

Review for indications for manual vacuum aspiration.

Perform counselling and complete the informed consent for medical action.

Indications:

- Abortion before 12-14 weeks
- Incomplete abortion up to 14 weeks
- Molar pregnancy (electric vacuum aspiration preferable)
- Delayed PPH due to retained placental fragments

Provide emotional support and encouragement.

Ask mother to urinate.
Put mother in lithotomy position and place buttocks’ mat and lower abdomen cover.

Attach a tensimeter, infusion set and the fluids and then administer an analgesic (paracetamol) 30 min prior to the action.

Inject 10 units of oxytocin IM or 0.2 mg of Ergometrine IM to make the myometrium firmer and reduce the risk of perforation.

Prepare the MVA kit and the instruments. Attach the adapter to 3 differently-sized cannulas. Place them close together and perform tests for functionality and completeness of resuscitator.

Wash hands and arms, dry them, and wear sterile gloves.

Prepare negative pressures in the MVA tube.

Inform mother that the action will begin.

Cervical priming: it decreases the morbidity associated with second trimester abortion, including risk of cervical injury, uterine perforation and incomplete abortion.

Misoprostol 400mcg vaginally 3–4 hours prior to procedure or sublingual 400mcg 2–3 hours prior to procedure is used for priming.

Procedure

Perform a bimanual pelvic examination to assess the size and position of the uterus and the condition of the fornices.

Clean the vulvar areas and the surroundings and then evacuate the bladder by using a catheter if mother has not urinated.

Insert a speculum or vaginal retractor into the vagina.
Apply antiseptic solution to the vagina and cervix.

Check the cervix for tears or protruding products of conception.

If products of conception are present in the vagina or cervix, remove those using ring or sponge forceps (see figure A.18).

Gently grasp the anterior or posterior lip of the cervix with a vulsellum or single-toothed tenaculum. If using a tenaculum to grasp the cervix, first inject 1 mL of 0.5% lignocaine solution into the anterior or posterior lip of the cervix which has been exposed by the speculum.

Determine a cannula size in accordance with ostium opening.

While gently applying traction to the cervix, insert the cannula through the cervix into the uterine cavity just past the internal os (Rotating the cannula while gently applying pressure often helps the tip of the cannula pass through the cervical canal).

Slowly push the cannula into the uterine cavity until it touches the fundus, but not more than 10 cm. Measure the depth of the uterus by dots visible on the cannula and then withdraw the cannula slightly.

Attach the prepared MVA syringe to the cannula by holding the vulsellum (or tenaculum) and the end of the cannula in one hand and the syringe in the other.

Hold the cannula and prop the tube with the palm of the hand and right forearm, and open the valve regulator in order to transfer the vacuum through the cannula to the uterine cavity.
Evacuate remaining uterine contents by gently rotating the syringe from side to side (10 to 12 o’clock) and then moving the cannula gently and slowly back and forth within the uterine cavity (see figure A.19).

Note: To avoid losing the vacuum, do not withdraw the cannula opening past the cervical os. If the vacuum is lost or if the syringe is more than half full, empty it and then re-establish the vacuum.

Note: Avoid grasping the syringe by the plunger arms while the vacuum is established and the cannula is in the uterus. If the plunger arms become unlocked, the plunger may accidentally slip back into the syringe, pushing material back into the uterus.

Signs of Completion

- Red or pink foam without tissue in the cannula
- A grating sensation is felt as the cannula passes over the surface of the evacuated uterus
- The uterus contracts around the cannula

Withdraw the cannula. Detach the syringe and place the cannula in decontamination solution.

With the valve open, empty the contents of the MVA syringe into a strainer by pushing on the plunger.

Remove the speculum or retractors and perform a bimanual examination to check the size and firmness of the uterus.
Quickly inspect the tissue removed from the uterus, by putting it in a bowl of water.

- For quantity and presence of products of conception.
- To assure complete evacuation.
- To check for a molar pregnancy (rare).

Chorionic villi tissues appear grayish and float, while endometrial tissues appear as soft, smooth masses, white granules without smooth tufts and sink.

If no products of conception are seen:

- All of the products of conception may have been passed before the MVA was performed (complete abortion).
- The uterine cavity may appear to be empty but may not have been emptied completely. Repeat the evacuation.
- The vaginal bleeding may not have been due to an incomplete abortion (e.g., breakthrough bleeding, as may be seen with hormonal contraceptives or uterine fibroids).
- The uterus may be abnormal (i.e., cannula may have been inserted in the non-pregnant side of a double uterus).

Note: Absence of products of conception in a woman with symptoms of pregnancy raises the strong possibility of ectopic pregnancy.

Gently insert a speculum into the vagina and examine for bleeding. If the uterus is still soft and not smaller or if there is persistent, brisk bleeding, repeat the evacuation.

Post-Procedure Care

Inform mother that the examination and medical action have been completed and there is still a need for monitoring and follow-up care.
Give paracetamol 500 mg by mouth as needed as well as prophylactic antibiotics and tetanus prophylaxis.

Monitor vital signs, complaints or re-bleeding every 10 min of the first hour after the medical action.

Discharge uncomplicated cases in one to 2 hours.

Advise the woman to watch for symptoms and signs requiring immediate attention:
- Prolonged cramping (more than a few days)
- Prolonged bleeding (more than 2 weeks)
- Bleeding more than normal menstrual bleeding
- Severe or increased pain
- Fever, chills or malaise
- Fainting

A.13 Dilatation and Curettage

The preferred method of evacuation of the uterus is by manual vacuum aspiration (see A.12). Dilatation and curettage should be used only if manual vacuum aspiration is not available.

Before Procedure
- Review for indications
- Perform counselling and obtain a medical informed consent. Provide emotional support and encouragement.
- Give pethidine IM or IV-2 mg/kg before the procedure or use a paracervical block.
Administer oxytocin 10 units IM or ergometrine 0.2 mg IM before the procedure to make the myometrium firmer and reduce the risk of perforation.

**Procedure**

- Perform a bimanual pelvic examination to assess the size and position of the uterus and the condition of the fornices.

- Insert a speculum or vaginal retractor into the vagina.

- Apply antiseptic solution to the vagina and cervix.

- Check the cervix for tears or protruding products of conception. If products of conception are present in the vagina or cervix, remove those using ring or sponge forceps.

- Gently grasp the anterior or posterior lip of the cervix with a vulsellum or single-toothed tenaculum (see figure A.20a).

- If using a tenaculum to grasp the cervix, first inject 1 mL of 0.5% lignocaine solution into the anterior or posterior lip of the cervix which has been exposed by the speculum.

- Dilatation is needed only in cases of missed abortion or when some retained products of conception have remained in the uterus for several days:
- Start with the smallest dilator through until the cervical canal is wide enough to be passed by the curette spoon (usually 10-12 mm) (see figure A.20b).

- Take care not to tear the cervix or to create a false opening.

- Evacuate the contents of the uterus with ring forceps (see figure A.20c) or a large curette. Gently curette the walls of the uterus until a grating sensation is felt.

- Remove the speculum or retractors and perform a bimanual pelvic examination to check the size and firmness of the uterus.

- Examine the evacuated material.

**Post-Procedure Care**

- Same as above procedure

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**A.14 Postpartum Insertion of IUD**

**Equipment**

Make sure that the equipment needed for the various procedures of postpartum IUD insertion is available.
### Table A.4. Requirements for inserting postpartum CuT

<table>
<thead>
<tr>
<th>Manual Insertion</th>
<th>Intra-Caesarean Insertion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sims speculum (to visualize the cervix)</td>
<td></td>
</tr>
<tr>
<td>• Sterile gloves</td>
<td></td>
</tr>
<tr>
<td>• Ring forceps to hold the cervix (NO tenaculum)</td>
<td></td>
</tr>
<tr>
<td>• Kelly 12” curved placenta forceps (if not available, use a long-ring forceps)</td>
<td></td>
</tr>
<tr>
<td>• Gauze</td>
<td></td>
</tr>
<tr>
<td>• Antiseptic liquid</td>
<td></td>
</tr>
<tr>
<td>• Sterile drape</td>
<td></td>
</tr>
<tr>
<td>Forceps insertion of post partum cut is:</td>
<td></td>
</tr>
<tr>
<td>• More convenient for mother (except in regional anesthesia).</td>
<td></td>
</tr>
<tr>
<td>• More easily performed while uterus is contracting.</td>
<td></td>
</tr>
<tr>
<td>• Sims speculum (to visualize the cervix)</td>
<td></td>
</tr>
<tr>
<td>• Long gloves (up to elbow) OR sterile standard gloves with sterile waterproof clothes</td>
<td></td>
</tr>
<tr>
<td>• Ring forceps to hold the cervix (NO tenaculum)</td>
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<tr>
<td>• Gauze</td>
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<tr>
<td>• Antiseptic liquid</td>
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<tr>
<td>• Sterile drape</td>
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<tr>
<td>• Sterile gloves</td>
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</tr>
<tr>
<td>• Ring forceps</td>
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### A 14.1 Insertion of IUD using ring forceps

This procedure requires an assistant to ensure the state of asepsis and safe insertion of the IUD.

**Before Procedure**

- Take written informed consent.
- Palpate uterus to assess fundal height and contractions and, if necessary, perform uterine massage to help achieving stable contractions.
Using sterile gloves place sterile drapes to cover mother’s lower abdomen and underneath mother’s buttocks.

Arrange all the necessary instruments and put them into a sterile container or a sterile drape.

**Procedure**

- Especially for post-placental insertion, insert a speculum into the vagina (held by non-dominant hand) and check for cervical lacerations. If the laceration and/or episiotomy (if performed) is not actively bleeding, suturing can be performed after IUD insertion.

- Insert the speculum into the vagina (held by the non-dominant hand), and then perform cervical visualization.

- Using the dominant hand, clean the cervix vaginal walls using an antiseptic solution.

- Clamp the anterior lip of the cervix using ring forceps.

- Once the cervix can be visualized and clamped using the ring forceps, visualization must be maintained.

- The assistant unpacks the IUD packaging half opened and put it into a sterile container.

- Clamp the IUD in packaging with Kelly placental forceps or long ring forceps (*see figure A.21 a*).

- Clamp the IUD on the vertical arm, while the horizontal is slightly outside the ring (*see figure A.21 a*).

- This will help releasing the IUD on the fundus and reduce the risk of the IUD being pulled out together when taking the forceps out.
Place the IUD on the inner arch of the Kelly forceps (not the outer arch) with the IUD threads away from the forceps.

With the help of an assistant to hold the speculum, hold the forceps that has clamped the IUD with the dominant hand and hold the forceps that clamps cervix with the other hand (see figure A.21 b).

Pull the forceps that clamps the cervix slowly toward the inserter and then visualize the cervix.

Insert the IUD-clamping forceps through the vagina and cervix, perpendicular to the back plane of the mother.

When the IUD-clamping forceps has passed through the cervix into the uterine cavity, the assistant removes the speculum.

Move the hand that holds the cervix-clamping forceps to the abdomen at the top of the uterine fundus.

With a hand on the abdomen, push the entire uterus superiorly (upward), to straighten out the angle between vagina and uterus (see figure A.21 c).

Insert the IUD-clamping forceps with a gentle upward movement toward the fundus. Keep in mind that the lower segment of the uterus may contract, and therefore it may need a bit of pressure to push the IUD going into the fundus.
If there is resistance, pull the forceps slightly and redirect it more anteriorly toward the abdominal wall.

Make sure by using a hand in the abdomen that the tip of the forceps has reached the fundus.

Open placental forceps and release the IUCD at fundus

Sweep forceps to side wall of uterus, stabilize uterus, remove the forceps from cavity keeping it slightly open.

Gently open the vaginal introitus using two fingers and see the inside of the vagina.

**Note:** Sometimes, if the uterus contracts properly and is small-sized, IUD thread can be seen out of the cervical ostium.

In case of large-sized uterus, visible thread shows that the IUD has not reached the fundus. In this situation, remove the IUD and repeat insertion using a sterile forceps and a new IUD in order to achieve the correct position.

Release and remove the cervix-clamping forceps.

### A. 14.2 Manual insertion of IUD

This technique can only be used within 10 min after placental birth. The main points of this technique that distinguish it from insertion using an instrument are as follows:

**Procedure**

- Wear long gloves (up to elbow) OR sterile standard gloves with sterile waterproof clothing.

- Hold the IUD by grasping it between the index and middle fingers of the dominant hand *(see figure A.22 a).*

- With the help of vaginal speculum, visualize the cervix and clamp it using a ring forceps. Then remove the speculum.
Slowly and perpendicularly to the back plane of the mother, insert the hand holding the IUD into the vagina and through the cervix into the uterus.

Remove the cervix-clamping forceps and place the non-dominant hand on the abdomen to hold the uterus steady. Stabilize the uterus by pushing the uterus superiorly (upward) to prevent it from moving upward when inserting the hand holding the IUD (see figure A.22b).

Upon reaching the fundus, rotate the hand holding the IUD at 45 degrees to the right to place the IUD horizontally in the fundus.

Remove the hand slowly, close to the lateral wall of the uterus. Pay attention not to displace the IUD when removing the hand.

IUD insertion in the fundus is the key to success.

Complications that may arise are:

- Bleeding
- Infection
- Perforation
- Expulsion
- Translocation

A.14.3 Intra-caesarean insertion

After a delivery by Caesarean section:
Massage the uterus until the bleeding diminishes and make sure that there is no tissue left in the uterine cavity.

Insert the IUD on uterine fundus manually or using an instrument.

Prior to suturing the uterine incision, place the thread on the lower segment of the uterus close to the internal cervical ostium. Do not remove the thread through the cervix since it increases the risk of infection.

A. 15 Episiotomy

Before Procedure

- Review for indications.
- Review general care principles and apply antiseptic solution to the perineal area.
- Provide emotional support and encouragement. Use local infiltration with lignocaine or a pudendal block).
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution.

Note: Aspirate to be sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. The woman can suffer convulsions and death if IV injection of lignocaine occurs.

- At the conclusion of the set of injections, wait 2 minutes and then pinch the incision site with forceps. If the woman feels the pinch, wait 2 more minutes and then retest.
- Wait to perform episiotomy until:

  Anaesthetize early to provide sufficient time for effect
- The perineum is thinned out and
- 3–4 cm of the baby’s head is visible during a contraction

**Procedure**

- Wearing high-level disinfected or sterile gloves, place two fingers between the baby’s head and the perineum.
- Use scissors to cut the perineum about 3–4 cm in the medio-lateral direction. or Use scissors to cut 2–3 cm up the middle of the posterior vagina.
- Control the baby’s head and shoulders as they deliver, ensuring that the shoulders have rotated to the midline to prevent an extension of the episiotomy.
- Carefully examine for extensions and other tears and repair (see below).

**Repair of Episiotomy**

**Note:** It is important that absorbable sutures be used for closure. Poly glycolic sutures are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications and episiotomy breakdown. Chromic catgut is an acceptable alternative, but is not ideal.

**Procedure**

- Apply antiseptic solution to the area around the episiotomy.
- If the episiotomy is extended through the anal sphincter or rectal mucosa, manage as third or fourth degree tears *(see A.16.2).*
- Close the vaginal mucosa using continuous 2-0 suture
- Start the repair about 1 cm above the apex (top) of the episiotomy. Continue the suture to the level of the vaginal opening.
- At the opening of the vagina, bring together the cut edges of the vaginal opening.
- Bring the needle under the vaginal opening and out through the incision and tie.
Close the perineal muscle using interrupted 2-0 sutures.

Close the skin using interrupted (or subcuticular) 2-0 sutures.

Complications

- If a haematoma is observed, open and drain it. If there are no signs of infection and the bleeding has stopped, the wound can be re closed.

- If there are signs of infection, open and drain the wound. Remove infected sutures and debride the wound
  - If the infection is mild, antibiotics are not required
  - If the infection is severe but does not involve deep tissues, give a combination of antibiotics:
    - Ampicillin 500 mg by mouth 4/d for 5 days PLUS
    - Metronidazole 400 mg by mouth 3/d for 5 days.
  - If the infection is deep, involves muscles and is causing necrosis (necrotizing fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours:
    - Penicillin G 2 million units IV every 6 hours PLUS
    - Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
    - Metronidazole 500 mg IV every 8 hours

- Once the woman is fever-free for 48 hours, give:
  - Ampicillin 500 mg by mouth 4/d for 5 days PLUS
  - Metronidazole 400 mg by mouth 3/d for 5 days.
Note: Necrotizing fasciitis requires wide surgical debridement.

Perform delayed primary closure in 2 to 4 weeks (depending on resolution of the infection).

A. 16 Repair of Tears

A. 16.1 Repair of cervical tears

Before Procedure

► Apply antiseptic solution to the vagina and cervix.
► Anaesthesia is not required for most cervical tears. For tears that are high and extensive, give pethidine and diazepam IV slowly or use ketamine.

Procedure

► Ask an assistant to gently provide fundal pressure to help push the cervix into view.
► Use vaginal retractors as necessary to expose the cervix.
► Gently grasp the cervix with ring or sponge forceps. Apply the forceps on both sides of the tear and gently pull in various directions to see the entire cervix. There may be several tears.
► Close the cervical tears with continuous 0 chromic catgut (or polyglycolic) suture starting at the apex (upper edge of tear), which is often the source of bleeding (see figure A.23).
If a long section of the rim of the cervix is tattered, under-run it with continuous 0 chromic catgut (or polyglycolic) suture.

If the apex is difficult to reach and ligate, grasp it with artery or ring forceps. Leave the forceps in place for 4 hours. Do not persist in attempts to ligate the bleeding points as such attempts may increase the bleeding.

- After 4 hours, open the forceps partially but do not remove
- After another 4 hours, remove the forceps completely

**Note:** A laparotomy may be required to repair a cervical tear that has extended deep beyond the vaginal vault.

### A. 16.2 Repair of vaginal or perineal tears

There are four degrees of tears that can occur during delivery

<table>
<thead>
<tr>
<th>Table A.5 Degrees of perineal tears</th>
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<tbody>
<tr>
<td>Vaginal mucosa, connective tissue</td>
<td>Level I</td>
</tr>
<tr>
<td>Vaginal mucosa, connective tissue, underlying muscles</td>
<td>Level II</td>
</tr>
<tr>
<td>Complete transection of the anal sphincter</td>
<td>Level III</td>
</tr>
<tr>
<td>Rectal mucosa</td>
<td>Level IV</td>
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</table>

**It is important to use absorbable sutures to close the tears.**

Polyglycolic sutures are preferred over the pre-tied chromic catgut for their stretch strength, non-allergenic nature, and lower possibility of infection complications. Pre-tied chromic catgut can be used as an alternative, but it is not an ideal suture.
Repair of First and Second Degree Tears

Most first degree tears close spontaneously without sutures.

Before Procedure

- Ask an assistant to check the uterus and ensure that it is contracted.
- Carefully examine the vagina, perineum and cervix.
- If the tear is long and deep through the perineum, inspect to be sure there is no third or fourth degree tear:
  - Place a gloved finger in the anus
  - Gently lift the finger and identify the sphincter
  - Feel for the tone or tightness of the sphincter
  - Change to clean, high-level disinfected or sterile gloves
- If the sphincter is not injured, proceed with repair.
- Apply antiseptic solution to the area around the tear.
- Make sure there are no known allergies to lignocaine or related drugs.
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution.

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated.

- At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the woman feels the pinch, wait 2 more minutes and then repair the vaginal mucosa using a continuous 2-0 suture.

Procedure (Figure 24 a, b, c)

- Start the repair about 1 cm above the apex (top) of the vaginal tear.
- Continue the suture to the level of the vaginal opening.
At the opening of the vagina, bring together the cut edges of the vaginal opening.

Bring the needle under the vaginal opening and out through the perineal tear and tie.

Repair the perineal muscles using interrupted 2-0 suture.

If the tear is deep, place a second layer of the same stitch to close the space.

Repair the skin using interrupted (or subcuticular) 2-0 sutures starting at the vaginal opening.

If the tear was deep, perform a rectal examination. Make sure no stitches are in the rectum.

**Repair of Third and Fourth Degree Perineal Tears**

*Note:* The woman may suffer loss of control over bowel movements and gas if a torn anal sphincter is not repaired correctly. If a tear in the rectum is not repaired, the woman can suffer from infection and recto vaginal fistula (passage of stool through the vagina).

**Before Procedure**

- Repair the tear in the operating room.
- Use a pudendal block, ketamine or spinal anaesthesia.
► Ask an assistant to check the uterus and ensure that it is contracted.
► Examine the vagina, cervix, perineum and rectum.
► To see if the anal sphincter is torn:
  ▪ Place a gloved finger in the anus and lift slightly
  ▪ Identify the sphincter, or lack of it
  ▪ Feel the surface of the rectum and look carefully for a tear
  ▪ Change to clean, high-level disinfected or sterile gloves
► Apply antiseptic solution to the tear and remove any faecal material, if present.
► Make sure there are no known allergies to lignocaine or related drugs.
► Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum, and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution.
► At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the woman feels the pinch, wait 2 more minutes and then retest.

Procedure
► Repair the rectum using interrupted 3-0 or 4-0 polyglactinsutures 0.5 cm apart to bring together the mucosa:
  ▪ Remember: Place the suture through the muscularis (not all the way through the mucosa).
  ▪ Cover the muscularis layer by bringing together the fascial layer with interrupted sutures.
► Apply antiseptic solution to the area frequently.
► If the sphincter is torn:
  ▪ Grasp each end of the sphincter with an Allis clamp (the sphincter retracts when torn). The fascial sheath around the sphincter is strong and will not tear when pulling with the clamp.
- Repair the sphincter with two or three interrupted stitches of 2-0 polyglactin suture (see figure A.25a, b & c).

- Apply antiseptic solution to the area again.
- Examine the anus with a gloved finger to ensure the correct repair of the rectum and sphincter. Then change to clean, high-level disinfected or sterile gloves.
- Repair the vaginal mucosa, perineal muscles and skin.

**Post-Procedure Care**
- If there is a fourth degree tear, give a single dose of prophylactic antibiotics
  - Ampicillin 500 mg by mouth PLUS
  - Metronidazole 400 mg by mouth
- Follow up closely for signs of wound infection.
- Avoid giving enemas or rectal examinations for 2 weeks.
- Low residue diet.
- Give stool softener by mouth for 1 week, if possible.
Complications

► If a haematoma is observed, open and drain it. If there are no signs of infection and the bleeding has stopped, the wound can be reclosed.

► If there are signs of infection, open and drain the wound. Remove infected sutures and debride the wound.

- If the infection is mild, antibiotics are not required;

- If the infection is severe but does not involve deep tissues, give a combination of antibiotics:
  - Ampicillin 500 mg by mouth 4/d for 5 days PLUS
  - Metronidazole 400 mg by mouth 3/d for 5 days

- If the infection is deep, involves muscles and is causing necrosis (necrotizing fasciitis), give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours:
  - Penicillin G 2 million units IV every 6 hours PLUS
  - Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
  - Metronidazole 500 mg IV every 8 hours

Once the woman is fever-free for 48 hours, give:

- Ampicillin 500 mg by mouth 4/d for 5 days PLUS
- Metronidazole 400 mg by mouth 3/d for 5 days

Note: Necrotizing fasciitis requires wide surgical debridement.
Perform delayed primary closure in 2 to 4 weeks (depending on resolution of the infection).

- Faecal incontinence may result from complete sphincter transection.
- Rectovaginal fistula requires reconstructive surgery 3 months or more postpartum.

**A. 17 Repair of Uterine Wall Tears**

**Before Procedure**

- Review indications, principles of surgery and start IV-infusion.
- Administer a single dose of antibiotics

**Procedure**

- Open the abdomen by midline vertical incision *(see A.5)*
- Examine the abdomen and the uterus for site of rupture and remove clots.
- Place a bladder retractor over the pubic bone and place self-retaining abdominal retractors.
- Deliver the baby and placenta.
- Administer 10 units of oxytocin in 500 mL of NaCl/Ringer’s lactate starting at 60 drops/min until the uterus contracts and then down to 20 drops/min after uterine contraction improves.
- Lift the uterus to see the entire uterine injury.
- Examine the anterior and posterior aspects of the uterus.
- Clamp bleeding using a ring forceps.
- Separate the bladder from the lower uterine segment by sharp or blunt dissection. If the bladder is scarred to the uterus, use fine scissors.
- Repair the tear with a continuous locking stitch of 0 chromic catgut (or polyglycolic) suture. If bleeding is not controlled or if the rupture is through a previous classical or vertical incision, place a second layer of suture.

- Ensure that the ureter is identified and exposed to avoid including it in a stitch.

- If the rupture is too extensive for repair, proceed with hysterectomy.

- Control bleeding by clamping with long artery forceps and ligating. If the bleeding points are deep, use figure-of-eight sutures.

- If the woman has requested tubal ligation, perform the procedure at this time.

- Attach an abdominal drain

- Ensure that there is no bleeding. Remove clots using a sponge.

- In all cases, check for injury to the bladder. If a bladder injury is identified, repair it.

- Close abdomen (see A.5).

**Rupture Through Cervix and Vagina**

- If the uterus is torn through the cervix and vagina, mobilize the bladder at least 2 cm below the tear.

- If possible, place a suture 2 cm above the lower end of the cervical tear and keep traction on the suture to bring the lower end of the tear into view as the repair continues.

**Rupture Laterally Through Uterine Artery**

- If the rupture extends laterally to damage one or both uterine arteries, ligate the injured artery.

- Identify the arteries and ureter prior to ligating the uterine vessels.
Rupture with Broad Ligament Haematoma

- Clamp, cut and tie off the round ligament.
- Open the anterior leaf of the broad ligament.
- Drain off the haematoma manually, if necessary.
- Inspect the area carefully for injury to the uterine artery or its branches. Ligate any bleeding vessels.

Repair of Bladder Injury

- Identify the extent of the injury by grasping each edge of the tear with a clamp and gently stretching. Determine if the injury is close to the bladder trigone (ureters and urethra).
- Dissect the bladder off the lower uterine segment with fine scissors or with a sponge on a clamp.
- Free a 2 cm circle of bladder tissue around the tear.
- Repair the tear in two layers with continuous 3-0 chromic catgut (or poly glycolic) suture:
  - Suture the bladder mucosa (thin inner layer) and bladder muscle (outer layer).
  - Invert (fold) the outer layer over the first layer of suture and place another layer of suture.
- Ensure that sutures do not enter the trigone area.
- Test the repair for leaks:
  - Fill the bladder with sterile saline or water through the transurethral catheter.
  - If leaks are present, remove the suture, repair and test again.
  - If it is not certain that the repair is well away from the ureters and urethra, complete the repair and refer the woman to a higher-level facility for an intravenous pyelogram.
Keep the bladder catheter in place for at least 7 days and until urine is clear. Continue IV fluids to ensure flushing of the bladder, and encourage the woman to drink fluids.

Post-Procedure Care

- If there are signs of infection or fever during maternal care, administer combined antibiotics until mother is fever-free for 48 hours:
  - 2 g of Ampicillin IV every 6 hours AND
  - 5 g/kg of body weight of Gentamicin IV every 8 hours AND
  - 500 mg of Metronidazole IV every 8 hours
- Administer adequate analgesics.
- If there is no sign of infection, remove drain after 48 hours.
- If tubectomy is not performed in uterine repair, offer a family planning method.
- Because there is an increased risk of rupture with subsequent pregnancies, the option of permanent contraception needs to be discussed with the woman after the emergency is over. Advise her to have elective Caesarean section for future pregnancies.

A. 18 Ligation of Ascending Uterine Artery

Ligation of ascending uterine artery is aimed to reduce uterine blood flow.

Before Procedure

- Review for indications.
- Administer a single dose of prophylactic antibiotics, namely 2 g of ampicillin IV OR 1 g cefazolin of IV.
- Administer infusion of Ringer lactate or 0.9% NaCl solution.
**Procedure**

- Open the abdomen by midline vertical incision.

- Place a bladder retractor over the pubic bone and place self-retaining abdominal retractors.

- Turn and pull uterus out to expose broad ligament.

- Feel for pulsations of the uterine artery near the junction of the uterus and cervix.

- Using 0 chromic catgut (or polyglycolic) suture on a large needle, pass the needle around the artery and through 2–3 cm of myometrium (uterine muscle) at the level where a transverse lower uterine segment incision would be made. Tie the suture securely (see figure A.26).  

  ![Figure A.26](image)

- Place the sutures as close to the uterus as possible, as the ureter is generally only 1 cm lateral to the uterine artery.

- Repeat on the other side.

- If the artery has been torn, clamp and tie the bleeding ends.

- If bleeding is still not controlled
  - Ligate the utero-ovarian artery just below the point where the ovarian suspensory ligament joins the uterus.
  - Repeat on the other side.
  - Observe for continued bleeding or formation of haematoma.
Before closing the abdomen:

- Ensure that there is no bleeding. Remove clots using a sponge.
- Examine carefully for injuries to the bladder and repair any found.

Close the abdomen.

Post-Procedure Care

- Monitor urine output. If there is blood in the urine or the woman has loin pain, refer the woman to a tertiary centre, if possible, for treatment of ureteric injury.

- If there are signs of infection or fever during maternal care, administer combined antibiotics until mother is fever-free for 48 hours:
  - 2 g of Ampicillin IV every 6 hours AND
  - 5 mg/kg of body weight of Gentamicin IV every 24 hours AND
  - 500 mg of Metronidazole IV every 8 hours

- Administer adequate analgesic drug.

- If there are no signs of infection, remove the abdominal drain after 48 hours.

Note: Evaluate success of ligation of the ascending uterine artery by assessing bleeding rather than contraction. Complication that may occur is an injury to blood vessels or ureter.

A. 19 Postpartum Hysterectomy

Postpartum hysterectomy can be subtotal (supracervical) unless the cervix and lower uterine segment are involved. Total hysterectomy may be necessary in the case of a tear of the lower segment that extends into the cervix or bleeding after placenta praevia.
Before Procedure

► Review indications.

► Review principles of surgery.

► Administer a single dose of antibiotics:
  ▪ 2 g of Ampicillin IV OR
  ▪ 2 g of cefazolin IV

► If there is uncontrolled bleeding after vaginal delivery, remember that speed is essential
  ▪ Open the abdomen by midline vertical incision (see A.4).
  ▪ Place a bladder retractor over the pubic bone and place self-retaining abdominal retractors.
  ▪ If the delivery was by Caesarean section, clamp the sites of bleeding along the uterine incision.
  ▪ In case of massive bleeding, have an assistant press fingers over the aorta in the lower abdomen. This will reduce intraperitoneal bleeding.
  ▪ Extend the skin incision, if needed.

A. 19.1 Subtotal hysterectomy

► Lift the uterus out of the abdomen and gently pull to maintain traction.

► Doubly clamp and cut the round ligaments with scissors. Clamp and cut the pedicles, but ligate after the uterine arteries are secured to save time (see figure A.27a).
From the edge of the cut round ligament, open the anterior leaf of the broad ligament. Incise to:

- The point where the bladder peritoneum is reflected onto the lower uterine surface in the midline or
- The incised peritoneum at a Caesarean section

Use two fingers to push the back of the broad ligament to the front, under the tube and ovary, near the edge of the uterus. Make a finger-sized hole on the broad ligament using a scissors. Clamp twice and cut the tube, ovarian ligament, via the hole in the broad ligament.

**The ureters are close to the uterine vessels. Clamps should be applied close to the uterus to avoid ureteric injury**

Divide the posterior leaf of the broad ligament downwards towards the uterosacral ligaments, using scissors.

Grasp the edge of the bladder flap with forceps or a small clamp. Using fingers or scissors, dissect the bladder downwards off of the lower uterine segment. Direct the pressure downwards but inwards toward the cervix and the lower uterine segment.

Locate the uterine artery and vein on each side of the uterus. Feel for the junction of the uterus and cervix.

Doubly clamp across the uterine vessels at a 90 degree angle on each side of the cervix. Cut and doubly ligate with 0 chromic catgut (or polyglycolic) suture. *(see figure 27 b)*.
Observe carefully for any further bleeding. If the uterine arteries are ligated correctly, bleeding should stop and the uterus should look pale.

Return to the clamped pedicles of the round ligaments and tubo-ovarian ligaments and ligate them with 0 chromic catgut (or polyglycolic) suture.

Amputate the uterus above the level where the uterine arteries are ligated, using scissors (see figure A.27 c).

Close cervical stump with interrupted sutures using chromic catgut 1-0 or 20 (or polyglycolide).

Carefully check cervical stump, the end of round ligament, and other structures on the pelvic floor to locate bleeding.

In case of minor bleeding or suspected clotting disorder, attach a drain via abdominal wall. Do not attach the drain via the cervical stump since it may cause infection.

Make sure that there is no bleeding and remove the clots using sponges.

In all cases, check for presence of bladder injury. Repair bladder injury, if any.

Close the abdomen (see A.4).

A. 19.2 Total hysterectomy

The following additional steps are required for total hysterectomy:

Push the bladder down to free the top 2 cm of the vagina.

Open the posterior leaf of the broad ligament.

Clamp, ligate and cut the uterosacral ligaments.
Clamp, ligate and cut the cardinal ligaments, which contain the descending branches of the uterine vessels. This is the critical step in the operation.

Grasp the ligament vertically with a large-toothed clamp (e.g. Kocher).

Place the clamp 5 mm lateral to the cervix and cut the ligament close to the cervix, leaving a stump medial to the clamp for safety.

If the cervix is long, repeat the step two or three times as needed. The upper 2 cm of the vagina should now be free of attachments.

Circumcise the vagina as near to the cervix as possible, clamping bleeding points as they appear.

Place haemostatic angle sutures, which include round, cardinal and uterosacral ligaments.

Place continuous sutures on the vaginal cuff to stop haemorrhage.

Close the abdomen (as above) after placing a drain in the extra peritoneal space (see figure A.5).

Post-Procedure Care

Monitor for intra-abdominal and vaginal bleeding and urine production.

If there are signs of infection or fever during maternal care, administer combined antibiotics until mother is fever-free for 48 hours:

- 2 g of Ampicillin IV every 6 hours AND
- 5 g/kg of body weight of Gentamicin IV every 24 hours AND
- 500 mg of Metronidazole IV every 8 hours

Administer adequate analgesics.

If there are no signs of infection, remove the abdominal drain after 48 hours.
A. 20 Salpingectomy in Ectopic Pregnancy

Evaluate contralateral tubal before deciding to perform salpingectomy.

Before Procedure

► Review indications.
► Review principles of surgery.
► Administer a single dose of antibiotics:
  ▪ Open the abdomen: Make a midline vertical/ pfannensteil incision (see A.4)
  ▪ Place a bladder retractor over the pubic bone and place self retaining abdominal retractors.
  ▪ Identify and bring to view the fallopian tube with the ectopic gestation and its ovary.
  ▪ Apply traction forceps (e.g. Babcock) to increase exposure and clamp the mesosalpinx to stop haemorrhage.
  ▪ Aspirate blood from the lower abdomen and remove blood clots.
  ▪ Apply sponges moistened with warm saline to pack off the bowel and omentum from the operative field.
  ▪ Separate mesosalpinx by using several clamps. Clamp as close to the tube as possible to maintain ovarian vascularization (see figure A.28 a).
- Transfix and tie the divided mesosalpinx with 2-0 chromic catgut (or polyglycolic) suture before releasing the clamps (see figure A.28 b).
- Place a proximal suture around the tube at its isthmic end and excise the tube (see figure A.28 c).
- Remove the large sponges, wash the abdominal cavity with warm physiological saline solution, and clean the remaining bloods/fluids.
- To close the abdominal wall, make sure that there is no bleeding. Remove blood clots by using sponges.
- Close the abdomen (see A.5)

**Post-Procedure Care**

- If there are signs of infection or fever during maternal care, administer combined antibiotics until mother is fever-free for 48 hours:
  - 2 g of Ampicillin IV every 6 hours AND
  - 5 g/kg of body weight of Gentamicin IV every 24 hours AND
  - 500 mg of Metronidazole IV every 8 hours
- Administer adequate analgesics.

**A. 21 Analgesia and Anaesthesia in Obstetric Procedures**

**A.21.1 Paracervical block**

**Before Procedure**
- Review indications and contraindications carefully.
Review general principles of surgery.

Prepare 20 mL 0.5% lignocaine solution without adrenaline.

Use a 3.5-cm, 22-gauge or 25-gauge needle to inject the lignocaine solution.

If using a tenaculum to grasp the cervix, first inject 1 mL of 0.5% lignocaine solution into the anterior or posterior lip of the cervix which has been exposed by the speculum.

Note: In incomplete abortion, the use of ring forceps is preferable to tenaculum, and an injection of lignocaine is not required.

Procedure

With the tenaculum or ring forceps on the cervix vertically (one tooth in the external os, the other on the face of the cervix), use slight traction and movement to help identify the area between the smooth cervical epithelium and the vaginal tissue. This is the site for insertion of the needle around the cervix (see figure A.29).
Insert the needle just under the epithelium.

**Note:** Perform aspiration and make sure not to get into the blood vessels. Never inject if blood is aspirated.

Inject 2 ml of lignocaine just below the epithelium, not deeper than 3 mm, at 3, 5, 7, and 9 o’clock. Add injections at 2 and 10 o’clock, if necessary. Correct injection will cause swelling and pale colour at the injection site.

At the conclusion of the set of injections, wait 2 minutes and then pinch the cervix with forceps. If the woman can feel the pinch, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect

### A.21.2 Pudendal block

**Table A.6 Indications and precautions for pudendal block**

<table>
<thead>
<tr>
<th>Indications</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental or breech delivery</td>
<td>Make sure there are no known allergies to lignocaine or related drugs</td>
</tr>
<tr>
<td>Episiotomy and repair of perineal tears</td>
<td></td>
</tr>
<tr>
<td>Craniotomy or craniocentesis</td>
<td>Do not inject into a vessel</td>
</tr>
</tbody>
</table>

**Before Procedure**

- Review general care principles.
- Prepare 40 mL 0.5% lignocaine solution without adrenaline.

**Note:** It is best to limit the pudendal block to 30 mL of solution so that a maximum of 10 mL of additional solution may be injected into the perineum during repair of tears, if needed.
Use a 15-cm, 22-gauge needle to inject the lignocaine.

The target is the pudendal nerve as it passes through the lesser sciatic notch. There are two approaches:

- Through the perineum
- Through the vagina

The perineal approach requires no special instrument. For the vaginal approach, a special needle guide ("trumpet"), if available, provides protection for the provider’s fingers.

**Procedure**

**Perineal Approach**

- Infiltrate the perineal skin on both sides of the vagina using 10 mL of lignocaine solution.

**Note:** Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated.

- Wearing high-level disinfected or sterile gloves, place two fingers in the vagina and guide the needle through the perineal tissue to the tip of the woman’s left ischial spine (see figure A.30a).

- Inject 10 mL of lignocaine solution in the angle between the ischial spine and the ischial tuberosity.

- Pass the needle through the sacrospinous ligament and inject another 10 mL of lignocaine solution.

- Repeat the procedure on the opposite side.

- If an episiotomy is to be performed, infiltrate the episiotomy site in the usual manner at this time.
At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the woman can feel the pinch, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

**Vaginal Approach**

- Wearing high-level disinfected or sterile gloves, use the left index finger to palpate the woman’s left ischial spine through the vaginal wall (see figure A 30b).
- Use the right hand to advance the needle guide (“trumpet”) towards the left spine, keeping the left fingertip at the end of the needle guide.
- Place the needle guide just below the tip of the ischial spine.
- Advance a 15-cm, 22-gauge needle with attached syringe through the guide.
- Penetrate the vaginal mucosa until the needle pierces the sacrospinous ligament.

**Note:** Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated.

Remember to keep the fingertip near the end of the needle guide. Do not place the fingertip beyond the end of the needle guide as needle-stick injury can easily occur.

- Inject 10 mL of lignocaine solution.
- Withdraw the needle into the guide and reposition the guide to just above the ischial spine.
Penetrate the vaginal mucosa and aspirate again to be sure that no vessel has been penetrated.

Inject another 5 mL of lignocaine solution.

Repeat the procedure on the other side, using the right index finger to palpate the woman's right ischial spine. Use the left hand to advance the needle and needle guide and inject the lignocaine solution.

If an episiotomy is to be performed, infiltrate the episiotomy site in the usual manner at this time.

At the conclusion of the set of injections, wait 2 minutes and then pinch the area with forceps. If the woman can feel the pinch, wait 2 more minutes and then retest.

Anaesthetize early to provide sufficient time for effect.

A.22 Female Sterilization Procedure

Mini laparotomy with Modified Pomeroy Technique for interval/post-abortal ligation

Timing of sterilization

- At the time of Caesarean section.
- Shortly after delivery.
- At a time unrelated to pregnancy
- Immediate post-abortal.

Before Procedure

- Review for contraindications.
- Preoperative evaluation of women before the surgery and for the type of anaesthesia to be used.
Perform counselling (inform about permanent method; efficacy and failure rate).

Take written consent.

Local anaesthesia with sedation (or general anaesthesia) administered.

Dorsal lithotomy position, clean and drape.

Procedure

Perform bimanual examination to assess the size and position of the uterus and the condition of fornices.

Visualize cervix with Sim’s speculum and anterior wall retractor, pass the uterine elevator through the vagina and into the cervix, up to the cervical guard. Remove the speculum.

A horizontal or vertical (if preexisting midline scar) 2 to 4 cm suprapubic incision made 2 to 3 cm above the border of the pubis. Bluntly dissect the subcutaneous fat using a Kelly forceps, Control bleeding in any vessels, as needed.

Open rectus sheath with a transverse incision until the rectus muscle can be seen on both sides of the midline. Bluntly separate the rectus muscles. Entry into the abdominal cavity is safer when the operating table is placed in the Trendelenburg position.

Elevate the uterus to view the uterine fundus, then gently rotate the handle of the uterine elevator in the opposite direction of the tube being accessed, to position the tube at the incision site. With the free hand, grasp the tube atraumatically using Babcock forceps. Release the uterine elevator, while continuing to hold the tube with the baby Babcock forceps and confirm the identity of the tube by following it to the fimbriated end.

With baby Babcock forceps, grasp and elevate at least a 2-cm loop at the isthmic portion of fallopian tube, approximately 2 to 3 cm from the cornual end of the tube (see figure A.31 a).
The base of the loop is ligated with No 1 plain/chromic catgut, leaving a 2 cms proximal stump of isthmus and sutures are held long (Figure A.31 b). A 2 to 3 cm portion of the tube in the ligated loop is transected and removed with scissors (see figure A.31c). To avoid incomplete resection the mesosalpinx within the ligated loop should be perforated with scissors before the tubal limb on each side of this window is cut (Modified Pomeroy’s method).

Same method used for other tube.

Close fascia after excluding any injury or bleeding using a continuous (running stitches) suture with delayed absorbable suture Number 0, skin with interrupted stitches, using either absorbable or non-absorbable suture Number 0. Finally, dress the closed incision before removing gloves, gowns, and drapes.

Postpartum sterilization:

- Up to 48 hours after vaginal delivery.
- Incision is made infraumbilical vertical or transverse, at level of uterine fundus.
- Lithotomy position and uterine elevator not required.

Post procedure Care

- Observe and record the client’s vital signs (respiratory rate, pulse, BP), every 15 min in first hour after surgery. Monitor and discharge 4–6 hours after surgery.
- Check surgical drape to promptly identify any bleeding.
- Instructions to return for routine follow-up within 1 week, and to return at any time if warning signs arise.
- Oral analgesics and antibiotics can be prescribed.
Good Clinical Practice

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B. 1 Talking with Women and their Families

Pregnancy is typically a time of joy and anticipation. It can also be a time of anxiety and concern. Talking effectively with a woman and her family can help build the woman’s trust and confidence in her health care providers. Women who develop complications may have difficulty talking to the provider and explaining their problem. It is the responsibility of the entire health care team to speak with the woman respectfully and put her at ease. Focusing on the woman means that the health care provider and staff:

- Respect the woman’s dignity and right to privacy.
- Are sensitive and responsive to the woman’s needs.
- Are non-judgmental about the decisions that the woman and her family have made thus far regarding her care.

Communication Techniques

Speak in a calm, quiet manner and assure the woman that the conversation is confidential. Be sensitive to any cultural or religious considerations and respect her views. In addition:

- Encourage the woman and her family to speak honestly and completely about events surrounding the complication.
- Listen to what the woman and her family have to say and encourage them to express their concerns; try not to interrupt.
- Respect the woman’s sense of privacy and modesty by closing the door or drawing curtains around the examination table.
- Let the woman know that she is being listened to and understood.
- Use supportive nonverbal communication such as nodding and smiling.
- Answer the woman’s questions directly in a calm, reassuring manner.
- Explain what steps will be taken to manage the situation or complication.
- Ask the woman to repeat back to you the key points to assure her understanding.
If a woman must undergo a surgical procedure, explain to her the nature of the procedure and its risks and help to reduce her anxiety. Women who are extremely anxious have a more difficult time during surgery and recovery.

**General Principles of Communication and Support**

While each emergency situation is unique, the following general principles offer guidance. Communication and genuine empathy are probably the most important keys to effective care in such situations.

**At The Time of The Event**

- Listen to those who are distressed. The woman/family will need to discuss their hurt and sorrow.
- Do not change the subject and move on to easier or less painful topics of conversation. Show empathy.
- Tell the woman/family as much as you can about what is happening. Understanding the situation and its management can reduce their anxiety and prepare them for what happens next.
- Be honest. Do not hesitate to admit what you do not know. Maintaining trust matters more than appearing knowledgeable.
- If language is a barrier to communication, find a translator.
- Do not pass the problem on to nursing staff or junior doctors.
- Ensure that the woman has a companion of her choice and, where possible, the same care giver throughout labour and delivery. Supportive companionship can enable a woman to face fear and pain, while reducing loneliness and distress.
- Where possible, encourage companions to take an active role in care. Position the companion at the top of the bed to allow the companion to focus on caring for the woman’s emotional needs.
- Both during and after the event, provide as much privacy as possible for the woman and her family.
After The Event

- Give practical assistance, information and emotional support.
- Respect traditional beliefs and customs and accommodate the family’s needs as far as possible.
- Provide counselling for the woman/family and allow for reflection on the event.
- Explain the problem to help reduce anxiety and guilt. Many women/families blame themselves for what has happened.
- Listen and express understanding and acceptance of the woman’s feelings. Nonverbal communication may speak louder than words: a squeeze of the hand or a look of concern can say an enormous amount.
- Repeat information several times and give written information, if possible. People experiencing an emergency will not remember much of what is said to them.
- Health care providers may feel anger, guilt, sorrow, pain and frustration in the face of obstetric emergencies that may lead them to avoid the woman/family. Showing emotion is not a weakness.
- Remember to care for staff who themselves may experience guilt, grief, confusion and other emotions.

B. 2 Anaesthesia and Analgesia

B. 2.1 Pain relief during labour

Information about pain management options for labour and birth should be shared with every woman during her prenatal care. The administration of analgesia during labour should not be undertaken without due consideration for the potential risks.

The perception of pain varies greatly with the woman’s emotional state. Supportive care during labour provides reassurance and decreases the perception of pain.
Pain-relieving management options during labour

- Comfort measures and relaxation techniques:
  - Labour support is the close, continuous presence of a member of a family or a friend or a person, but all of them should be trained before in providing emotional and physical support and encouragement throughout labour and birth.
  - The labour and birthing space should offer a comfortably furnished room with attention to lighting, noise level, and privacy.
  - If the woman is distressed by pain, allow her to walk around or assume any comfortable position.
  - Encourage her companion to massage her back or sponge her face between contractions.
  - Encourage the use of breathing techniques and allow the woman to take a warm bath or shower if she chooses. For most women, this is enough to cope with the pain of labour.

- Analgesic drugs during labour
  - If pain is not relieved with above measures administer:
    - Pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly every 4 hours as needed or give morphine 0.1 mg/kg body weight IM.
    - Promethazine 25 mg IM or IV if vomiting occurs.

Danger

If pethidine or morphine is given to the mother, the baby may suffer from respiratory depression. Naloxone is the antidote.

**Note:** Do not administer naloxone to newborns whose mothers are suspected of having recently abused narcotic drugs.
If there are signs of respiratory depression in the newborn, begin resuscitation immediately:

- After vital signs have been established, give naloxone 0.1 mg/kg body weight IV to the newborn.

- If the infant has adequate peripheral circulation after successful resuscitation, naloxone can be given IM. Repeated doses may be required to prevent recurrent respiratory depression.

- Barbiturates and sedatives should not be used to relieve anxiety in labour.

If there are no signs of respiratory depression in the newborn, but pethidine or morphine was given within 4 hours of delivery, observe the baby expectantly for signs of respiratory depression and treat as above if they occur.

**B. 2.2 Premedication with promethazine and diazepam**

Premedication is required for procedures that last longer than 30 minutes. A popular combination is pethidine and diazepam:

- Give pethidine 1 mg/kg body weight (but not more than 100 mg) IM or IV slowly.

- Give diazepam in increments of 1 mg IV and wait at least 2 minutes before giving another increment. A safe and sufficient level of sedation has been achieved when the woman’s upper eye lid droops and just covers the edge of the pupil. Monitor the respiratory rate every minute. If the respiratory rate falls below 10 breaths per minute, stop administration of all sedative or analgesic drugs.

**B. 2.3 Local anaesthesia**

Local anaesthesia (lignocaine with or without adrenaline) is used to infiltrate tissue and block the sensory nerves.
**Lignocaine**

Lignocaine preparations are usually 2% or 1% and require dilution before use. For most obstetric procedures, the preparation is diluted to 0.5%, which gives the maximum effect with the least toxicity.

**Preparation of lignocaine 0.5% solution**

<table>
<thead>
<tr>
<th>Combine:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Lignocaine 2%, one part</td>
</tr>
<tr>
<td>▶ Normal saline or sterile distilled water, three parts (do not use glucose solution as it increases the risk of infection)</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>▶ Lignocaine 1%, one part</td>
</tr>
<tr>
<td>▶ Normal saline or sterile distilled water, one part</td>
</tr>
</tbody>
</table>

**Adrenaline**

Adrenaline causes local vasoconstriction. Its use with lignocaine has the following advantages:

▶ Less blood loss

▶ Longer effect of anaesthetic (usually 1 to 2 hours)

▶ Less risk of toxicity because of slower absorption into the general circulation

If the procedure requires a large surface to be anaesthetized or requires more than 40 mL of lignocaine, adrenaline is required to reduce the absorption rate and thereby reduce toxicity. The best concentration of adrenaline is 1:200 000 (5 mcg/mL). This gives maximum local effect with the least risk of toxicity from the adrenaline itself.

All local anaesthetic drugs are potentially toxic.
Management of Lignocaine Allergy

- Give adrenaline 1:1000, 0.5 mL IM, repeated every 10 minutes if necessary.

- In acute situations, give hydrocortisone 100 mg IV every hour.

- To prevent recurrence, give diphenhydramine 50 mg IM or IV slowly, then 50 mg by mouth every 6 hours.

- Treat bronchospasm with aminophylline 250 mg in normal saline 10 mL IV slowly.

- Severe or recurrent signs may require corticosteroids (e.g., hydrocortisone IV 2 mg/kg body weight every 4 hours until condition improves).

Management of Lignocaine Toxicity

- Symptoms and signs of toxicity should alert the practitioner to immediately stop injecting and prepare to treat severe and life threatening side effects. If symptoms and signs of mild toxicity are observed, wait a few minutes to see if the symptoms subside, check vital signs, talk to the woman and then continue the procedure, if possible.

Table B.1. Diagnosis of lignocaine allergy and toxicity

<table>
<thead>
<tr>
<th>Allergy</th>
<th>Mild toxicity</th>
<th>Severe toxicity</th>
<th>Life threatening toxicity (very rare)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shock</td>
<td>• Numbness of lips and tongue</td>
<td>• Sleepiness</td>
<td>• Tonic - clonic convulsions</td>
</tr>
<tr>
<td>• Redness of skin</td>
<td>• Metallic taste in mouth</td>
<td>• Disorientation</td>
<td>• Respiratory depression or arrest</td>
</tr>
<tr>
<td>• Skin rash/hives</td>
<td>• Dizziness/light-headedness</td>
<td>• Muscle twitching and shivering</td>
<td>• Cardiac depression or arrest</td>
</tr>
<tr>
<td>• Bronchospasm</td>
<td>• Ringing in ears</td>
<td>• Slurred speech</td>
<td></td>
</tr>
<tr>
<td>• Vomiting</td>
<td>• Blurred vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Serum sickness</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Convulsions
▶ Turn the woman to her left side, insert an airway and aspirate secretions.
▶ Give oxygen at 6–8 L per minute by mask or nasal cannulae.
▶ Give diazepam 1–5 mg IV in 1-mg increments. Repeat if convulsions recur.

Respiratory Arrest
▶ If the woman is not breathing, assist ventilation using an Ambu bag and mask or via endotracheal tube; give oxygen at 4–6 L per minute.

Cardiac Arrest
▶ Hyperventilate with oxygen.
▶ Perform cardiac massage.
▶ If the woman has not yet delivered, immediately deliver the baby by Caesarean section using general anaesthesia.
▶ Give adrenaline 1:10 000, 0.5 mL IV.

Ketamine:
▶ Review indications and contraindications to ketamine administration.

Indications and contraindications to ketamine administration

Indications:
▶ Procedure with short duration (less than 60 min) and no muscular relaxation is required (e.g., extensive cervical or perineal tear, manual placenta removal, Caesarean section, breast abscess drainage).
▶ Suitable as a backup in case of failed inhalation equipment or general anesthesia performed without inhalation equipment.

Precautions:
▶ Single use of ketamine may cause hallucinations. In order to avoid hallucinations, 10 mg of diazepam IV can be used shortly after delivery.
▶ Ketamine should not be used in a woman with hypertension, pre-eclampsia, eclampsia, or heart disease.
Review principles of surgery and give IV infusion.

Ketamine can be administered either IM, IV, or via infusion. Dosage varies:
- 6-10 mg/kg of body weight IM. Anesthesia is achieved in 10 min and lasts up to 30 min
- Alternative: 2 mg/kg of body weight IV slowly over 2 min or longer. Effect of anesthesia persists for up to 15 min
- For procedures of longer duration: give infusion of 200 mg of ketamine in 1 L of dextrose at a rate of 2 mg/min (20 drops/min)

Premedication

- Give Atropine sulfate 0.6 mg IM 30 minutes prior to surgery.
- Give Diazepam 10 mg IV at the time of induction to prevent hallucinations (for Caesarean section, give diazepam after the baby is delivered).
- Give oxygen at 6–8 L per minute by mask or nasal cannulae.

Induction and Maintenance

- Check the woman's vital signs (pulse, blood pressure, respiration, temperature).
- Insert a mouth gag to prevent airway obstruction by the tongue.
- Induction of anaesthesia is achieved by administering ketamine two mg/kg body weight IV slowly over 2 minutes. For short procedures lasting less than 15 minutes, this will provide adequate anaesthesia.
- For longer procedures, infuse Ketamine 200 mg in 1 L dextrose at 2 mg per minute (i.e. 20 drops per minute).
- Check the level of anaesthesia before proceeding with the surgery. Pinch the incision site with forceps. If the woman can feel the pinch, wait 2 minutes and then retest.
- Monitor vital signs (pulse, blood pressure, respiration, temperature) every 10 minutes during the procedure.
**Post-Procedure Care**

- Discontinue ketamine infusion and administer a postoperative analgesic suited to the type of surgery performed.

- Maintain observations every 30 minutes until the woman is fully awake; ketamine anaesthesia may take up to 60 minutes to wear off.

**Table B.2. Analgesia and anaesthesia options**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Analgesia/Awesia Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breech delivery</td>
<td>• General methods of labour support</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>• Spinal anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Local anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Ketamine</td>
</tr>
<tr>
<td></td>
<td>• General anaesthesia</td>
</tr>
<tr>
<td>Cervical tears (extensive)</td>
<td>• Pethidine and diazepam</td>
</tr>
<tr>
<td></td>
<td>• Ketamine</td>
</tr>
<tr>
<td>Colpotomy/Culdocentesis</td>
<td>• Local anaesthesia</td>
</tr>
<tr>
<td>Craniotomy/Craniocentesis</td>
<td>• Emotional support and encouragement</td>
</tr>
<tr>
<td></td>
<td>• Diazepam</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
<tr>
<td>Dilatation and Curettage</td>
<td>• Paracervical block</td>
</tr>
<tr>
<td></td>
<td>• Pethidine</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>• Local anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>• Emotional support and encouragement</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
<tr>
<td>Procedure</td>
<td>Anaesthesia/Support Options</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Labour and childbirth</td>
<td>• General methods of labour support</td>
</tr>
<tr>
<td></td>
<td>• Pethidine and promethazine</td>
</tr>
<tr>
<td>Laparotomy</td>
<td>• General anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Spinal anaesthesia</td>
</tr>
<tr>
<td>Manual removal of placenta</td>
<td>• Pethidine and diazepam</td>
</tr>
<tr>
<td></td>
<td>• Ketamine</td>
</tr>
<tr>
<td>MVA</td>
<td>• Paracervical block</td>
</tr>
<tr>
<td></td>
<td>• Pethidine</td>
</tr>
<tr>
<td>Perineal tears (first and second degree)</td>
<td>• Local anaesthesia</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
<tr>
<td>Perineal tears (third and fourth degree)</td>
<td>• Pudendal block</td>
</tr>
<tr>
<td></td>
<td>• Ketamine</td>
</tr>
<tr>
<td></td>
<td>• Local anaesthesia, pethidine, and diazepam</td>
</tr>
<tr>
<td></td>
<td>• Spinal anaesthesia</td>
</tr>
<tr>
<td>Symphysiotomy</td>
<td>• Local anaesthesia</td>
</tr>
<tr>
<td>Uterine inversion (correction of)</td>
<td>• Pethidine and diazepam</td>
</tr>
<tr>
<td></td>
<td>• General anaesthesia</td>
</tr>
<tr>
<td>Vacuum extraction</td>
<td>• Emotional support and encouragement</td>
</tr>
<tr>
<td></td>
<td>• Pudendal block</td>
</tr>
</tbody>
</table>

**B. 3 Antibiotic Therapy**

**B. 3.1 Providing prophylactic antibiotics**

- Give prophylactic antibiotics 30 minutes before the start of a procedure.
An exception to this is Caesarean section, for which prophylactic antibiotics should be given when the cord is clamped after delivery of the baby.

One dose of prophylactic antibiotics is sufficient.

If the procedure lasts longer than 6 hours or blood loss is 1500 mL or more, give a second dose of prophylactic antibiotics to maintain adequate blood levels during the procedure.

Single dose of Cefazolin 1g iv or Ampicillin 2g iv after sensitivity test is administered.

### B. 3.2 Providing therapeutic antibiotics

If a woman is suspected to have or is diagnosed as having an infection, therapeutic antibiotics are more appropriate.

As a first defense against serious infections, give a combination of antibiotics:

- Ampicillin 2 g IV every 6 hours PLUS
- Gentamicin 5 mg/kg body weight IV every 24 hours PLUS
- Metronidazole 500 mg IV every 8 hours

**Note:** If the infection is not severe, amoxicillin 500 mg by mouth every 8 hours can be used instead of ampicillin. Metronidazole can be given by mouth instead of IV.

If the clinical response is poor after 48 hours, ensure adequate dosages of antibiotics are being given, thoroughly re-evaluate the woman for other sources of infection or consider altering treatment according to reported microbial sensitivity (or adding an additional agent to cover anaerobes, if not yet given).

For the treatment of metritis, combinations of antibiotics are usually continued until the woman is fever-free for 48 hours. Women with blood-stream infections, however, will require antibiotics for at least 7 days.
B. 4 Surgical Site Disinfection

- Prepare the skin with an antiseptic (e.g., iodophors, chlorhexidine):
  - Apply antiseptic solution three times to the incision site using a high-level disinfected or sterile ring forceps and cotton or gauze swab. If the swab is held with a gloved hand, do not contaminate the glove by touching unprepared skin.
  - Begin at the proposed incision site and work outward in a circular motion away from the incision site.
  - At the edge of the sterile field discard the swab.
- Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field.
- Drape the woman immediately after the area is prepared to avoid contamination:
  - If the drape has a window, place the window directly over the incision site first.
  - Unfold the drape away from the incision site to avoid contamination.

B. 5 Hand Washing

Handwashing is the most practical procedure for preventing cross-contamination.

- Vigorously rub together all surfaces of the hands lathered with plain or antimicrobial soap. Wash for 40-60 seconds and rinse with a stream of running or poured water.
- Wash hands:
  - Before and after examining the woman (or having any direct contact);
  - After exposure to blood or any body fluids (secretions or excretions), even if gloves were worn;
  - After removing gloves because the gloves may have holes in them.
How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDBRUB

Duration of the entire procedure: 40-60 seconds

- Wet hands with water;
- Apply enough soap to cover all hand surfaces;
- Rub hands palm to palm;
- Right palm over left dorsum with interlaced fingers and vice versa;
- Palm to palm with fingers interlaced;
- Backs of fingers to opposing palms with fingers interlocked;
- Rotational rubbing of left thumb clasped in right palm and vice versa;
- Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;
- Rinse hands with water;
- Dry hands thoroughly with a single use towel;
- Use towel to turn off faucet;
- Your hands are now safe.

World Health Organization
Patient Safety
A World Alliance for Safer Health Care
SAVE LIVES
Clean Your Hands
Figure B.1. Handscrub

- Remove all jewelry.
- Hold hands above the level of the elbow, wet hands thoroughly and apply soap (preferably an iodophore, e.g., betadine).
- Begin at the fingertips and lather and wash, using a circular motion:
  - Wash between all fingers.
  - Move from the fingertips to the elbows of one hand and then repeat for the second hand.
  - Wash for 3 to 5 minutes.
- Rinse each arm separately, fingertips first, holding hands above the level of the elbows.
- Dry hands with a clean or disposable towel, wiping from the fingertips to the elbows, or allow hands to air dry.
- Ensure that scrubbed hands do not come into contact with objects (e.g., equipment, protective gown) that are not high-level disinfected or sterile.

If the hands touch a contaminated surface, repeat surgical handscrub.

Waste Disposal

- Transporting solid contaminated waste to the disposal site in covered containers.
- Disposing of all sharp items in puncture-proof containers.
- Carefully pouring liquid waste down a drain or flush able toilet.
- Burning or burying contaminated solid waste.
- Washing hands, gloves and containers after disposal of infectious.
B.6. Surgical Safety Checklist

Before induction of anaesthesia
(with at least nurse and anaesthetist)

- Has the patient confirmed his/her identity, site, procedure, and consent?
  - Yes
  - No
  - Not applicable

- Is the site marked?
  - Yes
  - No
  - Not applicable

- Is the anaesthesia machine and medication check complete?
  - Yes
  - No
  - Not applicable

- Is the pulse oximeter on the patient and functioning?
  - Yes
  - No

- Does the patient have a:
  - Known allergy?
    - Yes
    - No
  - Difficult airway or aspiration risk?
    - Yes, and equipment/assistance available
    - No
  - Risk of >500ml blood loss (7ml/kg in children)?
    - Yes, and two IVs/central access and fluids planned
    - No

Before skin incision
(with nurse, anaesthetist and surgeon)

- Confirm all team members have introduced themselves by name and role.
- Confirm the patient’s name, procedure, and where the incision will be made.
- Has antibiotic prophylaxis been given within the last 60 minutes?
  - Yes
  - No
  - Not applicable

Anticipated Critical Events

To Surgeon:
- What are the critical or non-routine steps?
- How long will the case take?
- What is the anticipated blood loss?

To Anaesthetist:
- Are there any patient-specific concerns?

To Nursing Team:
- Has sterility (including indicator results) been confirmed?
- Are there equipment issues or any concerns?
- Is essential imaging displayed?
  - Yes
  - No
  - Not applicable

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

- Nurse Verbally Confirms:
  - The name of the procedure
  - Completion of instrument, sponge and needle counts
  - Specimen labelling (read specimen labels aloud, including patient name)
  - Whether there are any equipment problems to be addressed

- To Surgeon, Anaesthetist and Nurse:
  - What are the key concerns for recovery and management of this patient?
B.7. WHO Safe Childbirth Checklist

BEFORE BIRTH

WHO Safe Childbirth Checklist

On Admission

Does mother need referral?

☑ No
☑ Yes, organized

Parograph started?

☑ No, will start when born
☑ Yes

Start plotting when cervix dilates, then cervix should dilate 2 cm/hr
- Every 30 min plot HR, contractions, fetal HR
- Every 2 min plot temperature
- Every 4 min plot BP

Does mother need to start

Artificial?

☑ No
☑ Yes, given

Magnesium sulfate and antihypertensive treatment?

☑ No
☑ Yes, magnesium sulfate given
☑ Yes, antihypertensive medication given

Ask for allergies before administration of any medication
- Give medications to mother if any of:
  - Malignant temperature ≥39°C
  - History of fetalmurining vaginal discharge
  - Rupture of membrane ≥24 hr

Give magnesium sulfate to mother if any of:
- Diastolic BP ≥110 mmHg and 3+ proteinuria
- Diastolic BP ≥95 mmHg and 2+ proteinuria
  - and any urinary tract infection, visual disturbance, epigastric pain
- Give antihypertensive medication to mother if systolic BP >160 mmHg
  - Gastric intubation if Gastric intubation if Systolic BP <150/100 mmHg

☑ Confirm supplies are available to clean hands and wear gloves for each vaginal exam.

☑ Encourage birth companion to be present at birth.

☑ Confirm that mother or companion will call for help during labour if needed.

Call for help if any of:
- Bleeding
- Severe abdominal pain
- Severe headache or visual disturbance
- Unable to urinate
- Uterine pain

This checklist is not intended to replace clinical assessment and should not replace routine obstetric practice. Additional and modifications to the practices are encouraged. For more information on recommendations of the checklist, please refer to the “WHO Safe Childbirth Checklist Implementation Guide” at www.who.int/maternal_child_adolescent

Completed by: ____________________________

WHO Safe Childbirth Checklist

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### WHO Safe Childbirth Checklist

#### 2. Just Before Pushing (Or Before Caesarean)

**Does mother need to start:**
- [ ] Antibiotics?
  - [ ] No
  - [ ] Yes, given

**Magnesium sulphate and antihypertensive treatment?**
- [ ] No
- [ ] Yes, magnesium sulphate given
- [ ] Yes, antihypertensive medication given

**Confirm essential supplies are at bedside and prepare for delivery:**
- [ ] Gloves
- [ ] Alcohol-based handrub or soap and clean water
- [ ] Enoxacin 1.0 units in syringe

**For mother:**
- [ ] Clean towel
- [ ] Scalpel blade to cut cord
- [ ] Suction device
- [ ] Bag-and-mask

**For baby:**
- [ ] Clean towel
- [ ] Scalpel blade to cut cord
- [ ] Suction device
- [ ] Bag-and-mask

**Prepare to care for mother immediately after birth:**
1. Give oxygen within 1 minute after birth
2. Deliver placenta 1-3 minutes after birth
3. Massage uterus after placenta is delivered
4. Clean Stevens is contaminated

**Prepare to care for baby immediately after birth:**
1. Dry baby, keep warm
2. If not breathing, stimulate and clear away
3. If still not breathing:  
   - [ ] Mouth and nose
   - [ ] Clear airway if necessary
   - [ ] Administer bag and mask
   - [ ] Shout for help

**Assistant identified and ready to help at birth if needed.**

---

*This checklist is not intended to be comprehensive and should not replace the consent or protocol. Adaptions and modifications to fit local practice are encouraged. For more information on recommended use of the checklist, please refer to the "WHO Safe Childbirth Checklist Implementation Guide" at: [www.who.int](http://www.who.int).*

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**WHO Safe Childbirth Checklist**

**Completed by:** ____________________
### AFTER BIRTH

**WHO Safe Childbirth Checklist**

#### Soon After Birth (Within 1 Hour)

<table>
<thead>
<tr>
<th>Question</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is mother bleeding abnormally?</td>
<td>If bleeding abnormally:</td>
</tr>
<tr>
<td></td>
<td>- Massage uterus</td>
</tr>
<tr>
<td></td>
<td>- Consider more uterotonics</td>
</tr>
<tr>
<td></td>
<td>- Start IV and keep mother warm</td>
</tr>
<tr>
<td></td>
<td>- Treat cause: uterine atony, retained placenta/fragments, vaginal tear, uterine rupture</td>
</tr>
<tr>
<td>Does mother need to start:</td>
<td>Ask for allergies before administration of any medication</td>
</tr>
<tr>
<td>Antibiotics?</td>
<td>- Give antibiotics to mother if placenta manually removed or if mothers’ temperature &lt;38°C and any of:</td>
</tr>
<tr>
<td></td>
<td>- Chills</td>
</tr>
<tr>
<td></td>
<td>- Fouled-smelling vaginal discharge</td>
</tr>
<tr>
<td></td>
<td>- If mother has a third or fourth degree of perineal tear give antibiotics to prevent infection</td>
</tr>
<tr>
<td>Magnesium sulfate and antihypertensive treatment?</td>
<td>Give magnesium sulfate to mother if any of:</td>
</tr>
<tr>
<td></td>
<td>- Diastolic BP &gt;110 mmHg and 3+ proteinuria</td>
</tr>
<tr>
<td></td>
<td>- Diastolic BP &gt;10 mmHg, 2+ proteinuria, and any severe headache, visual disturbance, epigastric pain</td>
</tr>
<tr>
<td>Does baby need:</td>
<td>Give antihypertensive medication to mother if systolic BP &gt;150 mmHg</td>
</tr>
<tr>
<td>Referral?</td>
<td>- Goal: keep BP &lt;150/100 mmHg</td>
</tr>
<tr>
<td>Antibiotics?</td>
<td>Check your facility’s criteria.</td>
</tr>
<tr>
<td></td>
<td>Give baby antibiotics if antibiotics given to mother for treatment of maternal infection during childbirth or if baby has any of:</td>
</tr>
<tr>
<td></td>
<td>- Respiratory rate &gt;60/min or &lt;30/min</td>
</tr>
<tr>
<td></td>
<td>- Chest in-drawing, grunting, or cyanosis</td>
</tr>
<tr>
<td></td>
<td>- Poor movement on stimulation</td>
</tr>
<tr>
<td></td>
<td>- Baby’s temperature &lt;38°C (and not rising after warming) or baby’s temperature &gt;39°C</td>
</tr>
<tr>
<td>Special care and monitoring?</td>
<td>Arrange special care monitoring for baby if any:</td>
</tr>
<tr>
<td></td>
<td>- More than 1 month early</td>
</tr>
<tr>
<td></td>
<td>- Birth weight &lt;2500 grams</td>
</tr>
<tr>
<td></td>
<td>- Needs antibiotics</td>
</tr>
<tr>
<td></td>
<td>- Required resuscitation</td>
</tr>
</tbody>
</table>

- [ ] Started breastfeeding and skin-to-skin contact (if mother and baby are well).

- [ ] Confirm mother / companion will call for help if danger signs present.

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*Responsible for the interpretation and use of the material in this checklist has with the reader. In no event shall the World Health Organization be liable for damages arising from its use. For more information visit www.who.int/patientsafety*
# WHO Safe Childbirth Checklist

## Before Discharge

- **Confirm stay at facility for 24 hours after delivery.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does mother need to start antibiotics?</td>
<td>Ask for antibiotics before administration of any medication. Give antibiotics to mother if any of:</td>
</tr>
<tr>
<td></td>
<td>- Mother's temperature &gt;38°C</td>
</tr>
<tr>
<td></td>
<td>- Red swelling and delay discharge</td>
</tr>
<tr>
<td>Is mother's blood pressure normal?</td>
<td>Give magnesium sulfate to mother if any of:</td>
</tr>
<tr>
<td></td>
<td>- Diastolic BP &gt; 30 mmHg or 3+ proteinuria</td>
</tr>
<tr>
<td></td>
<td>- Diastolic BP &gt; 50 mmHg or 4+ proteinuria, and any reason headache, visual clots, severe pain</td>
</tr>
<tr>
<td></td>
<td>- Give antihypertensive medication to mother if systolic BP &gt; 140 mmHg</td>
</tr>
<tr>
<td></td>
<td>- Good BP ≤ 100/60 mmHg</td>
</tr>
<tr>
<td>Is mother bleeding abnormally?</td>
<td>If pulse &gt; 110 beats per minute or blood pressure &lt; 90 mmHg</td>
</tr>
<tr>
<td></td>
<td>- Start IV and keep mother warm</td>
</tr>
<tr>
<td></td>
<td>- Treat cause (hypovolemic shock)</td>
</tr>
<tr>
<td>Does baby need to start antibiotics?</td>
<td>Give antibiotics to baby if any of:</td>
</tr>
<tr>
<td></td>
<td>- Respiratory rate &gt; 60 breaths or &lt; 20 breaths</td>
</tr>
<tr>
<td></td>
<td>- Chest in-drawing, grunting, or cyanosis</td>
</tr>
<tr>
<td></td>
<td>- Poor movement or stimulation</td>
</tr>
<tr>
<td></td>
<td>- Baby's temperature &lt; 36°C (and not rising after warming)</td>
</tr>
<tr>
<td></td>
<td>- Baby's temperature &gt; 38°C</td>
</tr>
<tr>
<td></td>
<td>- Stopped breast-feeding well</td>
</tr>
<tr>
<td></td>
<td>- Umbilical cord swollen at skin or churing pus</td>
</tr>
</tbody>
</table>

- **Discuss and offer family planning options to mother.**

- **Arrange follow-up and confirm mother / companion will seek help if danger signs appear after discharge.**

## Danger Signs

- **Mother:**
  - Bleeding
  - Severe abdominal pain
  - Severe headache or visual disturbance
  - Breathing difficulty
  - Fever or chills
  - Difficulty emptying bladder
  - Epistaxis or pustules

- **Baby:**
  - Fast/difficult breathing
  - Fever
  - Unusually cold
  - Stops feeding well
  - Less activity than normal
  - Whole body becomes yellow

---

Responsible for the information and use of the elements in this checklist lies with the user. In case of doubt, the World Health Organization recommends consulting a health professional. For more information visit www.who.int/pahts/maternal_perinatal_health. 

WHO Safe Childbirth Checklist

Completed by: [Signature]
B. 8 Replacement of Fluids

Replacement fluids are used to replace abnormal losses of blood, plasma or other extracellular fluids by increasing the volume of the vascular compartment. They are used principally in

- Management of women with established hypovolumia (e.g., Haemorrhagic shock)
- Maintenance of normovolumia in women with ongoing fluid losses (e.g., surgical blood loss)

Intravenous replacement therapy

Intravenous replacement fluids are first-line treatment for hypovolemia. Initial treatment with these fluids may be life-saving and can provide some time to control bleeding and obtain blood for transfusion if it becomes necessary.

Crystalloid fluids

- Crystalloid replacement fluids
  - Contain a similar concentration of sodium to plasma
  - Cannot enter cells because the cell membrane is impermeable to sodium
  - Pass from the vascular compartment to the extracellular space (normally only a quarter of the volume of crystalloid infused remains in the vascular compartment)

- To restore circulating blood volume (intravascular volume), infuse crystalloids in a volume at least three times the volume lost.

- Common crystalloids: Normal Saline (NS), Ringer’s Lactate

- Dextrose (glucose) solutions are poor replacement fluids. Do not use them to treat hypovolaemia unless there are no other alternatives.
Colloid fluids

- Colloid solutions are composed of a suspension of particles that are larger than crystalloids. Colloids tend to remain in the blood where they mimic plasma proteins to maintain or raise the colloid osmotic pressure of blood.

- Colloids are usually given in a volume equal to the blood volume lost. In many conditions where the capillary permeability is increased (e.g., trauma, sepsis), leakage out of the circulation will occur and additional infusions will be necessary to maintain blood volume.

- Common colloids: albumin, dextran, gelatins, hydroxyethyl starch solution.

Points to remember:

- There is no evidence that colloid solutions have any advantage over normal saline or balanced salt solutions for resuscitation. There is very limited role for colloids in resuscitation.

- There is evidence that colloid solutions may have an adverse effect on survival.

- Colloid solutions are much more expensive than normal saline and balanced salt solutions.

- Human plasma should not be used as a replacement fluid. All forms of plasma carry a similar risk as whole blood of transmitting infection, such as HIV and hepatitis.

- Plain water should never be infused intravenously. It will cause haemolysis and will probably be fatal.

- In patients with Preeclampsia/ Eclampsia/ History of heart disease, fluid should be given judiciously @ 75ml/hr.

- In anaemic women, fluid transfusion should be done carefully with auscultation of lungs.
Safety measures before giving any IV infusion

Before giving any IV infusion

► Check that the seal of the infusion bottle or bag is not broken.
► Check the expiry date.
► Check that the solution is clear and free from visible particles.

Replacement of Blood and Blood Products

Obstetric care may require blood transfusion. The appropriate use of blood products is defined as the transfusion of safe blood products.

Conditions that may require blood transfusion include

► Postpartum haemorrhage leading to shock.
► Loss of a large volume of blood at operative delivery.
► Severe anaemia, especially in later pregnancy or if accompanied by cardiac failure.

The clinician should record the reason for transfusion and investigate any adverse effects.

In anaemic women, give Inj. Frusemide 20 mg IV before starting transfusion.
## Table B.3. Blood component therapy

<table>
<thead>
<tr>
<th>Blood component</th>
<th>Volume</th>
<th>Response</th>
<th>Indications</th>
</tr>
</thead>
</table>
| **Whole blood** | • 510 ml | • Increases Hb by 1% approx and Hct by 3% | • Red cell replacement in acute blood loss with hypovolaemia  
• Exchange transfusion  
• Patients needing red cell transfusions where red cell concentrates or suspensions are not available |
| **Packed RBC** | • 250ml | | • Replacement of red cells in anaemic patients  
• Use with crystalloid replacement fluids or colloid solution in acute blood loss |
| **FFP** | • 200-300 contains all clotting factors | • 10–15ml/kg increases factor level by 20 – 30% | • Depletion of coagulation factors in patients receiving large volume transfusions (6 units of PRBC)  
• Disseminated intravascular coagulation (DIC) |
| **Random donor Platelets** | • 50–60 ml | • 1 unit increase platelet count by 5000– 7000 | • In patients receiving large volume transfusions |
Risks of transfusion

- The transfusion of red cell products carries a risk of incompatible transfusion and serious haemolytic transfusion reactions.
- Blood products can transmit infectious agents—including HIV, hepatitis B, hepatitis C, syphilis, malaria and Chagas disease—to the recipient.
- Any blood product can become bacterially contaminated and very dangerous if it is manufactured or stored incorrectly.
- Plasma can also transmit most of the infections present in whole blood.
- Plasma can also cause transfusion reactions.

Screening for infectious agents

- All donated blood should be screened for the following:
  - HIV-1 and HIV-2
  - Hepatitis B surface antigen (HBsAg)
  - Treponema pallidum antibody (syphilis)
  - Hepatitis C
  - Chagas disease, in countries where the seroprevalence is significant
  - Malaria, in low-prevalence countries when donors have travelled to malarial areas. In areas with a high prevalence of malaria, blood transfusion should be accompanied by prophylactic antimalarials

- No blood or blood product should be released for transfusion until all nationally required tests are shown to be negative.
- Perform compatibility test on all blood components transfused even if, in life-threatening emergencies, the test are performed after the blood products have been issued.
- The blood unit should not be transfused if
  - The unit has been (or may have been) out of the refrigerator for longer than 30 minutes or
1. For each unit of blood transfused, monitor the patient at the following stages:

- Before starting the transfusion
- As soon as the transfusion is started
- 15 minutes after starting transfusion
- At least every hour during transfusion
- On completion of the transfusion
- 4 hours after completing the transfusion.

2. At each of these stages, record the following information on the patient’s chart:

- Patient’s general appearance
- Pulse
- Respiratory rate
- Temperature
- Blood pressure
- Fluid balance:
  - Oral and IV fluid intake
  - Urinary output

3. Record:

- Time the transfusion is started
- Time the transfusion is completed
- Volume and type of all products transfused
- Unique donation numbers of all products transfused
- Any adverse effects.

Table B.4 Monitoring the transfused patient

- If there is any sign that there is a leak or the bag has been opened or
- The plasma is pink or red or
- The red cells look purple or black.
# Table B.5 Guidelines for the recognition and management of acute transfusion reactions

<table>
<thead>
<tr>
<th>Category</th>
<th>Symptoms and Signs</th>
<th>Possible Cause</th>
<th>Immediate Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATEGORY 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>• Pruritus</td>
<td>• Hypersensitivity (mild)</td>
<td>• Slow the transfusion</td>
</tr>
<tr>
<td></td>
<td>• Localized cutaneous reactions</td>
<td></td>
<td>• Administer antihistamine IM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• If no clinical improvement within 30 minutes or if signs and symptoms worsen, treat as Category 2</td>
</tr>
<tr>
<td><strong>CATEGORY 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderately severe</td>
<td>• Anxiety</td>
<td>• Hypersensitivity (moderate–severe)</td>
<td>• Stop the transfusion. Replace the infusion set and keep IV line open with normal saline</td>
</tr>
<tr>
<td></td>
<td>• Pruritus</td>
<td>• Febrile non-haemolytic transfusion reactions:</td>
<td>• Notify the doctor responsible for the patient and the blood bank immediately</td>
</tr>
<tr>
<td></td>
<td>• Palpitations</td>
<td>- Antibodies to white blood cells, platelets</td>
<td>• Send blood unit with infusion set, freshly collected urine and new blood samples from vein opposite infusion site with appropriate request form to blood bank and laboratory for investigations</td>
</tr>
<tr>
<td></td>
<td>• Mild dyspnoea</td>
<td>- Antibodies to proteins, including IgA</td>
<td>• Administer antihistamine IM and oral or rectal antipyretic. Avoid aspirin in thrombocytopenic patients</td>
</tr>
<tr>
<td></td>
<td>• Headache</td>
<td>• Possible contamination with pyrogens and/or bacteria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flushing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Urticaria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rigours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Restlessness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| CATEGORY 3: Life-threatening | • Anxiety  
• Chest pain  
• Pain near infusion site  
• Respiratory distress/shortness of breath  
• Loin/back pain | • Acute intravascular haemolysis  
• Bacterial contamination and septic shock  
• Fluid overload  
• Anaphylaxis  
• Transfusion-associated lung injury | • Stop the transfusion. Replace the infusion set and keep IV line open with normal saline  
• Infuse normal saline to maintain systolic BP  
• Maintain airway and give high flow oxygen by mask  
• Give adrenaline (as 1:1000 solution) 0.01 mg/kg body weight by slow intramuscular injection  
• Give IV corticosteroids and bronchodilators if there are anaphylactoid features | • Give IV corticosteroids and bronchodilators if there are anaphylactoid features  
• Collect urine for next 24 hours for evidence of haemolysis and send to laboratory  
• If clinical improvement, restart transfusion slowly with new blood unit and observe carefully  
• If no clinical improvement within 15 minutes or if signs and symptoms worsen, treat as Category 3 |
| • Headache                  | • Give diuretic: e.g. furosemide 1 mg/kg IV |
| • Dyspnoea Rigours         | • Notify the doctor responsible for the patient and the blood bank immediately |
| • Fever                    | • Send blood unit with infusion set, fresh urine sample and new blood samples from vein opposite infusion site with appropriate request form to blood bank and laboratory for investigations |
| • Restlessness             | • Check a fresh urine specimen visually for signs of haemoglobinuria (red or pink urine) |
| • Hypotension (fall of ≥20% in systolic BP) | • Start a 24-hour urine collection and fluid balance chart and record all intake and output. Maintain fluid balance |
| • Tachycardia (rise of ≥20% in heart rate) | • Assess for bleeding from puncture sites or wounds. If there is clinical or laboratory evidence of DIC, give platelets and either cryoprecipitate or fresh frozen plasma |
| • Haemoglobinuria (red urine) | • Reassess. If hypotensive: |
| • Unexplained bleeding (DIC) |  |
Give further saline 20–30 ml/kg over 5 minutes
- Give inotrope, if available

If urine output falling or laboratory evidence of acute renal failure (rising S.potassium, urea, creatinine):
- Maintain fluid balance accurately
- Give further frusemide
- Consider dopamine infusion, if available
- Seek expert help: the patient may need renal dialysis

If bacteraemia is suspected (rigours, fever, collapse, no evidence of a haemolytic reaction), start broad-spectrum antibiotics IV, to cover pseudomonas and gram positives

Note: If an acute transfusion reaction occurs, first check the blood pack labels and the patient’s identity. If there is any discrepancy, stop the transfusion immediately and consult the blood bank.

In an unconscious or anaesthetized patient, hypotension and uncontrolled bleeding may be the only signs of an incompatible transfusion. In a conscious patient undergoing a severe haemolytic transfusion reaction, signs and symptoms may appear very quickly — within minutes of infusing only 5–10 ml of blood. Close observation at the start of the infusion of each unit is essential.
# Essential Drugs in Pregnancy

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of drugs</th>
<th>Common indications</th>
<th>Doses and administration</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Antibiotics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ampicillin</td>
<td>• Post obstetric procedures with signs of infection, puerperal sepsis, Group B Streptococcus infection at &lt;37 weeks (To reduce infection in neonate) • During C/S (prophylaxis) • Pre obstetric procedures (prophylaxis)</td>
<td>• 2 gm IV AST followed by 500 mg every 6 hours • 1 g IV AST • 1g IV AST single dose</td>
<td>• Should be combined with gentamycin and metronidazole except in Group B Streptococcus infection at &lt;37 weeks (To reduce infection in neonate) • After cord clamping and cutting</td>
</tr>
<tr>
<td></td>
<td>• Cefazolin</td>
<td>• During C/S (prophylaxis) • Pre obstetric procedures (prophylaxis)</td>
<td>• 1 g IV AST • 1g IV AST single dose</td>
<td>• After cord clamping and cutting</td>
</tr>
<tr>
<td></td>
<td>• Cloxacillin</td>
<td>• Mastitis/ Breast Abscess</td>
<td>• 500 mg orally four times per day x 7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antimalarials - Combination Therapy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>-------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACT (Artemisinin based chemotherapy)</td>
<td>Weight range</td>
<td>Dose</td>
<td></td>
</tr>
</tbody>
</table>

2. **Combination Therapy**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin</td>
<td>PPROM (Preterm Premature Rupture of Membranes)</td>
<td>250 mg orally three times per day x 7 days</td>
<td>PLUS Amoxicillin 500mg orally three times per day x 7 days</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>Post obstetric procedures with signs of infection</td>
<td>5 mg/kg body weight every 24 hours</td>
<td>Combined with Cefazolin or Ampicillin and Metronidazole</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>Post obstetric procedures with signs of infection</td>
<td>500 mg IV 8 hourly</td>
<td>Should be combined with Ampicillin or Cefazolin</td>
</tr>
<tr>
<td>Weight (kgs)</td>
<td>Artemether + Lumefantrine (mg) given twice daily for 3 days</td>
<td>Amodiaquine dose (mg) given daily for 3 days</td>
<td>Artesunate dose (mg) given daily for 3 days</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>≥ 35kgs</td>
<td>80 + 480</td>
<td>≥ 36kgs</td>
<td>≥ 36kgs</td>
</tr>
<tr>
<td>&gt;30kgs</td>
<td>200 + 540</td>
<td>≥ 36kgs</td>
<td>&gt;30kgs</td>
</tr>
<tr>
<td>&gt;25 kgs</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>20-200mg+</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>100-200mg+</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>50-75mg</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>25-50mg</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>&lt;25mg</td>
<td>100-200mg+</td>
<td>&gt;25kgs</td>
<td>&gt;25kgs</td>
</tr>
<tr>
<td>Medicine</td>
<td>Weight Range</td>
<td>Dose (mg)</td>
<td>Administration</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dihydroartemisinin + Piperaquine</td>
<td>36-60kg</td>
<td>120-960mg</td>
<td>Loading dose of 20 mg salt/kg bw provides therapeutic plasma concentrations within 4 hours. The maintenance dose is slow, rate-controlled infusion, usually diluted in 5% dextrose and infused over 4 hours.</td>
</tr>
<tr>
<td>Chloroquine base</td>
<td>&gt;25 kgs</td>
<td>10 mg/kg body weight by mouth once daily for 2 days followed by 5 mg/kg body weight on day 3. (safe in all trimesters)</td>
<td></td>
</tr>
<tr>
<td>Clindamycin</td>
<td>&gt;25 kgs</td>
<td>300 mg qid for 7 days</td>
<td></td>
</tr>
<tr>
<td>Artesunate</td>
<td></td>
<td>2.4 mg/kg body weight IV/IM as a single bolus</td>
<td></td>
</tr>
<tr>
<td>Artemether</td>
<td></td>
<td>3.2 mg/kg bw intramuscularly (to the anterior thigh). The maintenance dose is 1.6 mg/kg bw intramuscularly daily.</td>
<td></td>
</tr>
<tr>
<td>Quinine (parenteral)</td>
<td></td>
<td>Loading dose of 20 mg salt/kg bw provides therapeutic plasma concentrations within 4 hours. The maintenance dose is slow, rate-controlled infusion, usually diluted in 5% dextrose and infused over 4 hours.</td>
<td></td>
</tr>
</tbody>
</table>
of quinine (10 mg salt/kg bw) is administered at 8-hour intervals, starting 8 hours after the first dose. If there is no improvement in the patient’s condition within 48 hours, the dose should be reduced by one third, i.e., to 10 mg salt/kg bw every 12 hours.

<table>
<thead>
<tr>
<th>3. Antihypertensives</th>
<th></th>
</tr>
</thead>
</table>
| **Hydralazine** | **For hypertensive crisis** | **5 mg IV slowly every 5 mins maximum 20 mg**<br>- Maintenance dose 2-20 mg/hr | **Target DBP 90-100 mmHg**
| **Labetalol** | **For hypertensive crisis** | **10 mg IV slowly followed by 20 mg, 20 mg, 40 mg, 40 mg, and 80 mg. Max 220 mg every 10 min**<br>- Oral 100-200 mg 12 hourly | **If response to labetalol is inadequate (DBP remains above 110 mmHg) after 10 mins, give labetalol 20 mg IV; increase the dose to 40 mg and then 80 mg if satisfactory response is not obtained after 10 mins of each dose (max 220 mg)** |
### 4. Anticonvulsants

<table>
<thead>
<tr>
<th>Medication</th>
<th>Indication</th>
<th>Dosage</th>
<th>Additional Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nifedipine</td>
<td>For hypertensive crisis</td>
<td>5 mg-10 mg orally followed by 20-100 mg daily in divided doses</td>
<td>If response to nifedipine is inadequate (DBP remains above 110 mmHg) after 10 mins, give an additional 5 mg</td>
</tr>
<tr>
<td>Methyl dopa</td>
<td></td>
<td>250 mg tablets 2-3 tablets daily up to a maximum of 4g/day</td>
<td>Delay if RR &lt; 16/min, negative patellar reflex, urine output &lt; 30 ml/h for 4 hours and infuse IV NS or RL 1 L in 8 hours.</td>
</tr>
<tr>
<td>Magnesium sulfate</td>
<td>Prevention and treatment of seizure</td>
<td>Loading dose</td>
<td>If breathing stops, give breathing aids, give 1 gm of calcium gluconate</td>
</tr>
<tr>
<td></td>
<td>Recommended for severe pre-eclampsia and eclampsia</td>
<td>Maintenance dose</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Give deep IM 5 gm of 50% MgSO4 into alternate buttocks every 4 hours till 24 hours after delivery or the</td>
<td></td>
</tr>
</tbody>
</table>
5. **Oxytocics**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Indication</th>
<th>Dosage and Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytoin</td>
<td>Epilepsy in pregnancy</td>
<td>• Give vitamin K 1 mg IM to newborn as phenytoin can cause neonatal deficiency of Vit K dependent clotting factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Alternatively, give 1 g of 20% MgSO4 solution IV every hr by continuous infusion</td>
</tr>
<tr>
<td>Oxytocin</td>
<td>Active management of third stage of labour</td>
<td>• 10 units IM within 1 minute of delivery</td>
</tr>
<tr>
<td></td>
<td>(Prevention of PPH)</td>
<td>• 20 units in IV 1 litre IV (NS/ RL) @ 40-60 dpm or 10 units IM</td>
</tr>
<tr>
<td></td>
<td>Manual placenta removal (post procedure), bimanual</td>
<td>• If PPH continues give Ergometrine or prostaglandin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If PPH continues give Ergometrine or prostaglandin</td>
</tr>
<tr>
<td></td>
<td>compression in case of uterine atony, Manual correction of uterine inversion, Incomplete abortion, missed abortion, molar pregnancy</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| **Ergometrine**  | **MVA (Manual Vaccum Aspiration)**  
|                  | **Incomplete abortion**  
|                  | **PPH (PostPartum Haemorrhage) due to Atonic Uterus**  
|                  | **0.2 mg IM (repeat after 15 min if necessary)**  
|                  | **0.2 mg IM or IV slowly, repeat after 15 min if necessary; if required 0.2 mg IM or IV slowly every 4 hours (maximal 5 doses, total 1 mg)**  
|                  | **Avoid using in hypertension and heart disease**  
| **Prostaglandins** | **Atonic uterus**  
| **Prostaglandin F2 α** | **0.25 mg IM every 15 min (maximum 8 doses, total 2 mg)**  
|                  | **Do not give IV, may be fatal**  
|                  | **compression in case of uterine atony, Manual correction of uterine inversion, Incomplete abortion, missed abortion, molar pregnancy**  

<table>
<thead>
<tr>
<th>6. Tocolytic</th>
<th>PPH Prevention Treatment</th>
<th>Incomplete abortion up to 14 weeks</th>
<th>Misoprostol or, Terbutaline or, Salbutamol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Missed abortion &lt;12-14 weeks</td>
<td>600mcg oral or, 400 mcg S/L or, 400-800 mcg vaginally 800mcg vaginal 400mcg oral/sublingual 3 hours prior to evacuation</td>
</tr>
<tr>
<td>M Misoprostol</td>
<td>600mcg oral</td>
<td>250 mcg sc/iV slowly over 5 minutes</td>
<td>Fast infusion may cause tachycardia, dyspnea Should not be used for management of preterm labour</td>
</tr>
<tr>
<td>T Terbutaline</td>
<td>800mcg S/L</td>
<td>10 mg in 1 litre of IV fluid (NS/RL) @ 10 dpm</td>
<td>If contractions persist, increase infusion rate by 10 dpm every 30 mins until contractions stop</td>
</tr>
<tr>
<td>S Salbutamol</td>
<td>Hyperstimulation due to uterotonics</td>
<td>Hyperstimulation due to uterotonics</td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>Indication</td>
<td>Dosage/Details</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Nifedipine</td>
<td>Preterm labour</td>
<td>At the level of Nifedipine 10–30 mg stat followed by 10–20 mg every 4–8 hourly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 mg loading dose by mouth or per rectum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Give 25 mg every 6 hours for 48 hours or maternal pulse exceeds 120 bpm.</td>
<td></td>
</tr>
<tr>
<td>Indomethacin</td>
<td>Preterm labour</td>
<td>If contractions stop, maintain the same infusion rate for at least 8 hours after the last contraction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Betamethasone</td>
<td>To improve fetal lung maturity and chances of neonatal survival in Preterm labour</td>
<td>12 mg IM 2 doses 24 hours apart</td>
<td></td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>To improve fetal lung maturity and chances of neonatal survival in Preterm labour</td>
<td>6 mg IM 4 doses 12 hours apart</td>
<td></td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>Anaphylactic shock</td>
<td>50 mg IV if severe or recurrent 2 mg/kg IV 4 hourly until condition improves.</td>
<td></td>
</tr>
</tbody>
</table>
8. **Sedatives**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Indications</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazepam</td>
<td>Emergency treatment of eclampsia (when IV magnesium sulfate is used and failed)</td>
<td>10 mg IV over 2 minutes</td>
</tr>
<tr>
<td></td>
<td>Can be repeated if convulsion recurs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance with IV infusion of 40 mg in IV 500 ml (NS)</td>
<td></td>
</tr>
</tbody>
</table>

9. **Analgesics**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Indications</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pethidine</td>
<td>Pain relief in labour</td>
<td>1 mg / kg IM or 0.5 mg/kg IV slowly (not more than 100 mg IM and 50 mg IV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 hourly up to 400mg/24 hours</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>Pain relief/ high fever</td>
<td>500 mg orally every 6 hours</td>
</tr>
<tr>
<td>Morphine</td>
<td>Acute heart failure</td>
<td>10 mg IM single dose or 0.1 mg/kg IM</td>
</tr>
<tr>
<td>Indomethacin</td>
<td>Pain relief/ Tocolytic drug to stop uterine contraction</td>
<td>100mg loading dose by mouth or per rectum and give 25 mg every 6 hours for 48 hours</td>
</tr>
</tbody>
</table>
10. **Drugs used in emergencies**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Conditions</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenaline</td>
<td>Adult CPR, Anaphylactic shock</td>
<td>1mg IV every 3 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1mg IM, every 10 min</td>
</tr>
<tr>
<td>Atropine Sulphate</td>
<td>Adult CPR</td>
<td>3 mg single dose</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>Anaphylactic shock</td>
<td>50 mg IM or IV slowly, then 50 mg by mouth every 6 hours</td>
</tr>
<tr>
<td>Frusemide</td>
<td>Acute heart failure</td>
<td>40 mg IV repeated as necessary</td>
</tr>
</tbody>
</table>

11. **HIV**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indications</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenofovir</td>
<td>For prevention of parent to child transmission:</td>
<td>300 mg</td>
</tr>
<tr>
<td>Lamuvidine</td>
<td>Triple ARV treatment regimen for the mother</td>
<td>300 mg</td>
</tr>
<tr>
<td>Efavirenz</td>
<td>beginning in pregnancy and continued for life</td>
<td>600 mg</td>
</tr>
</tbody>
</table>
Chart C.1: Management of spontaneous abortion

Threatened abortion
- Avoid strenuous activity, no medical treatment required
  - <12-14 wks
    - MVA/D&E/Misoprostol f/b MVA
  - >12-14 wks
    - Spontaneous expulsion/oxytocin f/b expulsion

Inevitable abortion
- USG
  - RPOC <1.5cm
    - Expectant Management
  - RPOC >1.5cm
    - Pregnancy <14 wks MVA/Misoprostol

Incomplete abortion
- USG
  - Empty uterus, thin ET

Complete abortion
- Expectant Management
- Medical
- Surgical
  - Pregnancy <12-14 wks
    - Misoprostol MVA/D&E
  - Pregnancy >12-14 wks
    - Misoprostol f/b evacuation OR Oxytocin f/b evacuation

Missed abortion
- Empty G sac, No FCA in Fetal Pole

Abbreviations for management of Abortions:
- F/U: Follow Up
- MVA: Manual Vaccum Aspiration
- D&E: Dilatation and Evacuation
- USG: Ultrasound
- RPOC: Retained Products of Conception
- ET: Endometrial thickness
- FCA: Fetal Cardiac Activity
Chart C.2: Triage & rapid initial assessment (RIA) of serious obstetric patient

Sick obstetric patient
Do rapid initial assessment - Pulse, BP, Respiratory rate, Temperature, Bleeding per vaginum, check for consciousness

- Difficulty in breathing
  - No breathing
  - No pulse
  - Cyanosis
  - Pallor
  - Cough, wheezing
  - Take history, see for danger signs, manage according to diagnosis

- Shock
  - Check airway, prop up, give O2
  - Look for chest movement
  - Auscultate chest for crepts
  - Diagnose & treat

- Convulsion

- Severe vaginal bleeding
  - Pneumonia - cough with expectoration, rhonchi, chest pain, fever, consolidation - treat as per protocol

- High Fever
  - Heart disease may be in heart failure - edema over feet, hepatomegaly, basal crepts, ↑ JVP, irregular pulse, cyanosis

- Severe abdominal pain
  - Pulmonary embolism - sudden dyspnoea, chest pain, collapse
  - Asthma - cough with expectoration, rhonchi
  - Anaemia - Hb<7 gm/dl, flat nails, lethargy, CHF, evaluate for blood transfusion
  - Pulmonary edema - crepts, Frothing around mouth

- Dysuria & frequency
  - UTI
  - Malaria
  - Pelvic abscess
  - Breast infection
  - Chorio-amnionitis
  - Septic abortion
  - Pneumonia
  - DVT

- Ovarian cyst-torsion - tender mass in abdomen, signs of peritonitis
- Appendicitis - abdominal distension, nausea/vomiting, paralytic ileus, fever
- Cystitis/pyelonephritis - urinary symptoms, loin pain
- Ectopic pregnancy - Bleeding P/V, fainting
- Term/Preterm labour/rupture uterus
- Abruption placenta - High BP
Chart C.3: Sick obstetric patient in shock

Hypovolemic shock
- ↓BP, ↑pulse, cold limbs, ↓urine output

Cardiogenic shock
- ↓BP, ↑pulse, cold limbs, ↓urine output
- Ischemic heart disease
- Severe arrhythmia
- Valvular heart disease

Distributive shock
- ↓BP, warm limbs, ↓urine output
- Septic shock - give specific antibiotic
- Anaphylactic shock - adrenaline, cortisone

Obstructive shock
- ↓BP, ↑JVP
- Cardiac tamponade
- Pneumothorax

Vaginal bleeding during Pregnancy
- Check for gestational age/USG if available, NO PV examination in placenta praevia

Early Pregnancy bleeding
- Abortion
- Ectopic pregnancy
- Molar pregnancy

Late Pregnancy bleeding
- Placenta praevia
- Abruptio placentae
- Rupture uterus

Postpartum bleeding
- Check for retention of urine
- Check for uterine atony
- Check for vaginal & cervical tear
- Check for retained placenta/tissue
- Uterine inversion
- Check for coagulopathy

Abbreviations:
Do rapid initial assessment - Pulse, BP, Resp, Temp, Bleeding Per Vaginum, check for consciousness, Mobilize all personnel give oxygen & IV fluids
Chart C .4: Sick obstetric patient with convulsion
Do rapid initial assessment - Pulse, BP, RR, Temp, Bleeding Per Vagina, check for consciousness, period of gestation. Mobilize all personnel, Give oxygen & IV fluids.

- **Epilepsy**
  - Past h/o fits in non pregnant state, normal BP

- **Complicated Malaria**
  - Fever with rigours, headache, coma, anaemia, muscle & joint pains, jaundice

- **Eclampsia**
  - \( \uparrow \)BP > 140/90 after 20 wks gestation, Proteinuria, coma/semi conscious

- **Meningitis/encephalitis**
  - Headache, neck rigidity, fever, photophobia, confusion, drowsiness, coma

**Abbreviations:**
BP - Blood Pressure; RR - Respiratory rate; Temp - Temperature.
## Doses of Common Drugs for Neonates and Low-Birth-Weight Infants

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Form</th>
<th>Weight of infant in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1–&lt; 1.5</td>
</tr>
<tr>
<td><strong>Aminophylline</strong></td>
<td>Calculate the exact oral maintenance dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading dose:</td>
<td>250 mg/10 ml vial. Dilute loading dose</td>
<td>0.6 ml</td>
<td>0.8 ml</td>
</tr>
<tr>
<td>Oral or IV over 30 minutes</td>
<td>to 5 ml with sterile water, give slowly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mg/kg, then</td>
<td>over 15–30 min</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Aminophylline is not usually used for term infants.</em></td>
<td></td>
</tr>
</tbody>
</table>

<p>| Maintenance dose:          | First week of life: Oral: 2.5 mg/kg every 12 hours | 0.1–0.15 ml        | 0.15–0.20 ml | 0.20–0.25 ml |
|                            | Weeks 2–4 of life: Oral: 4 mg/kg every 12 hours   | 0.15–0.20 ml       | 0.25–0.30 ml | 0.30–0.40 ml |</p>
<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Form</th>
<th>Weight of infant in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1–&lt; 1.5</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>IM /IV: 50 mg/kg First week of life: every 12 hours</td>
<td>Vial of 250 mg mixed with 1.3 ml sterile water to 250 mg/1.5 ml</td>
<td>0.3–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.6 ml</td>
</tr>
<tr>
<td></td>
<td>Loading dose:</td>
<td></td>
<td>30 mg</td>
</tr>
<tr>
<td></td>
<td>Oral: 20 mg/kg (or IV over 30 min)</td>
<td></td>
<td>5–</td>
</tr>
<tr>
<td></td>
<td>Maintenance dose:</td>
<td></td>
<td>7.5 mg</td>
</tr>
<tr>
<td></td>
<td>5 mg/kg daily oral (or IV over 30 min)</td>
<td></td>
<td>20–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>IV: 50 mg/kg</td>
<td>Vial of 500 mg mixed with 2 ml sterile water to 250 mg/ml</td>
<td>0.3 ml</td>
</tr>
<tr>
<td></td>
<td>Premature infants: every 12 hours</td>
<td></td>
<td>0.3 ml</td>
</tr>
<tr>
<td></td>
<td>First week of life: every 8 hours</td>
<td></td>
<td>0.3 ml</td>
</tr>
<tr>
<td></td>
<td>Weeks 2–4 of life: every 6 hours</td>
<td></td>
<td>0.3 ml</td>
</tr>
<tr>
<td>Drug</td>
<td>Dosage</td>
<td>Form</td>
<td>Weight of infant in kg</td>
</tr>
<tr>
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<td>1–&lt; 1.5</td>
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<td>2–2.5</td>
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<td></td>
<td>2.5–&lt; 3</td>
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<td></td>
<td>3–3.5</td>
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<tr>
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<td></td>
<td>3.5–&lt; 4</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>4–&lt; 4.5</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>IV: 50 mg/kg every 12 hours</td>
<td>1-g vial mix with 9.6 ml sterile water</td>
<td>0.5–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to 1 g/10 ml</td>
<td>0.75–</td>
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<td></td>
<td></td>
<td>1–</td>
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<td>1.25–</td>
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<td>1.5–</td>
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<td>1.75–</td>
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<td></td>
<td>2–</td>
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<tr>
<td></td>
<td></td>
<td>IM /IV: 100 mg/kg every 12 hours</td>
<td>1–1.5 ml</td>
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<tr>
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<td></td>
<td>1.5–2 ml</td>
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<td>2–2.5 ml</td>
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<td>2.5–3 ml</td>
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<td>3–3.5 ml</td>
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<td></td>
<td>3.5–4 ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>4–4.5 ml</td>
</tr>
<tr>
<td></td>
<td>For pus draining from eye</td>
<td>50 mg/kg once IM</td>
<td>1–1.5 ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.5–2 ml</td>
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<td>2–2.5 ml</td>
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<td>3–3.5 ml</td>
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<td></td>
<td>3.5–4 ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4–4.5 ml</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>25–50 mg/kg per dose</td>
<td>25-mg vial mixed with 1.3 ml sterile</td>
<td>25 mg/kg: 0.3–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>water to 250 mg/1.5 ml</td>
<td>0.5 ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0.6 ml</td>
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<td></td>
<td></td>
<td></td>
<td>0.75 ml</td>
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<td></td>
<td></td>
<td></td>
<td>1.0 ml</td>
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<td></td>
<td></td>
<td></td>
<td>1.25 ml</td>
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<td></td>
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<td>1.5 ml</td>
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<td>2–</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2.5–</td>
</tr>
<tr>
<td></td>
<td>First week of life: every 12 hours</td>
<td>50 mg/kg:</td>
<td>0.3–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.6–</td>
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<td>0.9–</td>
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<td>1.5–</td>
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<td></td>
<td></td>
<td></td>
<td>2–</td>
</tr>
<tr>
<td></td>
<td>Weeks 2–4 of life: every 8 hours</td>
<td>50 mg/kg:</td>
<td>0.3–</td>
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<td></td>
<td></td>
<td></td>
<td>0.6–</td>
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<td>0.9–</td>
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<td>1.5–</td>
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<td>2–</td>
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<td></td>
<td></td>
<td></td>
<td>2.5–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3–</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Preferably calculate exact</td>
<td>Vial 20 mg/2 ml</td>
<td>0.3–</td>
</tr>
<tr>
<td></td>
<td>dose based on the infant’s</td>
<td></td>
<td>0.5–</td>
</tr>
<tr>
<td></td>
<td>weight</td>
<td>Vial 80 mg/2 ml</td>
<td>0.6–</td>
</tr>
<tr>
<td></td>
<td>First week of life: Vial 20mg</td>
<td></td>
<td>1.25–</td>
</tr>
<tr>
<td></td>
<td>2 ml</td>
<td></td>
<td>1.5–</td>
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<tr>
<td></td>
<td>Low-birth-weight Vial 80mg</td>
<td></td>
<td>1.75–</td>
</tr>
<tr>
<td></td>
<td>2 ml</td>
<td></td>
<td>2 ml</td>
</tr>
<tr>
<td></td>
<td>2 ml</td>
<td></td>
<td>2.25 ml</td>
</tr>
<tr>
<td>Drug</td>
<td>Dosage</td>
<td>Form</td>
<td>Weight of infant in kg</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------</td>
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<td></td>
<td>0.75–</td>
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<td></td>
<td></td>
<td></td>
<td>1.1 ml</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>To use a vial of 80 mg/2 ml, dilute to 8 ml with sterile water to 10 mg/ml, then use exactly the same dose as in the table above.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kanamycin</strong></td>
<td>IM /IV: 20 mg/kg (one dose for pus draining from eyes)</td>
<td>2-ml vial to make 125 mg/ml</td>
<td>0.2–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.3 ml</td>
</tr>
<tr>
<td><strong>Naloxone</strong></td>
<td>0.1 mg/kg</td>
<td>Vial 0.4 mg/ml</td>
<td>0.25 m</td>
</tr>
<tr>
<td><strong>Benzylpenicillin</strong></td>
<td>50 000 U/kg per dose (1 000 000 U)</td>
<td>Vial of 600 mg</td>
<td>0.2 ml</td>
</tr>
<tr>
<td>Drug</td>
<td>Dosage</td>
<td>Form</td>
<td>Weight of infant in kg</td>
</tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1–&lt; 1.5    1.5–&lt; 2  2–2.5  2.5–&lt; 3  3–3.5  3.5–&lt; 4  4–&lt; 4.5</td>
</tr>
<tr>
<td>First week of life:</td>
<td>every 12 hours</td>
<td>dilute with 1.6 ml sterile water</td>
<td>0.2 ml  0.3 ml  0.4 ml  0.5 ml  0.6 ml  0.7 ml  0.8 ml</td>
</tr>
<tr>
<td>Weeks 2–4 and older:</td>
<td>every 6 hours</td>
<td>to 500 000 U/ml</td>
<td>0.1 ml  0.15 ml  0.2 ml  0.25 ml  0.3 ml  0.3 ml  0.35 ml</td>
</tr>
<tr>
<td>Benzathine benzylpenicillin</td>
<td>50 000 U/kg once a day</td>
<td>IM : vial of 1 200 000 U mixed with 4 ml sterile water</td>
<td>Calculate the exact dose</td>
</tr>
<tr>
<td>Procaine benzylpenicillin</td>
<td>IM : 50 000 U/kg once a day</td>
<td>3-g vial (3 000 000 U) mixed with 4 ml sterile water</td>
<td>0.1 ml  0.15 ml  0.2 ml  0.25 ml  0.3 ml  0.3 ml  0.35 ml</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>Loading dose:</td>
<td>Vial 200 mg/ml diluted with</td>
<td>Calculate the exact dose</td>
</tr>
<tr>
<td>Drug</td>
<td>Dosage</td>
<td>Form</td>
<td>Weight of infant in kg</td>
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<td></td>
<td>1–&lt; 1.5</td>
</tr>
<tr>
<td>20 mg/kg</td>
<td>4 ml sterile water</td>
<td>½</td>
<td>¾</td>
</tr>
<tr>
<td>Maintenance dose: Oral: 5 mg/kg per day</td>
<td>30-mg tablets</td>
<td>¼</td>
<td>¼</td>
</tr>
<tr>
<td>30-mg tablets</td>
<td></td>
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<td>½</td>
</tr>
</tbody>
</table>
Notes
Notes
### Summary List of WHO Recommendations for Prevention and Treatment of Maternal Peripartum Infections

<table>
<thead>
<tr>
<th>Context</th>
<th>Recommendation</th>
<th>Strength of recommendation and quality of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevention of peripartum infections</strong></td>
<td>1. Routine perineal/pubic shaving prior to giving vaginal birth is not recommended.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
</tr>
<tr>
<td></td>
<td>2. Digital vaginal examination at intervals of 4 hours is recommended for routine assessment of active first stage of labour in low-risk women.</td>
<td>Strong recommendation based on very low-quality evidence</td>
</tr>
<tr>
<td></td>
<td>3. Routine vaginal cleansing with chlorhexidine during labour for the purpose of preventing infectious morbidities is not recommended.</td>
<td>Strong recommendation based on moderate-quality evidence</td>
</tr>
<tr>
<td></td>
<td>4. Routine vaginal cleansing with chlorhexidine during labour in women with group B Streptococcus (GBS) colonization is not recommended for prevention of early neonatal GBS infection.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
</tr>
<tr>
<td>Context</td>
<td>Recommendation</td>
<td>Strength of recommendation and quality of evidence</td>
</tr>
<tr>
<td>---------</td>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>5. Intrapartum antibiotic administration to women with group B Streptococcus (GBS) colonization is recommended for prevention of early neonatal GBS infection.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
<td></td>
</tr>
<tr>
<td>6. Routine antibiotic prophylaxis during the second or third trimester for all women with the aim of reducing infectious morbidity is not recommended.</td>
<td>Strong recommendation based on very low-quality evidence</td>
<td></td>
</tr>
<tr>
<td>7. Routine antibiotic administration is not recommended for women in preterm labour with intact amniotic membranes.</td>
<td>Strong recommendation based on moderate-quality evidence</td>
<td></td>
</tr>
<tr>
<td>8. Antibiotic administration is recommended for women with preterm prelabour rupture of membranes.</td>
<td>Strong recommendation based on moderate-quality evidence</td>
<td></td>
</tr>
<tr>
<td>9. Routine antibiotic administration is not recommended for women with prelabour rupture of membranes at (or near) term.</td>
<td>Strong recommendation based on low-quality evidence</td>
<td></td>
</tr>
<tr>
<td>Prevention of peripartum infections (continued)</td>
<td>10. Routine antibiotic administration is not recommended for women with meconium-stained amniotic fluid.</td>
<td>Conditional recommendation based on low-quality evidence</td>
</tr>
<tr>
<td>11. Routine antibiotic prophylaxis is recommended for women on undergoing manual removal of the placenta.</td>
<td>Strong recommendation based on very low-quality evidence</td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>Recommendation</td>
<td>Strength of recommendation and quality of evidence</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<td>---------------------------------------------------</td>
</tr>
<tr>
<td>12. Routine antibiotic prophylaxis is not recommended for women</td>
<td>Routine antibiotic prophylaxis is not recommended for women undergoing operative vaginal birth.</td>
<td><strong>Conditional recommendation</strong> based on very low-quality evidence</td>
</tr>
<tr>
<td>undergoing operative vaginal birth.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Routine antibiotic prophylaxis is recommended for women with a</td>
<td>Routine antibiotic prophylaxis is recommended for women with a third- or fourth-degree perineal tear.</td>
<td><strong>Strong recommendation</strong> based on very low-quality evidence</td>
</tr>
<tr>
<td>third- or fourth-degree perineal tear.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Routine antibiotic prophylaxis is not recommended for women</td>
<td>Routine antibiotic prophylaxis is not recommended for women with episiotomy.</td>
<td><strong>Strong recommendation</strong> based on consensus view</td>
</tr>
<tr>
<td>with episiotomy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Routine antibiotic prophylaxis is not recommended for women</td>
<td>Routine antibiotic prophylaxis is not recommended for women with uncomplicated vaginal birth.</td>
<td><strong>Strong recommendation</strong> based on very low-quality evidence</td>
</tr>
<tr>
<td>with uncomplicated vaginal birth.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Vaginal cleansing with povidone-iodine immediately before</td>
<td>Vaginal cleansing with povidone-iodine immediately before caesarean section is recommended.</td>
<td><strong>Conditional recommendation</strong> based on moderate-quality evidence</td>
</tr>
<tr>
<td>caesarean section is recommended.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. The choice of an antiseptic agent and its method of application</td>
<td>The choice of an antiseptic agent and its method of application for skin preparation prior to caesarean section should be based primarily on the clinician’s experience with that particular antiseptic agent and method of application, its cost and local availability.</td>
<td><strong>Conditional recommendation</strong> based on low-quality evidence</td>
</tr>
<tr>
<td>for skin preparation prior to caesarean section should be based</td>
<td></td>
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</tr>
<tr>
<td>primarily on the clinician’s experience with that particular antiseptic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>agent and method of application, its cost and local availability.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>Recommendation</td>
<td>Strength of recommendation and quality of evidence</td>
</tr>
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</tr>
<tr>
<td></td>
<td><strong>18.0</strong> Routine antibiotic prophylaxis is recommended for women on undergoing elective or emergency caesarean section.</td>
<td>Strong recommendation based on moderate-quality evidence</td>
</tr>
<tr>
<td></td>
<td><strong>18.1</strong> For caesarean section, prophylactic antibiotics should be given on prior to skin incision, rather than intraoperatively after umbilical cord clamping.</td>
<td>Strong recommendation based on moderate-quality evidence</td>
</tr>
<tr>
<td></td>
<td><strong>18.2</strong> For antibiotic prophylaxis for caesarean section, a single dose of first-generation cephalosporin or penicillin should be used in preference to other classes of antibiotics.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
</tr>
<tr>
<td>Treatment of peripartum infections</td>
<td><strong>19.</strong> A simple regimen such as ampicillin and once-daily gentamicin is recommended as first-line antibiotics for the treatment of chorioamnionitis.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
</tr>
<tr>
<td></td>
<td><strong>20.</strong> A combination of clindamycin and gentamicin is recommended as first-line antibiotics for the treatment of postpartum endometritis.</td>
<td>Conditional recommendation based on very low-quality evidence</td>
</tr>
</tbody>
</table>
Notes
Standards of Care and Quality Statements

Standard 1: Every woman and newborn receives routine, evidence-based care and management of complications during labour, childbirth and the early postnatal period, according to WHO guidelines.

Quality statements

1.1a: Women are assessed routinely on admission and during labour and childbirth and are given timely, appropriate care.

1.1b: Newborns receive routine care immediately after birth.

1.1c: Mothers and newborns receive routine postnatal care.

1.2: Women with pre-eclampsia or eclampsia promptly receive appropriate interventions, according to WHO guidelines.

1.3: Women with postpartum haemorrhage promptly receive appropriate interventions, according to WHO guidelines.

1.4: Women with delay in labour or whose labour is obstructed receive appropriate interventions, according to WHO guidelines.

1.5: Newborns who are not breathing spontaneously receive appropriate stimulation and resuscitation with a bag-and-mask within 1 min of birth, according to WHO guidelines.

1.6a: Women in preterm labour receive appropriate interventions for both themselves and their babies, according to WHO guidelines.

1.6b: Preterm and small babies receive appropriate care, according to WHO guidelines.
1.7a: Women with or at risk for infection during labour, childbirth or the early postnatal period promptly receive appropriate interventions, according to WHO guidelines.

1.7b: Newborns with suspected infection or risk factors for infection are promptly given antibiotic treatment, according to WHO guidelines.

1.8: All women and newborns receive care according to standard precautions for preventing hospital-acquired infections.

1.9: No woman or newborn is subjected to unnecessary or harmful practices during labour, childbirth and the early postnatal period.

**Standard 2: The health information system enables use of data to ensure early, appropriate action to improve the care of every woman and newborn.**

**Quality statements**

2.1: Every woman and newborn has a complete, accurate, standardized medical record during labour, childbirth and the early postnatal period.

2.2: Every health facility has a mechanism for data collection, analysis and feedback as part of its activities for monitoring and improving performance around the time of childbirth. Standard 3: Every woman and newborn with condition(s) that cannot be dealt with effectively with the available resources is appropriately referred. Quality statements

**Standard 3: Every woman and newborn with condition(s) that cannot be dealt with effectively with the available resources is appropriately referred.**

**Quality statements**

3.1: Every woman and newborn is appropriately assessed on admission, during labour and in the early postnatal period to determine whether referral is required, and the decision to refer is made without delay.
### Standard 4: Communication with women and their families is effective and responds to their needs and preferences.

**Quality statements**

- **4.1:** All women and their families receive information about the care and have effective interactions with staff.
- **4.2:** All women and their families experience coordinated care, with clear, accurate information exchange between relevant health and social care professionals.

### Standard 5: Women and newborns receive care with respect and preservation of their dignity.

**Quality statements**

- **5.1:** All women and newborns have privacy around the time of labour and childbirth, and their confidentiality is respected.
- **5.2:** No woman or newborn is subjected to mistreatment, such as physical, sexual or verbal abuse, discrimination, neglect, detainment, extortion or denial of services.
- **5.3:** All women have informed choices in the services they receive, and the reasons for interventions or outcomes are clearly explained.

### Standard 6: Every woman and her family are provided with emotional support that is sensitive to their needs and strengthens the woman's capability.

**Quality statements**

- **6.1:** Every woman is offered the option to experience labour and childbirth with the companion of her choice.
6.2: Every woman receives support to strengthens her capability during childbirth.

Standard 7: For every woman and newborn, competent, motivated staff are consistently available to provide routine care and manage complications.

Quality statements

7.1: Every woman and child has access at all times to at least one skilled birth attendant and support staff for routine care and management of complications.

7.2: The skilled birth attendants and support staff have appropriate competence and skills mix to meet the requirements of labour, childbirth and the early postnatal period.

7.3: Every health facility has managerial and clinical leadership that is collectively responsible for developing and implementing appropriate policies and fosters an environment that supports facility staff in continuous quality improvement.

Standard 8: The health facility has an appropriate physical environment, with adequate water, sanitation and energy supplies, medicines, supplies and equipment for routine maternal and newborn care and management of complications.

Quality statements

8.1: Water, energy, sanitation, hand hygiene and waste disposal facilities are functional, reliable, safe and sufficient to meet the needs of staff, women and their families.

8.2: Areas for labour, childbirth and postnatal care are designed, organized and maintained so that every woman and newborn can be cared for according to their needs in private, to facilitate the continuity of care.

8.3: An adequate stock of medicines, supplies and equipment is available for routine care and management of complications.