

Report on the

**Regional consultation on establishing guidelines
for the management and care of acute coronary
syndromes**

Cairo, Egypt
27–29 March 2007



**World Health
Organization**

Regional Office for the Eastern Mediterranean

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1. INTRODUCTION

The World Health Organization (WHO) Regional Office for the Eastern Mediterranean (EMRO) held a regional consultation on establishing guidelines for the management and care of acute coronary syndromes in Cairo, Egypt, from 27 to 29 March 2007. The objectives of the meeting were to:

- review the progress made in the management and care of acute coronary syndromes in countries of the Region; and
- set regional strategies for the management and care of acute coronary syndromes.

In his opening address, Dr Hussein A Gezairy, WHO Regional Director for the Eastern Mediterranean, emphasized the escalating prevalence of cardiovascular diseases, including coronary artery disease, stroke, peripheral vascular disease and hypertension in the Eastern Mediterranean Region. He pointed out that cardiovascular diseases now accounted for approximately a third of all deaths in the Region. This was attributed to the ageing of the population, the high rates of smoking and the adoption of unhealthy lifestyles. Noting that risk factors of today were the diseases of tomorrow, the prevention of those risks were the key to halt the growing epidemic of cardiovascular diseases. Successful prevention measures should include active community mobilization, supportive policy discussion and integration of coronary risk factors control in primary health care services.

Dr Gezairy concluded by explaining that the aim of the consultation was to develop a regional strategy and simple, flexible, updatable and cost-conscious guidelines for the prevention, treatment and care of acute coronary syndromes. He stressed the importance of developing skills to apply non-pharmacological approaches to the prevention of vascular disorders and building communication skills and trust between clinicians and patients and their families.

The Chairmanship was shared on a rotating basis. The programme and list of participants are included as Annexes 1 and 2, respectively.

2. TECHNICAL PRESENTATIONS

2.1 Acute coronary syndromes: a prologue

Professor Mohamed S El-Guindy, WHO Temporary Adviser

The basic pathology of acute coronary syndrome is rupture of the atherosclerotic plaque. Platelets form a plug, activate coagulation and promote inflammation. Distal embolization of platelet thrombi results in micro infarcts that elevate serum troponin which is a marker of myocyte injury and subsequently necrosis. At initial presentation ST elevation acute coronary syndrome is managed by urgent reperfusion, but patients with non-ST elevation acute coronary syndrome should be subjected to risk stratification which has to continue during hospitalization if coronary anatomy is not clarified by angiography. Clopidogrel adds to the therapeutic effect of aspirin irrespective of the presence of high-risk features. By contrast, GP IIb/IIIa inhibitors, low molecular weight heparin and

revascularization are more beneficial in high-risk non-ST elevation acute coronary syndrome. A conceptual model of acute coronary syndrome is built on the combination of endothelial dysfunction, platelet activation, inflammation and genetic susceptibility. Markers of the relative contribution of each of these components may prove helpful in individualizing therapy (smart therapy). Our limited therapeutic armament of today will be promoted by further research in plaque phenotyping, angiogenesis, cytoprotection and gene therapy.

2.2 Acute coronary syndromes: regional overview

Dr Oussama Khatib, RA/NCD

Cardiovascular disease is a major cause of death and disability worldwide. Its prevalence has increased significantly in the last two decades in low- and middle-income countries. The world now suffers from a global pandemic of chronic diseases, such as coronary artery disease, stroke, hypertension, dyslipidemia and diabetes, along with their co-morbid risk factors such as tobacco consumption, obesity and sedentary living. It is estimated that by 2020 the number of people who die from ischemic heart disease will increase by approximately 50% in countries with established market economies and in the Russian Federation and by over 100% in low- and middle-income countries. Similar increases will also be found in cerebrovascular disease by 2020. The Eastern Mediterranean Region is a classic example of countries in the midst of an epidemiological transition, with an increasing rate of obesity accompanied by a growing prevalence of hypertension and diabetes. The Region also has high rates of smoking and elevated rates of consanguineous marriage, which is associated with a high risk for genetic disorders.

In the Eastern Mediterranean Region, chronic diseases (cancer, diabetes, etc.) account for 52% of all deaths. Deaths from chronic diseases are projected to increase by 25% in the next 10 years. Cardiovascular diseases and stroke are major causes of illness. They account for the highest morbidity burden among all other noncommunicable diseases, at 31%, to hypertension at 26%. This is due to: ageing populations, high incidence of hyperlipidaemia, hypertension, smoking and changes in nutritional and behavioural habits along with sedentary lifestyles. In the Region, four chronic diseases (cardiovascular, diabetes, cancer and pulmonary diseases) are responsible for 50% of deaths and are caused by four risk factors: overweight–obesity, physical inactivity, dyslipidaemia and smoking.

Up to 80% of cases of coronary heart disease, 90% of type 2 diabetes, and one third of cancers could be avoided by changing to a healthier diet, increasing physical activity and stopping smoking. The scientific evidence is strong that a change in dietary habits and physical activity can powerfully influence several of these risk factors among populations. In the Region, the majority of individuals who develop heart attacks and stroke every year have three or more cardiovascular risk factors such as diabetes, high blood pressure, smoking, high blood lipids, overweight–obesity or physical inactivity.

It is necessary to support health education by ensuring that populations have equitable access to health promotion and prevention. This necessitates: avoidance of tobacco consumption; adequate physical activity (at least 30 minutes per day); healthy food choices; avoiding overweight and obesity; blood pressure (below 130/90); blood cholesterol (below 5

mmol/L; and tight glycaemic control. Also, it is important to use the above-mentioned factors (tobacco, blood pressure, etc.) as indicators of successful national programmes aimed at improving prevention and care of cardiovascular diseases.

The WHO programme on cardiovascular diseases is concerned with the prevention, management and monitoring of cardiovascular diseases globally. It aims to develop global strategies to reduce the incidence, morbidity and mortality of cardiovascular diseases by: effectively reducing cardiovascular diseases risk factors and their determinants; developing cost-effective and equitable health care innovations for the management of cardiovascular diseases; and monitoring trends of cardiovascular disease and their risk factors.

Key areas of work include:

- reducing major cardiovascular diseases risk factors and their social and economic determinants through community-based programmes for integrated prevention of noncommunicable diseases;
- developing standards of care and cost-effective case management of cardiovascular diseases;
- undertaking global action to enhance the capacity of countries to meet the health care needs of cardiovascular diseases;
- developing feasible surveillance methods to assess the pattern and trends of major cardiovascular diseases and risk factors and monitoring prevention and control initiatives;
- developing effective intercountry, interregional and global networks and partnerships for concerted global action.

One of the strategies to respond to the challenges to population health and well-being by the global epidemic of heart attacks and stroke is to provide actionable information relevant to policy level, populations and individuals at risk. Acute coronary syndromes include a broad spectrum of clinical presentations. They represent one of the most common causes of acute medical admissions in the Region. An estimated 1.6 million Americans suffer from an acute coronary syndrome each year and it is estimated that less than half of these patients receive optimal treatment because of the complexity of monitoring and implementing multi-drug and lifestyle treatments. It is important to establish an initial working diagnosis for management and care to provide clinical decision-making for acute coronary syndrome.

Prompt and early diagnosis among professionals is vital. Optimal patient outcomes depend on rapid diagnosis, accurate risk stratification and the effective implementation of proven therapies, as advocated by clinical guidelines. The challenge is in effectively applying evidence in clinical practice. Also, ensure that definitive care of patients with acute coronary syndromes is carried out by cardiologists that are well trained.

In the Eastern Mediterranean Region, it is important to develop disease registries, particularly for acute coronary syndromes with reliable statistics on mortality, morbidity and risk-factor levels. Observational registries are key to understanding the link between evidence-based medicine, clinical practice and patient outcomes.

A comprehensive management plan has to be simple. It has been noted that hospital deaths among patients with acute coronary syndrome do in fact decrease when care is based on national clinical practice guidelines. As adherence to the guidelines increases, mortality usually decreases. Defining and implementing 'best practice' in care for patients presenting with acute coronary syndrome is one of the major challenges facing emergency and cardiology services throughout the world and particularly in the Eastern Region. It is important to develop a framework for a regional guideline which will translate evidence into 'best practice', taking into consideration resources, availability, affordability and accessibility of health services. The suggested regional guideline must be based on the results of recent clinical trials, and include risk-factor reduction, lifestyle changes and medicines.

All patients should have access, and be actively referred, to comprehensive ongoing prevention and cardiac rehabilitation services. All patients should be provided with a written action plan for chest pain, and as may be expected, hospitals with the highest overall adherence scores had higher than average scores on all acute, discharge and lifestyle prevention measures.

2.3 Nuclear cardiac imaging in acute coronary syndromes

Mokhtar Gomaa, Temporary Adviser, WHO

In the United States of America 8 million patients present with chest pain to emergency departments annually. There is the same prevalence of cardiovascular disease in the Region, with approximately 16 million patients suffering chest pain annually. Chest pain is a symptom of a large spectrum of conditions that vary in gravity from no danger at all e.g. panic syndrome to a deadly aortic dissection or extensive cardiac infarction, so proper verification of the aetiology of chest pain is necessary to save lives without wasting resources.

Two out of three criteria of cardiac ischemic syndromes are enough to make the diagnosis of acute coronary syndrome as mentioned by all the guidelines: chest pain; ECG changes; enzyme changes. However, it is known that classical chest pain may not be associated with cardiac problems, atypical chest pain may be associated with serious cardiac problems and serious cardiac problems may not be associated with chest pain at all.

Patients presenting to emergency departments with suspicion of acute coronary syndrome are categorized into three groups:

- Group 1: patients presenting to the hospital with definite criteria of acute coronary syndrome, those should be rushed to coronary care units.
- Group 2: patients with moderate likelihood of acute coronary syndrome, they should be kept in hospital, either in chest pain clinic (if available), in intermediate coronary care unit or cardiac ward for further follow-up.
- Group 3: patients with low likelihood of acute coronary syndrome should be sent home, to be reviewed in a cardiac outpatient department.

2.4 Acute coronary syndromes in the emergency department

Professor Samir Alam: Temporary Adviser/WHO

The clinical encounter of acute chest pain in the emergency room represents a serious diagnostic challenge because it portends important and serious clinical conditions, such as acute coronary syndrome and aortic dissection. Timely diagnosis, however, provides an important opportunity for effective and life-saving intervention.

Acute coronary syndrome encompasses a spectrum of clinical conditions which convey a major challenge of modern acute care medicine being the expression of acute transformation of silent atherosclerotic disease and a significant cause of mortality and morbidity in the short and intermediate term. Unfortunately, serious limitations of diagnostic algorithms impede the detection of many patients at risk. Hence, good clinical judgment aided by a careful mix of diverse diagnostic modalities, including echocardiographic, radiologic, electrocardiographic criteria, in addition to biochemical markers should constitute the strategy of early detection and appropriate target-directed therapy. Acute coronary syndromes are the consequences of plaque rupture, exposure of platelets to collagen and tissue factor and consequent platelet mediated thrombosis, flow reduction, and possible immobilization downstream in the microcirculation. Cell mediated inflammation and a cascade of cytokine-activated molecular mechanisms play a critical role in the initiation and perpetuation of plaque destabilization and thrombosis. The fate and fragmentation of the overlying thrombus determines the clinical ischemic syndrome of unstable angina, non-ST elevation myocardial infarction or ST-elevation myocardial infarction. Understanding the dynamic nature of the syndrome is the key to diagnosis and management. Inflammatory markers (CRP), thrombosis markers (troponin), ischemic markers (BNP), and EKG changes (both fixed and dynamic) define the components of multiple markers strategy of risk stratification of acute coronary syndrome, and hence, of triage and management.

This process must start early in the emergency department and should continue until a definitive diagnosis is made. Deploying invasive methods should be considered when non-invasive strategy fails to elucidate the nature of the problem. Important therapeutic implications can be effectively based on the TIMI risk score which is constructed on seven elements: age ≥ 65 years; ≥ 3 CAD risk factors; prior CAD (stenosis $>50\%$); aspirin in last 7 days; >2 anginal events in ≤ 24 hours; ST-deviation; elevated cardiac markers; (CK-MB or troponin).

2.5 Continuous risk stratification in acute coronary syndrome

Sania Nishtar: WHO Temporary Adviser

The development of guidelines for the management and care of acute coronary syndromes in developing countries should be population specific and evidence-based with the participation of stakeholders. Acute coronary syndrome is a dynamic state with frequent shift of patients' presentations over time. Algorithms have been developed to aid in determining the risk of these patients at admission, during hospitalization and post-discharge. The development of high-risk features at any stage mandates radical alteration in therapeutic strategy.

Initial assessment relies on focused history and physical examination, an electrocardiogram and biological markers, mainly troponins. Other markers, including those of inflammation thrombolysis ischemia and vascular dysfunction are useful as the disorder evolves, but some of these markers are not yet adequately evaluated in clinical trials. Patients without high-risk features may be evaluated with stress testing. Non-invasive high-risk features are indicators of therapeutic shift as well as short- and long-term prognosis. Important initial risk tools are the TIMI risk score and the GRACE score. Early invasive strategy is recommended for patients with recurrent ischemia, elevated troponin level, significant ECG changes and haemodynamic or electrical instability.

2.6 Biochemical markers as guide to therapy of acute coronary syndromes

Wafaa Elaroussy, Temporary Adviser, WHO

Biochemical markers are pivotal to the therapy and prognostic evaluation of patients presenting with acute coronary syndromes. Biomarkers can reflect the pathophysiological sequence of events of acute coronary syndrome. They can be classified according to which phase they reflect into: inflammation and acute phase reactants; plaque rupture and endothelial cell activation; thrombosis; and necrosis. An ideal marker should be cardio-specific, early detected, when the damage is still reversible and definitely should be easily obtained, standardized and inexpensive.

The most commonly-used biomarkers of inflammation cytokines; interleukin-6, although it showed benefit from early intervention in non-ST elevation MI, its use is limited to the wide intra-individual variability, and further need for validation. The secondly most commonly-used markers are the cardiac enzymes CK, and CK MB fraction as they appear early and can detect reinfarction. The implementation of cardiac troponin has changed the criteria of the diagnosis of acute coronary syndrome according the latest guidelines of the European Society of Cardiology (ESC) and the American Heart Association (AHA), which included cardiac troponin (c Tn) as a diagnostic criteria of myocardial infarction. Studies revealed its importance in risk stratifying patients and as a prognostic factor for major cardiac events post-MI.

The acute phase reactant hs-CRP showing its importance as a marker of inflammation and predictor of higher mortality is still not commonly approved. Yet the combination of these three biomarkers: c Tn, CK MB and hs-CRP correlated with the 30-day mortality post-MI. The use of BNP and NT-Pro BNP has emerged as a biomarker to demonstrate the haemodynamic burden of the myocardium. It showed important prognostic value for the future.

Biomarkers have an impact on the management of acute coronary syndrome, if the pathophysiology of acute coronary syndrome is looked at. For patients who have an inflammatory profile, treatment should be targeted for very aggressive anti-inflammatory therapies. For patients who have a profile that might suggest that haemodynamic stress and neurohormonal activation, their treatment should be targeted for very aggressive antagonism of those pathways with beta blockade and ACE inhibition, and patients who have evidence of

coronary thrombus, their management should be targeted for aggressive anti-thrombotic therapies.

To conclude, the clinical application of cardiac biomarkers in acute coronary syndrome is no longer limited to establishing or refuting the diagnosis of myocardial necrosis. Care should be taken that they may be false positive. They have to be considered in conjunction with good history and dynamic ECG changes. Cardiac biomarkers provide a convenient and non-invasive means to gain insight into prognosis. They improve substantially clinical decision-making and outcomes in patients with acute coronary syndrome.

2.7 Anticoagulant therapy in acute coronary syndromes

Hadi Goubran, Temporary Adviser

Low molecular weight heparin (LMWH) should now be considered the standard anticoagulant for patients with acute coronary syndrome. Its use ensures less risk of bleeding and allows earlier hospital discharge. One limitation of LMWH is variability in product efficacy. This leads to the research for new molecules that target new and key sites in the coagulation cascade. New anticoagulants targeting the TF/VIIa include true factor pathway inhibitors, TF antibodies and nematode anticoagulant protein.

Factor IXa inhibitor can be achieved by IXa antibodies. Fuller Xa inhibition can be achieved by protein C antibodies, thrombomodulin and pentasaccharides. Direct thrombin inhibitors include hirudin, bivalirudin, argatroban, napsagatran and inogatran. Hirudins have a predictable and reproducible anticoagulant response and are not neutralized by platelet factor 4. The recently published ACUITY trial (2007) revealed that anticoagulant with bivalirudin alone suppresses adverse ischemic events to a similar extent as does heparin plus glycoprotein IIb/IIIa inhibitors while significantly lowering the risk of major haemorrhagic complications.

2.8 Role of cardiac surgery in the treatment of acute coronary syndromes

Zuhair Alhalees, M.D., Temporary Adviser/WH

There are two treatment strategies for patients presenting with acute coronary syndromes: early conservative and early invasive. Our preference is for early coronary angiography-guided revascularization unless there is a specific contradiction. Revascularization should be complete as there is evidence in literature in favour of that, rather than culprit lesion treatment alone. There are two issues that are no longer debatable: patients want less invasive therapy; and percutaneous coronary interventions (PCI) can be a very effective treatment if used appropriately.

PCI for single and double vessel coronary artery disease is a reasonable option provided limitations and the risks of PCI are explained to the patient. Nevertheless, PCI is not as effective as CABG in the real world. Numerous studies in literature testify to the superior efficacy of CABG over PCI with respect to survival and reduced re-intervention. There is similar evidence of the superior results of CABG in diabetic patients. Drug-eluting stents produce significant reduction in angiographic restenosis in low risk coronary lesions (9% versus 29%), however, there was no decrease in mortality (2.7% versus 2.9%) at 1 year.

Several studies have reported that even a year after DES implantation, patients who stop dual antiplatelet medication are at risk of myocardial infarction which is associated with very high mortality.

Coronary artery bypass grafting is still the best treatment for multivessel and left main disease. The cardiologists are the gatekeepers and this may produce a conflict of interest in terms of self-referral. It is likely that most patients undergoing coronary angiography are not told the entire story when a decision is made for PCI. Without surgical opinion, the patient is in no position to have rational input into the decision. Patients with multivessel diseases should be treated by a multidisciplinary team.

2.9 Transferring clinical needs into viable inventions: what makes an innovation succeed?

Professor Mohamed El Guindy, Temporary Adviser

Acute coronary syndromes are a fertile area for innovation, and the attributes of a successful innovation include:

- a common approach to innovation involves objective definitions, need finding, need verification, concept creation, concept evaluation and concept development;
- identifying an important clinical need is a crucial step in medical innovation;
- innovation starts with brainstorming that involves free thinking. Ideas can be grouped and analysed according to well-defined metrics and then winners identified;
- training in innovation relies mainly on identifying patients' needs. Formal education in engineering, accounting and marketing is of marginal importance;
- the role of regulatory agencies in controlling medical innovation and biotechnology is discussed with clarification of the differences between the policy of the regulatory bodies of the Food and Drug Administration (FDA) and the European Union (EU).

Discussions

The discussion emphasized the importance of time in the initial treatment of acute coronary syndromes. The time limits indicated in many guidelines is related to the very dynamic pathological changes underlying the disorders. They remain a target for early therapeutic measures. This may necessitate radical changes in ambulatory and emergency department services in many areas of the Eastern Mediterranean Region.

Initial medical treatment of acute coronary syndromes includes aspirin, heparin, clopidogrel and a beta-blocker. A platelet GP IIb/IIIa inhibitor is added for those with continuing angina at rest or those with known suspected complex coronary artery and in a diabetic patient undergoing PCI.

Angiotensin-converting enzyme (ACE) inhibitors and beta-blockers are added to the acute and chronic medical management regimen where there are no contraindications. Whereas patients with ST-segment elevation ACS should receive immediate reperfusion therapy if they are eligible for it, those with non-ST segment elevation should undergo further

observation and continuous risk stratification with the aim of directing the various subgroups to interventional or long-term non-invasive therapy.

Patients with recurrent ischaemia, haemodynamic or electrical instability, elevation of multiple serum biomarkers or high TIMI score should be referred to coronary angiography with a view to revascularization by PCI or coronary bypass surgery.

2.10 Basic differences between the treatment of stable angina and acute coronary syndrome

Professor S. Alam

Stable angina can be a background for the development of acute coronary syndrome. Therapy of stable angina is directed at reducing the heart rate, blood pressure and contractile response to exercise and stress. Medication and interventions that increase coronary blood flow and oxygen delivery may also be useful. Exogenously administered nitrates increase oxygen delivery to the subendocardial region supplied by a severely narrowed coronary artery.

Selected beta-blockers reduce mortality and the risk of repeated hospitalization in patients with poor myocardial infarction, heart failure and hypertension. Angiotensin-converting enzyme (ACE) inhibitors may improve endothelial functions in patients with stable coronary heart disease.

The risk of myocardial infarction in patients with coronary heart disease is reduced with aspirin. Clopidogrel in combination with aspirin may be beneficial to patients with established coronary disease. To date, oral IIb/IIIa angiotensins have no protective effect and may show possible harm. The cyclooxygenase (Cox-2) inhibitors that increase the blood pressure appear to slightly increase the risk of vascular events (e.g. valdecoxib). Other Cox-2 inhibitors used in low dose, such as celecoxib are probably harmless.

2.11 Reperfusion therapy: lytics versus PCI

Professor Habid Gamra

If there is one constant in this rapidly evolving field, it is the major impact of time on modulating patient outcome. Effective reperfusion therapy initiated within the first hour of symptom onset saves lives. Whereas 65 of 1000 patients so treated are saved, this benefit declines over time. Within the second hour less than half of the benefit found in the first hour is achieved. Effective fibrinolytic therapy and PCI are administered with anti-thrombotic therapy (aspirin and an antithrombin).

Percutaneous coronary intervention is superior to fibrinolytic therapy in circumstances where there is immediate access to skilled facilities and physician/health care teams. If this is not available, fibrinolytic therapy is an effective alternative consisting of streptokinase, tPA, rPA and TNK. Overcoming under treatment and applying reperfusion therapy is likely to be more important than the choice of reperfusion therapy employed. Priority should be given to streptokinase for the marked cost difference.

It is essential that community hospitals develop or enhance effective communication strategies with fully equipped centres to ensure that timely transfer of high-risk patients as well as those not responding to fibrinolytic therapy can occur.

Secondary prevention after MI begins on admission and consists of pharmacological therapy with beta-blockers, angiotensin–converting enzyme (ACE) inhibitors, statins, aspirin and often clopidogrel. This in addition to lifestyle modifications and rehabilitation are important in determining future outcomes.

2.12 Post-hospital and long-term treatment of acute coronary syndrome

Moderator Dr Hussein Abdullah

Late hospital and post-hospital stress testing is valuable in selecting patients for invasive management as well as for designing the appropriate rehabilitation programme. Evaluation of left ventricular function, residual myocardial ischaemia and myocardial viability are essential for appropriate selection of evidence-based therapeutic modalities. Risk factor control should start early on and continue indefinitely. Of paramount importance is weight control, smoking cessation, lipid management, blood pressure adjustment and treatment of diabetes.

Evidence-based medications, including antiplatelet medicines, beta-blockers, statins, angiotensin-converting enzyme (ACE) inhibitors should be started during hospitalization and continued thereafter. Physical activity, formal cardiac rehabilitation, and psychological and social support are to be emphasized and discussed with the patient and family before leaving the hospital and during the follow-up visits.

3. CONCLUSIONS AND RECOMMENDATIONS

Recognizing that acute coronary syndromes represent the most serious biological transformation of coronary atherosclerosis, and hence, are a leading cause of mortality among adult men and women in the Eastern Mediterranean Region, and because these clinical conditions provide an important window for life-saving interventions, concerned specialists in the field of cardiovascular medicine, representatives from the Member States in the Eastern Mediterranean Region and the Royal Colleges of Physicians and Public Health, London, UK, urge Member States to:

1. Prioritize acute coronary syndromes on national health agendas by stressing that acute coronary syndromes are serious, prevalent and a humanly-costly national public burden, whose true epidemiological and economic burden should be determined. This demands: developing disease registries, particularly for acute coronary syndromes, with reliable statistics on mortality, morbidity and risk factor level. Observational registries are key to understanding the link between evidence-based medicine, clinical practice and patient outcomes; and developing/strengthening systems that include appropriate monitoring, feedback and quality improvement components.

2. Design national strategies to confront acute coronary syndromes as part of an integrated approach to the prevention and care of noncommunicable diseases. This will address acute coronary syndromes jointly with other major preventable risk factors.
3. Support health care systems to provide and raise awareness among the population about the factors relevant to good cardiovascular health, i.e. developing a national health system that supports promoting a heart-healthy population.
4. Enhance health care systems to develop specialized centres and dedicated teams for acute coronary syndromes. This will require:
 - promoting prompt and early diagnosis among professionals;
 - ensuring that definitive care of patients with acute coronary syndromes is carried out by well-trained cardiologists;
 - setting standards for patient management, taking into account availability, affordability and accessibility of health care and the potential gains associated with the consistent use of non-invasive technologies;
 - ensuring effective systems of care to deliver optimal care for people with acute coronary syndrome, particularly in rural and remote areas;
 - evaluating best therapies that provide the greatest cost-effectiveness for the limited resources available;
 - ensuring all patients have access and are actively referred to comprehensive ongoing prevention and cardiac rehabilitation services;
 - providing all patients with a written action plan for chest pain.
5. Foster training for professionals and paramedical staff and shorten delay times to action as delays to treatment of acute coronary syndromes result in escalating the morbidity burden of cardiovascular disease. This demands public education through the mass media, professional education on acute coronary syndromes and the emphasis of the importance of timely treatment.
6. Develop regional guidelines for the management and care of acute coronary syndromes adapted from internationally-approved guidelines. The suggested guidelines should be simple, flexible, updateable, recognize the priority of using cost-effective management and care and acknowledge the role of compelling indications and the pharmacokinetic principles that emphasize availability; affordability; accessibility of health care; and set standards for patient management, taking into account potential gains associated with the consistent use of non-invasive technologies; which therapies provide the greatest cost-effectiveness for the limited resources available; and a comprehensive and integrated team approach that includes a surgeon for the management and care; and improve the quality of clinical practice and patient care in the Region.
7. Offer technical support to assist nationals to develop effective systems of care that are required to deliver optimal care for people with acute coronary syndrome, particularly in rural and remote areas.

8. Establish regional training courses for acute coronary syndrome management and care for all members of health care teams, including physicians, nurses, physicians' assistants, pharmacists and dieticians to work together to reinforce instructions of lifestyle modification and blood pressure control.
9. Assist nationals to develop chest pain clinics similar to those in the national health service in the United Kingdom. The chest pain clinic system in the UK has, over the last five years, led to reductions in hospital admissions and to the prevention, management and care of acute coronary syndromes.
10. Implement the *Clinical guidelines for the management of hypertension*, the Regional Office for the Eastern Mediterranean Technical Publications Series 29, and produce follow-up progress reports on implementing the recommendations of the previous regional consultations on hypertension prevention and control held in Abu Dhabi, United Arab Emirates, from 20 to 22 December 2003.

Annex 1

PROGRAMME

Tuesday, 27 March 2007

08:30–09:00	Registration
09:00–09:30	Opening session
	Regional Director’s opening address
	Election of Chairperson and Rapporteur
10:00–10:15	Acute coronary syndromes: a prologue <i>Professor Mohamed El-Guindy, National WHO Temporary Adviser</i>
10:15–10:30	Acute coronary syndromes: regional and global perspectives <i>Dr Oussama Khatib, RA/NCD</i>
10:30–10:45	Pathology, molecular mechanisms and natural history of acute coronary syndromes <i>Professor Mokhtar Gomaa, National WHO Temporary Adviser</i>
10:45–11:00	Discussion
11:00–12:00	Round table discussion– Moderator: <i>Professor Mohamed El-Guindy</i> Management of suspected coronary syndromes at initial presentation
13:00–13:20	Acute coronary syndromes in the emergency department, the chest pain units <i>Professor Samir Alam, WHO Temporary Adviser</i>
13:20–13:35	Non-invasive and invasive evaluation of acute coronary syndromes <i>Professor Mohammad Arafa, WHO Temporary Adviser</i>
13:35–13:50	Continuous risk stratification of acute coronary syndromes <i>Dr Sania Nishtar, WHO Temporary Adviser</i>
13:50–14:15	Discussion

14:15–16:00 Round table discussion–
Moderator: *Professor Samir Alam*
Basic difference between the treatment of stable and unstable
coronary syndromes

Wednesday, 28 March 2007

09:00–09:15 Biochemical markers as guide to therapy of acute coronary
syndromes
Professor Wafaa El-Arousy, National WHO Temporary Adviser

09:15–09:30 Anticoagulant, antithrombotic, fibrinolytic and cell protection
therapy in acute coronary syndromes
Professor Hady Gobran, WHO Temporary Adviser

09:30–09:45 Role of cardiac surgery in acute coronary syndromes
Professor Zuhair Al-Halees, WHO Temporary Adviser

09:45–10:00 Discussion

10:30–12:30 Round table discussion –
Moderator: *Professor Mohammad Arafa*
Reperfusion therapy: lytics versus PCI

12:30–12:45 Transferring clinical needs into viable inventions: what makes an
innovation succeed?
Professor Mohamed El-Guindy, National WHO Temporary Adviser

12:45–13:00 Acute coronary syndromes in special patient groups: the elderly,
women, diabetics and athletes
Dr Nizal Sarrafzadegan, WHO Temporary Adviser

13:05–13:15 Discussion

14:15–16:00 Round table discussion–
Moderator: *Professor Nizal Sarrafzadegan*
Post-hospital and long-term treatment of acute coronary syndrome

Thursday, 29 March 2007

09:00–10:00 Framework for regional guidelines
Professor Mohamed El-Guindy, National WHO Temporary Adviser

10:30–12:30 Recommendations and conclusions

Annex 2

LIST OF PARTICIPANTS

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