
UNIT 2 ISCHAEMIC HEART DISEASE

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2.0 OBJECTIVES

At the end of this unit, you shall be able to:

- describe the symptomatology of ischaemic heart disease in elderly;
- explain various diagnostic modalities; and
- organise the treatment of ischaemic heart disease including management of acute coronary syndromes.

2.1 INTRODUCTION

In the previous unit you have read about cardiac failure hypertension and hypotension. In this unit you will learn about ischaemic heart disease (IHD). The significance of ischaemic heart disease in elderly is mainly due to vague presentation, difficulty in diagnostic prognosis and response to therapy. In addition the extent of coronary atherosclerosis is greater in the elderly, and comorbidity frequently present. Thus the elderly ischaemic heart disease patient requires a highly individualised approach to management. In this unit you will learn about the diagnosis of the ischaemic heart disease in elderly and its management.

2.2 CLINICOEPIDEMIOLOGICAL ASPECTS OF CORONARY ARTERY DISEASE IN ELDERLY

Ischaemic heart disease remains the leading cause of death for those older than 65 years of age, despite a substantial reduction in IHD death rates in the last 30 years. In United States IHD is the leading overall cause of death for women because the IHD death rate in older women (particularly > 75 years) is very high, exceeding that of older

man. Moreover, cardiovascular disease is becoming the leading cause of death throughout the entire world. The implications of aging for cardiovascular disease especially IHD are profound.

Definitions

Let us become familiar with a few terminologies:

Stable Angina: It is defined as no change in the past 60 days in frequency, duration or precipitating causes. Pain duration is less than 10 minutes.

Unstable Angina: There is a change in pattern, increasing frequency, severity and/or duration of pain and a lesser degree of known precipitating factors, i.e. progressive or crescendo angina or worsening of previously stable angina. It includes:

- a) *Subset I* Pain mainly on exertion. Pain at rest and on minor activities.
- b) *Subset II* New onset angina present less than 60 days.
 - On exertion
 - Pain at rest with or without exertional pain.

Prinzmetals (Variant) Angina: It is characterised by pain that occurs at rest due to coronary vasospasm accompanied by transient ST segment elevation.

Myocardial infarction: It is characterised by anginal pain of long duration and increasing frequency and intensity. Myocardial infarction may be silent especially in elderly and diabetic patients.

Presenting complaints, diagnostic testing, prognostic implications and responses to therapy are substantially altered as age progresses beyond 65 years. In all coronary syndromes, it is helpful to classify clinical presentations as typical, painless and frequent in elderly. Instead vague symptoms, especially central nervous system complaints, silent presentation are frequent in the elderly, suggesting disorderly sensory perception or composed memory problems in recalling complaints at the time of history taking. Physical examination often reveals abnormalities that can complicate the interpretation of the complaints presenting as possible coronary artery disease. Carotid bruits suggest primary central nervous system disease when the presenting complaint might be due to low cardiac output state or an embolic phenomenon from acute myocardial infarction. The murmur of aortic stenosis (a common finding in the elderly) and the presence of fourth heart sound (the consequence of diastolic dysfunction related to aging) along with systolic hypertension can suggest that acute myocardial infarction is not responsible for the patient's dyspnoea or worsening heart failure.

The ECG in the elderly person suspected or known to have coronary artery disease must be interpreted with a different orientation because abnormalities that are regularly the result of coronary artery disease in younger patients are often the result of other processes in the elderly. The ECG frequently shows bundle branch block or other intraventricular delays that are a consequence of aging *per se*. Left ventricular hypertrophy, sometimes associated with associated ST changes is a common finding. ST segment depression is often the manifestation of acute myocardial infarction rather than ST segment elevation with typical Q-wave changes seen in younger patients. Multiple drugs, frequently used in the elderly, may alter the ST segment.

Interpretation of exercise testing with ECG, echocardiographic or nuclear medicine techniques must take into account the age related changes, the burden of past disease, and co-morbidity including non-coronary cardiac diseases. Similarly, the use of coronary arteriography as a diagnostic test is problematic because there is a heavy burden of anatomic changes in the coronary arteries, which may not be flow limiting and are unrelated to the patients presenting syndromes. These features, unique to the older population, assume increasing importance as the patient age.

2.3 DIAGNOSIS OF ISCHAEMIC HEART DISEASE

We will now briefly outline the methodology for the diagnosis of ischaemic heart disease.

2.3.1 Physical Examination

The physical examination yields valuable information in the elderly. Left ventricles hypertrophy and calcific aortic stenosis are relatively frequently found on examination. Also, neurologic abnormalities (the residua of past strokes that may not have been identified during history taking) are important. Carotid and femoral/ abdominal bruits may be of limited value in predicting complications but remind the examiner that important diffuse vascular disease is often present and may need to be evaluated. Poorly controlled hypertension is common, and recent weight loss may be apparent indicating the possibility of poor nutrition, associated disease, or senile *cachexia*—all poor prognostic features.

2.3.2 Non-invasive Testing for Diagnostic Prognosis

In the elderly, non-invasive testing is rarely justified as a screening test in the asymptomatic individual, particularly those older than age 70-75. Testing can be useful in symptomatic patients in whom the diagnosis is not established by clinical evaluation or when there is need for prognostic information. Because the presence of associated resting ECG abnormalities complicate test performance and interpretation, non-invasive testing is less helpful and predictive in elderly patients.

2.3.3 Exercise Electrocardiographic Studies

Exercise ECG testing remains the simplest, most widely available, and least expensive approach and provides valuable information. Exercise protocols must often be modified in reference to speed and rate of incline of the treadmill, which is the preferred exercise device because many elderly patients are unable to pedal a bicycle. Heart rate may not reach 85 per cent of the predicted value, but the increase in systolic blood pressure and myocardial oxygen consumption (MVO_2) and a high RPP (heart rate pressure product).

2.3.4 Nuclear Medicine and Echocardiographic Tests

Nuclear Medicine and Echocardiographic tests have become popular because of the desire to increase the diagnostic yield (sensitivity) and prognostic capability of non-invasive testing. Pharmacologic agents (dipyridamol, dobutamix) are frequently used to produce the stress, which further enhances the tests appeal in the elderly who are frequently unable to perform dynamic exercise because of underlying medical conditions—particularly orthopaedic. These tests are more sensitive without loss of specificity in the diagnosis of myocardial ischaemia in the elderly.

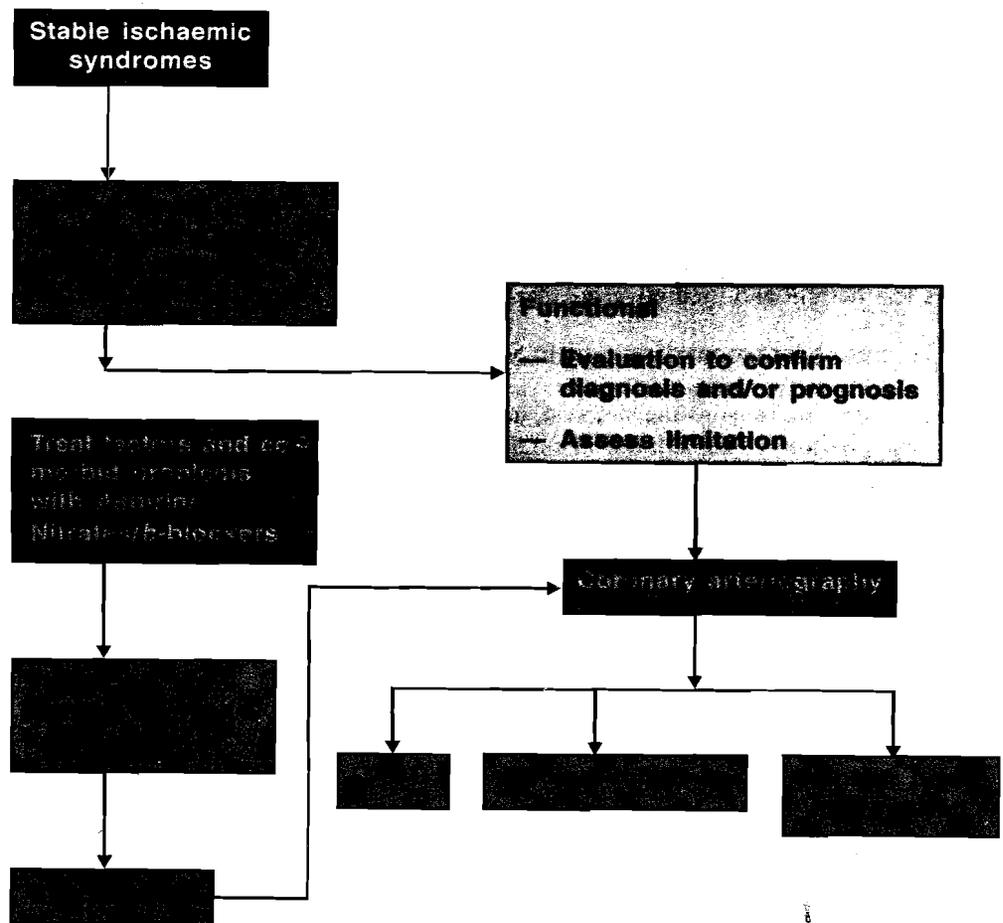
The data on the diagnostic and prognostic value of an echocardiographic study combined with exercise or dobutamine infusion in the elderly are more sparse. In addition, the technical difficulties in obtaining high quality echocardiographic data in the elderly are substantial and operator and institutional dependent. The inherent changes in ventricular function, including diastolic dysfunction and the presence of associated valvular abnormalities, may further complicate the interpretation of echocardiographic functional studies in the elderly. Because exercise radionuclide ventriculography lacks sufficient specificity to exclude heart disease or evaluate ischaemia in older patients, such may also be true for echocardiography, which has been insufficiently studied.

2.3.5 Coronary Arteriography

This test is the standard for establishing the presence and extent of coronary atherosclerosis. It is very difficult to correlate clinical anatomical relationship in elderly with stable ischaemic syndrome especially in the absence of clinical manifestations or functional studies demonstrating ischaemia. Exceptions to this general rule occur in unstable states when the presence of thrombus or ruptured plaque ensure the importance of the anatomic abnormalities. There is a clinical paradox that occurs in the octogenarian,

which has been noted by some authors. In a patient presenting with a first ever ischaemic attack after the age of 80 year, there is a relatively high probability that the individual will have limited 1-vessel or 2-vessel disease when examined angiographically. This probability is a reflection of such an individual's relatively low biologic propensity for developing atherosclerosis and its limited expression in reference of extent of disease. This probability has clinical relevance in suggesting a more favourable prognosis than for the octogenarian who has had ischaemic events long before the age of 80. In light of its limited usefulness as a diagnostic test in elderly patients, the decision to perform angiography should be undertaken primarily to assess the suitability of the coronary circulation for aortocoronary surgery or a catheter based intervention.

Algorithm for Management of IHD in Elderly



Check Your Progress 1

1) What is myocardial infarction?

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2) State True (T) or False (F).

a) Typical chest pain is a characteristic feature of angina pectoris in elderly. (T/F)

b) ECG abnormalities suggesting coronary artery disease in young may be due to other reasons in elderly. (T/F)

2.4 MANAGEMENT OF ISCHAEMIC HEART DISEASE

Here you will find that the elderly behave differently than other adult patients and require different therapy schedule and follow up.

2.4.1 General Measures and Drug Therapy

The overall goals of management are similar for the old as the young, but the emphasis is greatly altered. Symptom relief and maintenance of an active life style becomes the paramount aim, whereas increasing longevity becomes secondary; particularly in patients older than 80 years in whom significantly prolonging life may not be a realistic goal. A third objective of treatment is managing complications, particularly periods of unstable angina and myocardial infarction.

The various general measures include:

- 1) Education and explanation reinforced with printed material about the course and options for management.
- 2) Maintenance of diary that compensates for the memory loss and lack of precision and recall that is so common in the elderly.
- 3) Management of co-morbid factors like anaemia, thyroid dysfunction, hypertension, arrhythmias, valvular heart disease and congestive heart failure.
- 4) Cessation of smoking.
- 5) Exercise and involvement in community activities.

Drug therapy includes:

- 1) Maintenance of low-dose aspirin if there are no contraindications.

The basic principle for drug therapy is "start low, go slow and keep it as simple as possible."

- 2) Use of prophylactic sublingual nitroglycerin for predictable episodes.

Long acting nitrate drugs with or without β -blockers or calcium channel blockers should be the mainstay of long-term prophylactic antianginal therapy in the elderly, long acting nitrates alone are usually more easily titrated, then combination therapy and if symptoms are totally ameliorated, there may be little reason to add a second agent.

All appropriately selected elderly patients should receive β -blockers but must be carefully monitored to detect and assess the severity of any adverse side effects before discontinuing them.

Calcium channel blockers are frequently the choice as a second line drug because of the adverse effects of β -blockers but hypotension, flushing and peripheral edema are relatively common in the elderly with calcium channel blockers. The combination of β -blockers and calcium channel blockers should be used with particular care in the elderly because of the potential for severe bradycardia and profound depression of the conduction system.

2.4.2 Catheter Based Interventions and Coronary Artery Bypass Grafting

Coronary arteriography is not required in elderly patients with stable ischaemia whose symptoms are well controlled by medications in the absence of intolerable side effects and whose lifestyle is acceptable. Because of the high incidence of comorbidity, catheter based interventions offer considerable appeal, especially because they are associated with such a low incidence of central nervous system complications. The concept of interventional incomplete revascularisation seems pertinent in older patients. The presence of extensive coronary atherosclerosis and complex lesions makes catheter based interventions problematic in reference to complex revascularisation and there is a need for frequent repeat procedures including (ABG). The approach to catheter based interventions is changing rapidly, so it is impossible to make a statement about how current practices are influencing practice in this elderly group. However, the over-

riding consideration in elderly people with extensive diseases is the relief of symptoms and maintenance of function.

2.4.3 Management of Acute Coronary Syndrome

Unstable angina pectoris is often the presenting complaint in the elderly coronary heart disease patient. It is very difficult to differentiate unstable angina from Acute Myocardial infarction, because myocardial infarction in elderly is often associated with ST segment depression and enzyme deviations are very minimal in the elderly. The management approach to unstable angina in the elderly does not differ from that of younger patients and involves continuous ECG monitoring, serial enzyme measurements, aspirin, B-blockers, Nitroglycerin and Heparin and careful attention to any complications such as arrhythmias or heart failure.

A new class of therapeutic agents has been developed to block the glycoprotein IIb/III-a receptor in the management of unstable angina. These include Abciximab, eptifibatid and Tirofiban. All are administered intravenously. However, its efficacy in the elderly is yet to be studied and determined.

Antithrombin therapy with Heparin is a mainstay of therapy in managing unstable angina. Heparin use requires special attention in the elderly as it is associated with intracranial haemorrhage and bleeding in other sites. Lower doses—3000 units bolus instead of 5000 and 500 units/hour instead of 1000 in a 50 kg elderly patient should be considered. Partial thromboplastic time should be measured.

Lower molecular weight Heparin (Fraxeparin) is another alternative with lesser incidence of side effects and increased duration of action than conventional Heparin.

Coronary arteriography is indicated in patients whose complaints recur and in high risk patients with pre-existing chronic limiting angina or modestly depressed left ventricular function.

Acute Myocardial Infarction (AMI)

Age has a profound effect on the incidence and outcome of AMI. Elderly patients with AMI have a much higher risk of complications like congestive heart failure, cardiogenic shock, atrial fibrillation and myocardial rupture. The diagnostic approach for AMI in the elderly is based on the same criteria as in younger patients, but each of the principal modes of evaluation is of more limited value making it more difficult to establish a prompt diagnosis.

Silent AMI is more common in elderly making the diagnosis even more complicated. ECG changes also may not be classical in some of the patients. Enzyme elevations also may not be too high.

Fibrinolysis in therapy is contraindicated in patients presenting with AMI associated in the ST segment depression. However, fibrinolytic therapy is indicated in patients presenting with ST segment elevation and should be instituted within 6 hours of onset of AMI.

The number of elderly patients meeting, conventional criteria for fibrinolysis therapy for AMI becomes a diminishing minority as age increases because of delays in arrival at the emergency department and ECG findings of ST depression rather than ST elevation on the ECG. These features coupled with the increased probability of intracranial haemorrhage makes catheter-based intervention appealing. The logistics and expertise required for timely catheter-based interventions provide major obstacles to the widespread and routine use of this approach.

Other drugs used in the management of AMI in elderly include aspirin, ACE inhibitors and calcium channel blockers.

2.4.4 Cardiac Rehabilitation

Because normal aging is accompanied by reduced exercise capacity or alteration in life-style, the exercise aspect of rehabilitation is particularly important in the elderly. Healthy elderly patients can significantly increase their exercise capacity through exercise training, which need not occur within a structured group programme but is feasible at

home. An important component of cardiac rehabilitation programme is individual and group counselling, including focussed diet, risk factor modification and social adjustment interventions.

Check Your Progress 2

- 1) Fibrinolytic should be instituted within hours of onset of AMI.
- 2) Fibrinolytic therapy can be initiated in AMI patients with ST-segment depression. True/False
- 3) Discuss the management approach to unstable angina.

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2.5 LET US SUM UP

Ischaemic herat disease in the elderly population will continue to be a source of major concern because of the increasing costs entitled and uncertainty about how the wide-spread array of diagnostic and therapeutic interventions, often expensive and sometimes hazardous, should be applied. Algorithms and clinical rules developed in younger cohorts are not directly transferable to the elderly cardiovascular patients, further emphasising the need for prospectively collected, syndrome specific data. The heterogeneity of aging emphasises the wide variability in patients ability to withstand the stress of procedures and complications of disease and makes clear the need to consider physiologic reserve and biologic age rather than chronology.

2.6 KEY WORDS

- Arrhythmias** : Change/abnormality of normal cardiac rhythm.
- Coronary angiography** : Visualization of coronary arteries and obstruction there in, by injecting contrast media into the coronaries through a catheter.
- Echocardiography** : It is a non-invasive technique which has the ultrasound to visualize internal cardiac structures and functioning of heart.

2.7 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) Myocardial infarction is characterised by sharp pain of long duration with increasing frequency and intensity.
- 2) a) F
b) T

Check Your Progress 2

- 1) 6 hrs
- 2) False
- 3) Management of unstable angina includes continuous ECG monitoring, serial enzyme measurements, aspirin, β -blockers, nitroglycerines and heparin. It is also required to look out for any complications like arrhythmias or heart failure.

2.8 FURTHER READING

Gottlieb, C., Friesinger, M.D. and Thomas J. Ryan, M.D. "Cardiovascular Diseases in the Elderly", *Cardiov. Clin.*, Vol. 17, No. 1, 1999.