Ischaemic heart disease| Coronary Artery Disease

Ischaemic heart disease (IHD) is characterised by myocardial impairment due to imbalance between coronary blood flow and myocardial requirement. In other words, it is the presence of symptoms or signs of cardiac ischaemia.

Commonest ischaemia cause is atherosclerosis which is the formation of lipid-laden plaques in coronary artery walls.

Symptoms occur when plaques;

(a) grow and obstruct the vessel, causing angina, or

(b) rupture and form a thrombus, occluding the vessel and causing the acute coronary syndrome.

Causes

The commonest cause of ischaemic heart disease is **atherosclerotic** coronary artery disease (CAD).

Nonatherosclerotic causes of myocardial ischaemia are rare and include

- coronary spasm (Prinzmetal's angina),
- coronary artery embolism,
- coronary arteritis (polyarteritis nodosa,
- Takayasu's disease,
- systemic lupus erythematosus),
- cocaine abuse or
- spontaneous dissection of coronary arteries.

A spectrum of Myocardial infarction

The ischaemic heart disease can present as

- Stable effort angina,
- Unstable angina,
- Non-Q wave MI,
- Q wave MI,
- Heart failure and sudden cardiac death

Ischaemic Heart Disease can present with angina or acute coronary syndrome (ACS).

Risk factors

Modifiable Risk Factors:

- Hypertension
- Dyslipidaemia: ?TC, ?TC: HDL ratio, ?LDL.
- Diabetes mellitus
- Smoking
- Excess alcohol
- Obesity

Fixed Risk Factors:

- Age
- Male
- South Asian ethnicity.
- Medical history of atheroma: MI, stroke, or PVD.
- Family history: Myocardial infarction in 1st-degree relative, male < 55 years, female < 65 years.

Signs and symptoms of ischaemic heart disease

Symptoms

The typical clinical presentation of angina is called **angina equivalents.**refers to poorly localised retrosternal discomfort with radiation to neck, shoulders, arms, jaws, epigastrium or back; usually, not above the jaw and not below the umbilicus.

Angina is triggered by physical activity, emotional stress, exposure to cold, consuming a heavy meal or smoking.

Pain is poorly localised, vague chest discomfort which may be described as squeezing, burning, tightness, choking, heaviness, hot or cold sensation, dyspnoea, fatigue, weakness, lightheadedness, nausea, diaphoresis, altered sensorium and syncope.

Pain lasts for 2 to 8 minutes. Ischaemia seldom lasts more than 30 minutes without causing acute myocardial infarction (AMI).

Pain is relieved with rest or sublingual nitroglycerine in 2 to 5 minutes.

It is less likely to be angina if it is localised (finger pointing), less than 30 s, or more than 30 min without AMI, exclusively at rest (except unstable/Prinzmetal), pricking or jabbing and changing sites of pain

The location of pain and its relation with exertion are important factors in the patient's history for the determination of the cause of chest pain.

In the presence of both factors (diffuse retrosternal pain and aggravation with exertion; relief on rest), chest pain is likely to be due to underlying CAD in 90% of patients

Physical Findings

The physical finding may reveal risk factors of coronary artery disease.

These include elevated blood pressure, corneal arcus, xanthelasma, retinal arteriolar changes, diagonal earlobe crease, etc.

The cardiovascular system (CVS) examination is normal (except for audible S4) in most individuals with stable angina.

The presence of systolic murmur may suggest underlying aortic stenosis, mitral valve prolapse (MVP) or hypertrophic obstructive cardiomyopathy (HOCM) as the cause of angina.

Diagnosis

For a patient with stable CAD, investigations are aimed at excluding non-cardiac cause of chest pain,

Assessment of risk factors for modification,

Risk stratification,

Stress testing to evaluate inducible ischaemia, Left ventricular function assessment,

Assessment for silent myocardial ischaemia and assessment of coronary anatomy where indicated.

The patient should be evaluated for the presence of underlying diabetes mellitus (Fasting and post-prandial blood sugar levels, HbA1C),

dyslipidaemia (raised total cholesterol, LDL-C, VLDL-C, triglycerides, ApoB and reduced HDL-C).

The presence of markers like hs-CRP, lipoprotein (a), homocysteine, tPA, PAI-I, fibrinogen, etc. can be indicators of underlying atherosclerosis.

Baseline Electrocardiogram. This is likely to be normal in over 90% cases and only helps to recognise LVH, bundle branch block, old MI or pre-excitation.

A normal ECG does not exclude ischaemia as being a cardiac cause.

Stress Testing

Exercise is common physiological stress used to elicit cardiovascular abnormalities not present at rest and to determine the adequacy of cardiac function. As exercise progresses, in individuals with underlying CAD, there occurs a mismatch between oxygen supply and demand which may manifest with electrocardiographic, regional wall motion or myocardial perfusion abnormalities.

The commonly used exercise stress tests to diagnose underlying CAD are;

- A treadmill stress test,
- Dobutamine
- Stress echocardiography and
- Stress perfusion imagining

Treadmill stress test

Treadmill stress test remains a cornerstone of cardiovascular evaluation. It is a simple, safe and cost-effective test in the diagnosis of coronary artery disease.

- Coronary Angiography
- Ambulatory Electrocardiographic Monitoring
- Cardiac Biomarkers
- Multislice CT Coronary Angiogram

Treatment

Goals of treatment are

1. To improve the quality of life,
2. To reduce the incidence of unstable angina and MI,
3. To decrease the frequency and severity of anginal episodes and
4. To improve longevity.

The modalities of treatment are,

1. Risk factor modification,
2. Lifestyle modification,
3. Pharmacological measures and
4. Revascularisation

Lifestyle modification

Pharmacologic treatment entails the use of;

- Anti-platelets
- Lipid-lowering agents
- Nitrates
- Beta-blockers
- Calcium channel blockers

Adjunctive treatments used are;

Metabolic modulation with Trimetazidine

ACE-inhibitors, Aldosterone antagonists

Other modalities are;

- Gene therapy
- Stem cell therapy
- Percutaneous coronary intervention
- Surgical revascularisation