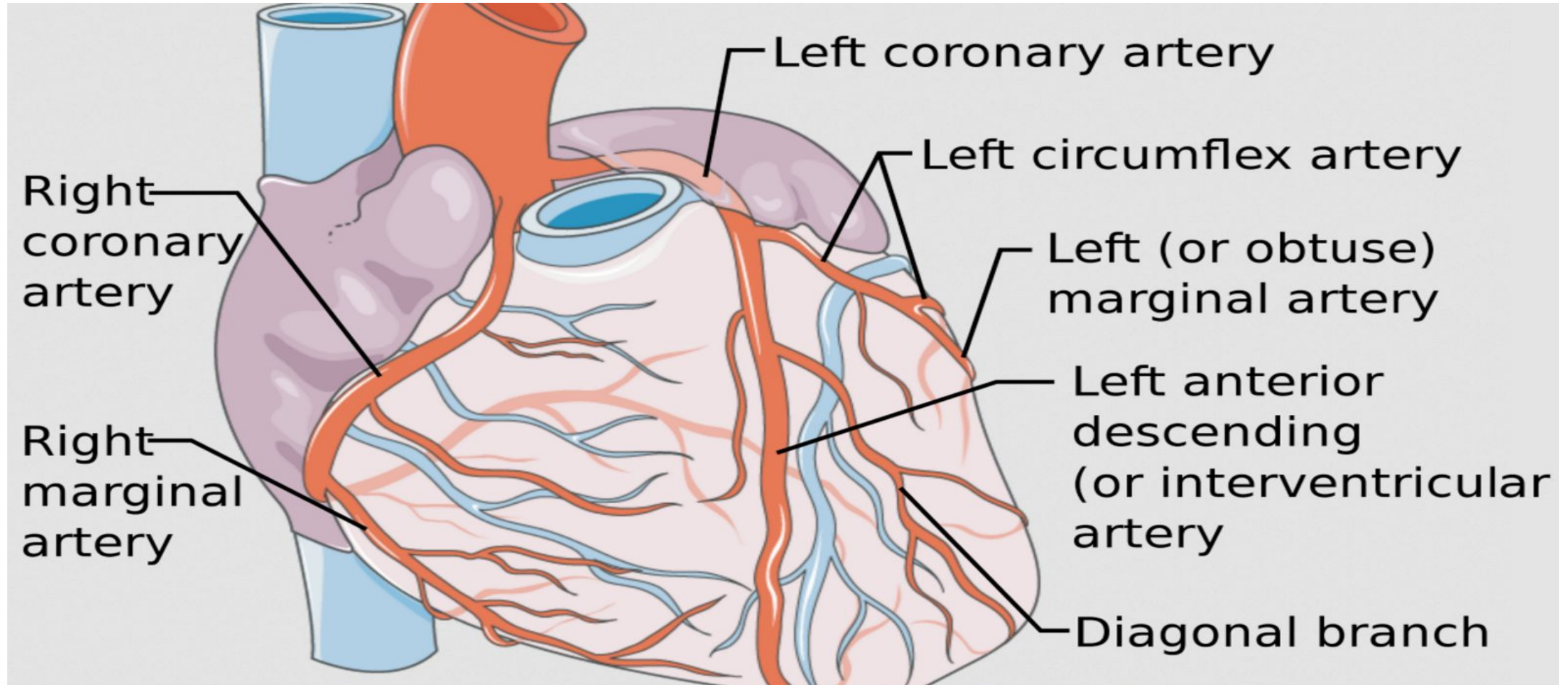


Coronary artery disease (CAD) Ischemic Heart Disease (IHD)

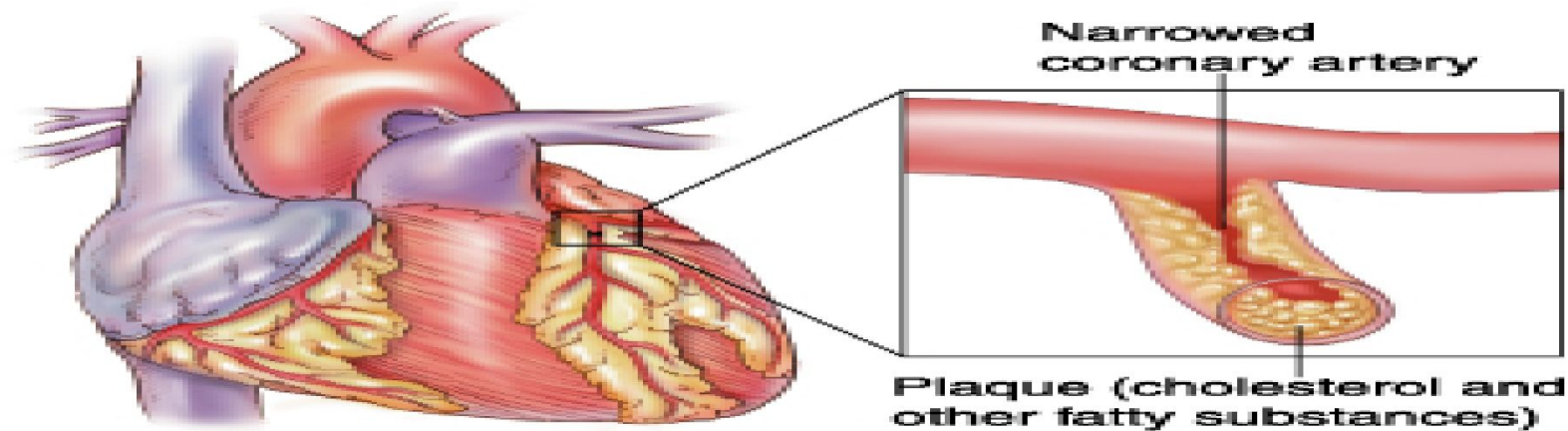
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Coronary arteries



Ischemic Heart Disease (IHD) - (Coronary Heart Disease).

- IHD are group of closely related conditions (syndromes) caused by an imbalance between the myocardial oxygen demand and blood supply. it occurs when the myocardium need oxygen and there is no enough blood supply .
- Usually caused by decreased coronary artery blood flow, so it's called also (coronary artery disease).



IHD can cause

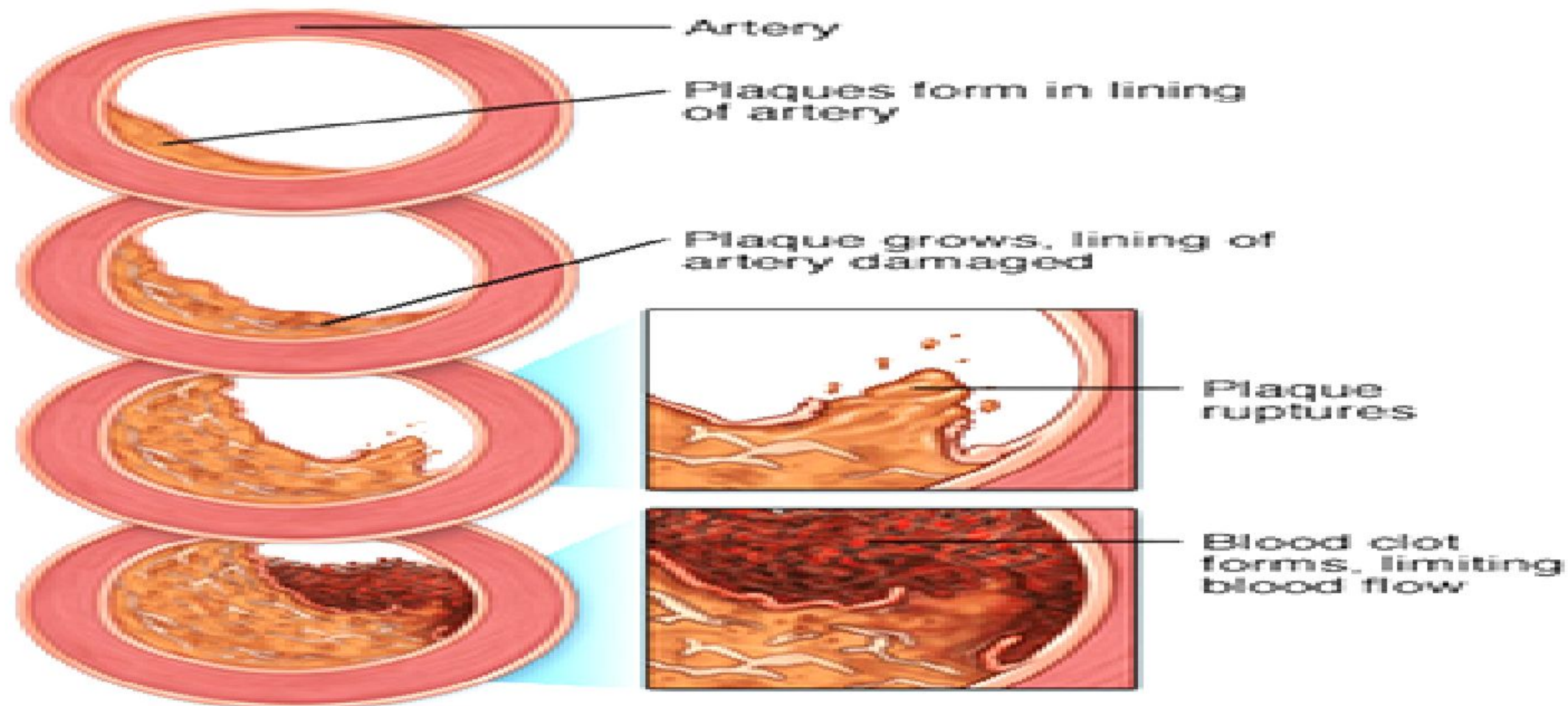
- 1. Angina pectoris (chest pain).
- 2. Acute myocardial infarction (MI) = heart attack.
- 3. Sudden cardiac death.
- 4. Chronic ischemic heart disease (IHD) with congestive heart failure (CHF)

Epidemiology

- Coronary artery disease (CAD) is the commonest cause of angina and acute coronary syndrome and the leading cause of death worldwide.
- It also has a devastating effect on quality of life.
- Disability-adjusted life years, a measure of healthy years of life lost, can be used to indicate the burden of disease rather than the resulting deaths

Pathogenesis

- Atherosclerosis is a progressive inflammatory disorder of the arterial wall that is characterised by focal lipid-rich deposits of atheroma that remain clinically silent until they become large enough to impair tissue perfusion, or until ulceration and disruption of the lesion occurs resulting in thrombotic occlusion or distal embolisation of the vessel
- Atherosclerosis begins early in life with deposits of lipids in the vessel wall, which tend to occur at sites of altered arterial shear stress, such as bifurcations, and are associated with abnormalities of endothelial function at that site



Angina pectoris.

- Angina pectoris is a type of IHD characterized by paroxysmal and usually recurrent attacks of substernal or precordial chest discomfort, described as constricting, crushing, squeezing, choking, or knifelike pain. The pain may radiate down the left arm or to the left jaw (called as referred pain) .



Types of angina pectoris:

- 1- Angina pectoris: Stable angina/ typical angina pectoris:
 - Stable angina (typical angina) is the most common form of angina. It is caused by atherosclerotic disease with usually $\geq 70\%$ to 75% narrowing of lumen i.e. (critical stenosis or fixed chronic stable stenosis).
- 2- Angina Pectoris: Unstable or crescendo angina:
 - It is an unstable and progressive condition (90% narrowing (fixed) of lumen).
 - Pain occurs with progressively increasing frequency, and is precipitated with progressively less exertion, even at rest , and tends to be of more prolonged duration.

Myocardial Infarction (MI).

- MI, also known as "heart attack," is the death of cardiac muscle (coagulative necrosis) resulting from ischemia. MI: commonly affected coronary vessel in persons with right dominant coronary artery heart (90% of population).
- Myocardial necrosis begins within 20-30 minutes, mostly starting at the subendocardial region (less perfused, high intramural pressure).
- - Infarct reaches its full size within 3-6 hrs, during this period, lysis of the thrombus by streptokinase or tissue plasminogen activator, may limit the size of the infarct.
- Irreversible cell injury: 20-40 min

Myocardial Infarction: Clinical Features

Pain:

- Severe crushing sub-sternal chest pain, which may radiate to the neck, jaw, epigastrium, shoulder or left arm.
 - lasts for hours to days and is not relieved by nitroglycerin or rest.
 - In 10% to 15% of patients (diabetics, hypertensive, elderly) MIs can be asymptomatic. (no pain)
(Diabetic patients have autonomic neuropathies that may prevent perception of pain.)

Pulse is rapid and weak.

Diaphoresis (excessive sweating)

Dyspnea

ECG shows typical findings of ischemia :

- Q waves (indicating transmural infarcts)
 - ST-segment abnormalities
 - T-wave inversion
- Arrhythmias

Risk factors

- **Age and sex**
- Age is the most powerful independent risk factor for atherosclerosis
- and sex also plays a role.
- Pre-menopausal women have lower rates of disease than men, although the sex difference disappears after the menopause.
- Hormone replacement therapy (HRT) is not effective in the prevention of CAD, and HRT in post-menopausal women is associated with an increased risk of cardiovascular events

- Genetics

- Atherosclerotic CAD often runs in families and a positive family history is common in patients with early-onset disease (age < 50 in men and < 55 in women).

- Smoking

- There is a strong relationship between cigarette smoking and CAD,
- especially in younger (< 70 years) individuals, and this is the most important modifiable risk factor.

- Hypertension

- The incidence of atherosclerosis increases as BP rises, and this is related
- to systolic and diastolic BP, as well as pulse pressure.
- Antihypertensive therapy reduces cardiovascular mortality, stroke and heart failure.

- Hypercholesterolaemia

- The risk of atherosclerosis rises with serum cholesterol concentrations
- and lowering serum total and LDL cholesterol concentrations reduces
- the risk of cardiovascular events.

- **Diabetes mellitus**

- This is a potent risk factor for all forms of atherosclerosis, especially type 2 diabetes mellitus. It is often associated with diffuse disease that is difficult to treat. Insulin resistance (normal glucose homeostasis with high levels of insulin) is associated with obesity and physical inactivity, and is also a risk factor for CAD.
- Glucose intolerance makes a major contribution to the high incidence of CAD in people from South Asia and some other ethnic groups.

- **Haemostatic factors**

- Platelet activation and high plasma fibrinogen concentrations are associated with an increased risk of coronary thrombosis, whereas antiphospholipid antibodies are associated with recurrent arterial thromboses.

- **Physical activity**

- Regular exercise (brisk walking, cycling or swimming for 20 minutes two or three times a week) has a protective effect, whereas inactivity roughly doubles the risk of CAD and is a major risk factor for stroke.

- Obesity

- Obesity, particularly if central or truncal, is an independent risk factor,
- although it is often associated with other adverse factors such as hypertension, diabetes mellitus and physical inactivity.

- Alcohol

Excess alcohol consumption is associated with hypertension and cerebrovascular disease

- Diet

- Diets deficient in fresh fruit, vegetables and polyunsaturated fatty acids are associated with an increased risk of cardiovascular disease.
- However, dietary supplements, such as vitamins C and E, beta-carotene,
- folate and fish oils, do not reduce cardiovascular events and, in some
- cases, have been associated with harm.

- **Personality**

- While certain personality traits are associated with an increased risk,
- there is no evidence to support the popular belief that stress is a major cause of CAD

- **Social deprivation**

- Social deprivation is strongly associated with cardiovascular disease.
- This may be partly due to associations with lifestyle risk factors, such
- as smoking and alcohol excess, which are more common in socially
- deprived individuals

Management

- **Primary prevention** aims to introduce lifestyle changes or therapeutic interventions to prevent CAD and other forms of atherosclerosis in the whole population or in healthy individuals with an elevated risk of disease.
- **Secondary prevention** involves initiating treatment in patients who already have had an event, with the aim of reducing the risk of subsequent events.

THANK YOU

Activity

- How to deal with CAD patients during anesthesia ?