UNIT NO. 2

ASSESSMENT OF RISK FACTORS

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ABSTRACT

This study unit reviews the risk factors which can lead to atherothrombosis. The first part will describe the conventional risk factors, such as: family history, smoking, hypertension, hyperlipidaemia, diabetes mellitus, obesity, inactivity, and being post menopause in women. The second part describes novel risk factors, which can be determined by a laboratory test such as C reactive protein and homocysteine.

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CONVENTIONAL RISK FACTORS

The conventional risk factors are very useful for daily clinical practice and help the clinician to manage the patient at risk for coronary artery disease. Despite the simplicity of managing these risk factors, reality shows that treatment targets are often not achieved in those with risk factors which can be corrected by pharmaceutical means, or by modifying habits or lifestyle.

Family History

Genes contribute both to the cause and pathogenesis of atherosclerosis. Those patients who have a family member with coronary artery disease, are at an increased risk of developing coronary artery disease themselves. Patients who have a first degree family member who had a cardiovascular event at a young age, are at a very high risk. In this group of patients, the other risk factors should be treated very aggressively.

Smoking

Smoking is the single most important modifiable risk factor for coronary artery disease. Coronary artery disease causes 35 to 40% of all smoking related deaths, with an additional 8% for second hand smoke. Cessation of smoking will reduce coronary artery disease related deaths by 36% as compared to those who continue smoking.

Hypertension

Hypertension is often a silent cardiovascular risk factor. Its prevalence is high and reaches 65% after the age of 60. Only 25% of the hypertensive get treatment and 70% of the people treated do not achieve their target pressures. Optimal treatment to a blood pressure of less than 120/80 mm Hg can results in up to 63% reduction in stroke and up to 46% reduction in cardiac events.

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Hyperlipidaemia

Over the past 15 years, numerous clinical trials using statins have shown up to 40% reduction of cardiovascular events in those patients treated with statins. These numbers were consistent in high risk, intermediate risk, and low cardiovascular risk patient populations. Clinical trial results show that aggressive lowering of LDL cholesterol results in a further reduction of cardiovascular risk. Present target LDL goals in a high risk population are as low as 70 mg/dl or less. Targeting both hypertension and hyperlipidaemia simultaneously and aggressively can reduce cardiovascular events up to 65%.

Diabetes Mellitus

Patients with diabetes mellitus have an up to eight times higher risk to develop cardiovascular disease than the normal population. Patients with glucose intolerance also have higher cardiovascular event rates. Hypertension and hyperlipidaemia in the diabetic population should therefore be treated very aggressively, and one should aim for a BP of less than 120/80 mm Hg and a LDL cholesterol of less than 100 mg/dl, or 70 mg/dl in those diabetics with other multiple cardiac risk factors.

Inactivity

Prospective epidemiological studies across the board show that regular exercise reduce the cardiovascular morbidity and mortality. Exercise lowers blood pressure, improves cholesterol levels, vascular inflammation and plasma rheology. Exercise levels achieved with as little as 30 minutes of walking daily have major cardiovascular benefits.

Obesity

Epidemiological studies have shown that a higher body mass index is associated with a higher risk of cardiovascular events. Weight control therefore plays an essential role in all preventive cardiology practices.

NOVEL ATHEROSCLEORIC RISK FACTORS

C-reactive Protein

Inflammation plays a central role in all phases of atherosclerosis and provides a critical pathophysiological link between plaque formation and acute rupture leading to acute coronary syndrome. The acute phase protein CRP is a simple downstream marker which has been shown to be elevated in patients at high risk for a cardiovascular

event. CRP when measured with new high sensitive assays (hsCRP) independently predicts risk of myocardial infarction, stroke, peripheral vascular disease, and sudden cardiac death. Hs CRP levels of less than 1, 1 to 3 and greater than 3 mg/liter should be interpreted as low, moderate and high cardiovascular risk respectively. Treatment with statins can reduce CRP levels.

Homocysteine

Patients with rare inherited defects of methionine metabolism can develop severe homocysteinaemia (>100 micromol/l) and have marked risk of premature atherothrombosis. Mild to moderate elevations of homocysteine (>15 micrmol/l) are quite common in the general populations. It is still controversial if this is associated with a strong increased risk of cardiovascular events. Interventional trials with folic acid have not given any conclusive evidence.

LEARNING POINTS

- **Assessment of all cardiac risk factors by history taking, physical examination, and laboratory tests is an essential approach to assess the complete cardiovascular risk profile in a patient.**
- **Intervention by lifestyle advice (diet, exercise), and advice of smoking cessation should be routine, and reduces the risk of cardiovascular events significantly.**
- **Lowering blood pressure with medication to less than 120/80 mm Hg and LDL cholesterol to less than 100 mg dl, (or 70 mg/dl in high risk patients) can reduce the cardiovascular risk up to 65%.**