

# Coronary Artery Disease

The coronary arteries are vessels that supply fresh oxygenated blood to the entire heart. The heart requires a constant supply of oxygenated blood; more so when it is pumping faster, as it does during times of exercise, excitement or stress, and exposure to cold. Coronary artery disease (CAD) is a condition where the coronary arteries get clogged up with a waxy substance called plaque, restricting blood flow to the heart. This plaque is a substance, rich in cholesterol and white blood cells, that starts to get deposited in the interior walls of the blood vessels from a young age, in a process known as atherosclerosis. With time, these deposits can grow significantly, and harden into a thick structure. At times, the plaque may even rupture and form a clot. Both hardening and rupturing of this plaque can significantly narrow the diameter of the arteries, and restrict blood flow to the heart tissues, resulting in a heart attack.

The most common symptom of CAD is a tight, squeezing, painful sensation in the chest known as angina, which may also travel to the left shoulder and arms, back, neck or jaw. Other symptoms include palpitations, weakness, shortness of breath, dizziness, nausea, and/or sweating. However, most patients with atherosclerosis remain symptom free until the condition is well advanced where severe narrowing of the vessels occurs. This inability to recognize the condition in the early stages is responsible in part for the huge mortality related to the condition. In 2010, CAD is estimated to have been responsible for more than 7 million deaths globally, and 1 in every 6 deaths in the USA is attributed to this condition.

## Risk factors

There are several risk factors to developing CAD. The

most significant of these is age. Men over 45 and women over 55 years of age are at increased risk of CAD. Smoking, high blood pressure, high levels of blood cholesterol, obesity, and diabetes are some other risk factors. However, about 40-60% of susceptibility to CAD comes from genetic risk factors. Individuals with a first degree male relative who developed CAD before 55 years of age or a first degree female relative who developed CAD before 65 years of age are at increased risk of developing the condition themselves. In addition, this genetic risk has been found to be independent of all other risks. Studies have shown the heritability for CAD to be 39% in men and 43% for women. Although variants at more than 30 loci have been recognized to contribute to the genetic susceptibility of CAD, with the 9p21 variant on the short arm of chromosome 9 being the most well-studied one of them, the cumulative effect from all these loci is still not sufficient to explain the total heritability of the condition.

## Diagnosis and Management

CAD is a chronic condition that builds up over time. Individuals suspected of having the condition, either due to the presence of risk factors or due to clinical symptoms, can undergo certain tests to check for the definitive presence of CAD. These include studying electrocardiograms, echocardiograms, stress tests results and angiograms. The latter involves injecting a dye into the arteries to visualize blood flow through them and to identify narrow spots or blockages. Medical treatment, supported by lifestyle modifications, is enough to manage CAD in the early stages. Medications include those that lower blood cholesterol, blood thinning agents to prevent clots from forming, and drugs to decrease blood pressure and to open up the coronary arteries. Lifestyle modifications include

eating a healthy diet, performing moderate exercise, and avoiding smoking. However, if the blockage is significant, surgical intervention is required. This could either be in the form of angioplasty, in which a mechanical device is inserted into the arteries to widen it and keep it open, or in the form of a bypass surgery, in which a vessel from another part of the patient's body is grafted on to the heart to create an additional route for blood to flow into the heart.

### CAD in the Arab World

Although the disease burden due to cardiovascular disorders is high globally, the situation is particularly bad in the Arab region. Mortality due to CAD is far more in the Arab World when compared to countries in the West. Additionally, large scale studies have shown that the average age of presentation of a heart attack in the Middle East at 51-years is more than a decade lower than that in Western Europe. Researchers and

doctors attribute this heavy burden of CAD in the region to the high prevalence of risk factors, such as high blood pressure and cholesterol, diabetes, smoking, and lack of exercise. In addition, parts of the region also suffer from lack of proper screening programs and awareness building measures for heart health and do not have proper facilities for managing cardiovascular conditions at both primary and secondary level.

Interestingly, in several Arab countries, especially those of the Arabian Gulf, cardiovascular risk factors have been seen to be more prominent in women than in men. In addition, Arab women with CAD have also been found to have a worse mortality rate than men. It is clear that large scale public awareness measures need to be implemented in order to lessen the impact of this growing epidemic of cardiovascular diseases in the region.

