

## Cardiac Disease Management- Partly Genetic, Partly Lifestyle

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**There is evidence that individuals with high genetic risk can reduce their risk by adequately managing their lifestyle.**



Coronary artery disease (CAD) is a condition where the blood vessel supplying blood to the heart is blocked due to a waxy deposit called 'plaque'. When the plaque completely blocks the blood vessel, a part of heart muscle dies due to lack of blood supply, commonly known as 'heart attack'. Sometimes plaque in an artery can rupture and block the artery, leading to either a heart attack or stroke. A significant number of CAD patients have a case of Young Onset Myocardial Infarction (YOMI), who are below 40 years of age and experienced a heart attack due to a block in the arteries. Globally, CAD, along with stroke, is the leading cause of death and is predicted to remain so for the next 20 years. Among Indians, there has been a recent rise of premature onset of myocardial infarction/ heart attack. Epidemiological studies from various parts of India indicate a prevalence of CAD to be between 7% and 13% in urban and 2% and 7% in rural populations. South Asian population is the only population in world where cardiovascular mortality is on the rise, while in the rest of the world it is declining. We have the fatal combination of high risk of acquiring the disease and having a minimally accessible medical management. Lack of awareness only adds up the odds. Rapid urbanisation has led to stress and flawed lifestyle in individual like high fat diet, lack of exercise and poor daily routines. We are partly blessed to be in the medical generation where cardiac disease management is available with new generation drugs and interventions. Affordability is still a challenge to many in spite of recent steps such as recently subsidised stent prices. The other aspect of this disease is that prevention does not get adequate attention in case of CAD. It is only until an event occurs that we start worrying about the organ which works round the clock for us.

### Genetic factors

Coronary artery disease results from a combination of multiple factors, partly genetic and partly lifestyle. Some people are more susceptible to get CAD due to their genetic makeup. Multiple genetic factors and a combination of these with the environmental factors lead to the disease condition. Discovery of genetic factors has helped improve management, especially early intervention in these patients. There has been a recent interest in using this genetic information as combinatorial risk

assessment to predict a person's risk to develop CAD by scoring the disease causing and beneficial mutations. There is also evidence that individuals with high genetic risk can reduce their risk by adequately managing their lifestyle. If a person is aware that they may be more likely to get the disease compared to others in their age, they can be counselled to be careful about their lifestyle. This may prevent or delay any untoward coronary event.

### **Latest development**

Also new mutations are being identified as potential therapeutic targets and existing medications are being validated for safe use, without increasing cardiovascular risk. Recently, a variant in the *GLP1R* gene encoding the glucagon-like peptide-1 receptor was reported to be associated with lower fasting glucose levels, lower T2D susceptibility, and with reduced risk for CAD. This information is useful in the light that agonists for this gene can be used for treating diabetes without increasing cardiac risk.

A cluster of lifestyle factors such as increased blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol or triglyceride levels also collectively known as 'Metabolic Syndrome' increases the risk of cardiovascular hazard. One of the causes of CAD is familial hypercholesteremia, a condition where individuals have elevated LDL (low density lipoprotein) levels due to mutations in genes regulating lipid (fat) metabolism. All these are clinically manageable conditions and an appropriate predictive diagnosis can direct the patient to the clinic in time.

Plaque deposition in the arteries starts early at about the second decade of our lives, depending on one's family history and habits. Both the genetic and lifestyle factors can independently predict likelihood of a person developing the condition. A two pronged approach with knowledge about the risk and timely lifestyle and medical management can help avoid an unwanted trip to the cardiac surgeon.

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