**Cardiac health;** *Prevention is better than cure*

* Dr Vikram Kolhari

Heart attack is the most common cause of death worldwide accounting for roughly 12 Million deaths annually. During last 30 years there has been an alarming increase in incidence of heart attack in developing countries especially India.

**Why Should I (Indian) be worried?**

* Indians are more susceptible than other ethnic groups
* Get the disease at much younger age (a decade earlier than the western population)
* Disease follows more severe course with higher rate of second heart attack and higher mortality.

**Commonly used terms:**

* **What is Heart?**
	+ It is basically a muscle pump which supplies nutrients and oxygen rich blood to all body parts, including *itself*, pumps 4-5 litres of blood every minute during rest.
* **Heart Attack (Myocardial Infarction):**
	+ A heart attack occurs when an artery supplying **heart** with blood and oxygen becomes blocked. When the blood supply is cut off, the heart muscle begins to die. Myocardial infarction literally means tissue death (infarction) of the heart muscle (myocardium).
* **Heart Failure:** Heart failure occurs when heart muscle doesn't pump blood as well as it should, leading to shortness of breath, fatigue and weakness, swelling of legs, ankles and feet. Common causes for heart failure include heart attack and high blood pressure.
* **Cardiac Arrest:** It is the abrupt loss of heart function, i.e heart stops pumping, which if not treated early leads to death. Sudden cardiac arrest isn't the same as a heart attack, however, a heart attack can sometimes lead to cardiac arrest.
* **Atherosclerosis:** Over time, fatty deposits called plaques build up within the artery walls. The artery becomes narrow. This is atherosclerosis
* **Coronary artery disease:** When atherosclerosis occurs in the coronary arteries, heart does not get sufficient blood, the condition is called coronary artery disease, which can eventually lead to heart attack.



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**How the Heart Changes with Age**

People aged 65 and older are much more likely than younger people to suffer a [heart attack](https://www.nia.nih.gov/health/what-heart-attack), to have a [stroke](https://www.nia.nih.gov/health/stroke), or to develop [coronary heart disease](https://www.nhlbi.nih.gov/health-topics/ischemic-heart-disease) and [heart failure](https://www.nia.nih.gov/health/what-heart-failure). [Heart disease](https://www.nhlbi.nih.gov/health-topics/ischemic-heart-disease) is a major cause of disability in the elderly limiting the quality of life.

Ageing can cause changes in the heart and blood vessels. For example, as you get older, your heart can't beat as fast during [physical activity](https://www.nia.nih.gov/health/exercise-and-physical-activity-getting-fit-life) as it did when you were younger.

The most common ageing change is increased stiffness or hardening of the large arteries. This causes [high blood pressure](https://www.nia.nih.gov/health/high-blood-pressure), or hypertension.

High blood pressure and other risk factors, including advancing age, increase the risk of developing atherosclerosis. Over time, the heart muscle can become weakened and/or damaged, resulting in [heart failure](https://www.nia.nih.gov/health/what-heart-failure).

**Age can cause other changes to the heart. For example:**

* There are age-related changes in the **electrical system** that can lead to [arrhythmias](https://www.nhlbi.nih.gov/health-topics/arrhythmia)—a rapid, slowed, or irregular heartbeat—and/or the need for a pacemaker. Valves—the one-way, door-like parts that open and close to control blood flow between the chambers of the heart—may become thicker and stiffer. Stiffer valves can limit the flow of blood out of the heart and become leaky, both of which can cause fluid to build up in the lungs or in the body (legs, feet, and abdomen).
* The **chambers of heart may increase** in size. The heart wall thickens, so the amount of blood that a chamber can hold may decrease despite the increased overall heart size. The heart may fill more slowly. Increased thickness of the heart wall can increase the risk of atrial fibrillation, a common heart rhythm problem in older people.

**Risk factors for Heart attack:**

**Major risk factors that can’t be changed**

* *Increasing Age*
* *Men > 45 & Women > 55*
* *Male gender -* Men have a greater risk of heart attack than women do, and men have attacks earlier in life.
* *Heredity (including race) -* Most people with a significant family history of heart disease have one or more other risk factors. So, it’s even more important to treat and control any other associated modifiable risk factors.

**Major risk factors that you can modify, treat or control**

#### *Tobacco -* Tobacco use in any form increases the risk of coronary heart disease. Cigarette smoking is a powerful independent risk factor for sudden cardiac death in patients with coronary heart disease. Cigarette smoking also interacts with other risk factors to greatly increase the risk for heart disease. Exposure to other people’s smoke increases the risk of heart disease even for nonsmokers.

* *High blood pressure*
* *Low HDL cholesterol*
* *Damaged arteries and blood cells*, leading to clotting
* *Increased heart attacks*

#### *High blood cholesterol -* Everybody needs cholesterol, it serves a vital function in the body. It circulates in the blood. As the blood cholesterol rises, so does the risk of coronary heart disease.

**Where does cholesterol come from?**

 **Two sources:**

1.Food (35% of total cholesterol) – Foods that contain cholesterol and are high in saturated fat. Full fat dairy foods such as cheese, yogurt and cream. Animal fats, such as butter, ghee, margarines and spreads made from animal fats. Fatty meat and processed meat products such as sausages.

There is an ample evidence that saturated fatty acids and trans-fats increase cardiovascular disease risk. The fact that dietary cholesterol is common in foods that are high in saturated fatty acids might have contributed to the hypothesis that dietary cholesterol is atherogenic.

2. Produced in our body (65% of total cholesterol) – Liver & other cells

*Good vs. Bad Cholesterol:*

* **LDL cholesterol** is known as bad cholesterol. It has a tendency to increase risk of heart disease. LDL cholesterol is a major component of the plaque that clogs arteries.
* **HDL cholesterol** is known as the good cholesterol. It is higher in women, increases with exercise. HDL cholesterol helps carry some of the bad cholesterol out of arteries and prevents the blockage.

#### *High Blood Pressure:*

High blood pressure increases the heart’s workload, causing the heart muscle to thicken and become stiffer. It also increases the risk of stroke, heart attack, kidney failure and heart failure. When high blood pressure is present alongside obesity, smoking, high blood cholesterol levels or diabetes, the risk of heart attack or stroke increases even more.

#### *Physical Inactivity:*

An inactive lifestyle is a risk factor for coronary heart disease. Regular, moderate to vigorous physical activity helps reduce the risk of cardiovascular disease. Physical activity can help control cholesterol, diabetes and obesity and to lower the blood pressure.

#### *Obesity:*

People who have excess body fat – especially if a lot of it is at the waist (abdominal obesity) – are more likely to develop heart disease and stroke, even without other risk factors.

**Diabetes:**

Research shown that a Person with Diabetes is more likely to die of a heart attack than a non-diabetic. At least 68% of people with diabetes over 65 years of age die of some form of heart disease. Among that same group, 16 percent die of stroke. Even when glucose levels are under control, diabetes increases the risk of heart disease and stroke. The risks are even greater if blood sugar is not well-controlled. Regular follow up with your Doctor is recommended.

### Other factors that contribute to heart disease risk

#### *Stress:*

#### Individual response to stress may be a contributing factor for heart attacks. Some scientists have noted a relationship between coronary heart disease risk and stress in a person’s life, along with their health behaviors (like overeating, smoking etc) and socioeconomic status.

**Alcohol:**

Drinking too much alcohol can raise blood pressure, and increase the risk for cardiomyopathy, stroke, cancer, obesity and liver disease. It can also contribute to high triglycerides and produce irregular heartbeats. All that said, there is a protective benefit to moderate alcohol consumption. Limit your alcohol consumption to no more than two drinks per day for men and no more than one drink per day for women. *However, it is not recommended that non-drinkers start using alcohol.*

**Interactions of Risk Factors:**

The risk is multiplicative when many risk factors co-exist; risk factors often cluster together. Majority of events arise in individuals with modest elevations of many risk factors than from marked elevation of a single risk factor.

**Types of Symptoms of Coronary Artery Disease:**

* No symptoms for long period
* Chest pain on exertion also known as Angina
* **Myocardial Infarction or Heart attack** - Severe chest pain, death of heart muscle, heart failure, irregular heart beats
* Sudden Death

**What is Angina?**

Discomfort in the center of the chest, described as pressure, squeezing, heaviness, fullness, burning sensation or pain, generally not localized, which comes with exertion and is relieved with rest, may be associated with sweating and the pain may radiate to the left arm. Heart attack is the most severe form of angina, present at rest and associated with impending sense of doom.

However, atypical presentations are not uncommon. About 10-20% of heart attacks are painless, especially in diabetics and elderly. Patients may develop symptoms like breathlessness, pain or discomfort in one or both arms, the back, neck, jaw or stomach, breaking out in a cold sweat, nausea or lightheadedness. Many a times, symptoms are confused with gastritis and leads to delay in seeking medical help.

**Tests/ Investigations:**

1. **ECG -** An ECG (electrocardiogram) records the electrical activity of the heart at rest. It provides information about heart rate and rhythm, and shows if there is enlargement of the heart or evidence of a heart attack. However, it does not detect asymptomatic blockages or predict the risk of a future heart attack. The resting ECG is different from a stress or exercise ECG. ECG is one of the basic tests to diagnose heart attack, however in almost 25% of cases, initial ECG may be normal and serial ECG monitoring may be required for diagnosis.
2. **Cardiac enzymes -** Cardiac enzymes are released into the circulation when myocardial necrosis occurs, as seen in heart attack. Blood tests to detect CPK-MB and Troponins are commonly used for diagnosing a heart attack. Troponin test is considered the gold standard. It gets elevated after 3-4 hours after myocardial infarction and remains elevated for 10-14 days.
3. **Echocardiogram -** It is a test that uses [ultrasound](https://www.webmd.com/a-to-z-guides/what-is-an-ultrasound) to show how the heart muscle and valves are working. An echocardiogram can help to diagnose several kinds of heart problems, including:
* An [enlarged heart](https://www.webmd.com/heart-disease/guide/enlarged-heart-causes-symptoms-types)
* Weakened heart muscles
* Evidence of heart attack
* Problems with heart valves
* Heart defects present since birth
* [Blood clots](https://www.webmd.com/dvt/blood-clots) or tumors
1. **Stress test -** Also called an exercise stress test (TMT), shows how the heart works during physical activity. Because exercise makes the heart pump faster, an exercise stress test can reveal problems with blood flow to the heart. It is done to detect coronary artery blockages in patients with doubtful or no symptoms.
2. **Coronary Angiogram -** A coronary angiogram is a procedure that uses X-ray imaging to see the heart's blood vessels (coronary arteries). This is the definitive test to detect blockages causing a heart attack.

**Treatment of Heart attack:**

*Importance of Golden hour:*In the event of heart attack, the first 60 minutes are decisive, and this time is therefore referred to as the “golden hour.” The concept of golden hour is extremely important because most deaths and cardiac arrests occur during this period. However, if the person gets treated within this period s/he can expect near-complete recovery. The Golden Hour is a window of opportunity that impacts a patient’s survival and quality of life following a heart attack. This is because the heart muscle starts to die within 80-90 minutes after it stops getting blood, and within six hours, almost all the affected parts of the heart could be irreversibly damaged. So, the faster normal blood flow is re-established, the lesser would be the damage to the heart.

**Primary Angioplasty and Stenting:** Primary angioplasty and stent placement is the **treatment of choice for acute heart attack** worldwide. Once the diagnosis of heart attack is made, angioplasty and stenting should be done at the earliest, preferably within the golden hour. Initial medications such as blood thinners (like aspirin), statins are given in the emergency room and patient is shifted to *Cath lab for Angiogram* (to know where and how much is the blockage) followed by angioplasty to open the blocked artery and re-establish the blood supply to heart. In some cases, *Bypass Surgery* (CABG) may also be required.

Primary angioplasty involves stretching any narrowed areas of the coronary arteries using a balloon which is attached to a thin catheter (tube). The catheter is inserted, under local anaesthetic, into a main artery in the groin or wrist and then passed gently into the aorta. The balloon, at the tip of the catheter, is blown up at the narrowed area(s) of the artery; this forces the artery open and widens it. In the majority of cases a metal stent (drug coated) will also be placed in the artery. A stent is a cylinder of metal mesh which acts like a scaffold to keep the artery open and prevent the re-narrowing. The artery heals around the stent making it a permanent part of the artery. Patient will not be aware that it is there.

**How can one try prevent Heart attack?**

It is interesting to note that majority of premature heart attacks and strokes are preventable. Healthy diet, regular physical activity, and not using tobacco products are the keys to prevention. Checking and controlling risk factors for heart disease and stroke such as high blood pressure, high cholesterol and high blood sugar or diabetes is also very important.

**Eat a healthy diet:** A balanced diet is crucial to a healthy heart and circulation system. This should include plenty of fruit and vegetables, whole grains, lean meat, fish and pulses with restricted salt, sugar and fat intake. Alcohol should be used in moderation if using.

**Regular physical activity:** At least 30-45 minutes of physical activity daily helps to maintain cardiovascular fitness. Regular exercise reduces incidence of obesity, increases HDL, lowers LDL cholesterol, helps control diabetes and hypertension

**Avoid tobacco use:** Tobacco in every form is harmful - cigarettes, cigars or chewable tobacco. The risk of heart attack starts to drop immediately after a person stops using tobacco and can drop by as much as half after 1 year.

**Know your blood pressure:** Have your blood pressure checked and know your numbers. If it is high, you will need lifestyle changes, a healthy diet with less salt intake and increased physical activity, and take medications regularly to control your blood pressure (<140/90).

**Know your blood lipids:**  Blood cholesterol needs to be controlled through a healthy diet and, if necessary, by appropriate medications. 10% reduction of blood cholesterol produces 20-30% decline in CHD deaths.

**Know your blood sugar:**  All adults should have their blood sugar checked regularly, as there are no early symptoms of diabetes.If you have Diabetes, it is very important to control blood sugar to minimize the risk.

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