

INDIANS AND HEART ATTACK (Ischaemic Heart Disease)

Magnitude of the Problem

Six and a half million people die of heart attack (cardiovascular disease) per year globally and half of these are in women according to a report of World Health Organisation. In the United States alone one million people succumb to heart attacks annually and approximately one half of these are sudden. It was estimated that in the year 2002 in Edinburgh. (United Kingdom, Scotland) 1,37,000 deaths occurred due to heart attack and 50 percent of them before reaching the hospital. In spite of medical advances heart attack remains a major worldwide public health problem affecting both men and women.

Indian Scenario

In India there are no authentic population data with regard to prevalence of heart attack (ischaemic heart disease). In one study in urban Delhi prevalence of heart attack was estimated to be 7.6 per cent and in rural Delhi at the same period the prevalence rate was 3.1 per cent in the year 1960. However, by the year 1990 this disease has increased to 12.6 per cent in urban Delhi and 7.4 per cent in rural Delhi. In yet another survey (1994) the disease was prevalent in 3.5 per cent of rural population in Rajasthan and 11 per cent among urbanites in Chennai (1997).

It is feared that at this rate the Indian share of global burden of heart disease (ischaemic heart disease) will surpass any region in the world by the year 2020. Expected increase in death due to heart attack in India is 103 per cent in men and 90 per cent in women from 1985 to 2015. It is interesting to note that in the last 30 year, the rate of heart disease (ischaemic heart disease) in United States of America has decreased by 30 per cent and in India it has increased by 300 per cent.

Immigrant Indians

In the year 1959 it was realised from a postmortem report in Singapore the death due to heart attack was seven times more among people of Indian descent compared to Chinese. Similar reports published between 1959 to 1984 revealed that heart attack was three fold higher among people of Indian descent in Uganda, South Africa, Fiji and Singapore and the heart attacks among men and women of Indian origin were more common in United Kingdom compared to their natives (1996).

In the United States heart attacks was three times higher (mean age 46.4 years) among the first generation of immigrant Indian physicians compared to local natives (a survey in 1996). In an another survey undertaken in the year 2000 in Canada, the incidence of heart attacks was 10.7% among South Asians as against 4.6% in Europeans and 1.7% in Chinese. It was also proved that not only the rate of heart attacks was 5 times higher in Indians compared to Europeans but also occurred at an earlier age - 50.5 years *v/s* 55.5 years; 5 years earlier and Indians suffered larger heart attacks and many coronary vessels occluded in 38% of them making it unsuitable for coronary by-pass surgery.

Women and Heart Attacks

Women outlive men by 10 years—65% of 65 years age in USA are women. As on 28th February 2005 decline in death rates from most major causes including heart disease and cancer have pushed Americans life expectancy to a record of 77.6 years. Women are still living longer than men but the gap is narrowing. More women died of heart attack than men. 31% of women die of heart attacks while 3% from breast cancer in USA Heart attacks are greater in overseas Indian women than in men although smoking is rare among Indian women (tobacco paradox).

Among immigrant Indians, women have 30 per cent higher mortality from heart attack than whites and 325 per cent higher than Chinese in USA. Heart attacks in women of Indian origin were premature with poorer prognosis and more severe outcome than Indian men. Death in women below 50 years due to heart attack was double that of men. More than half of sudden deaths occur within 6 hours of symptoms, two thirds of them have no previous symptoms. Situation is no different in India. Today life expectancy for men is 62 years and for women 68 years in India (an increase by 20 years from 1960 to 1996). Heart attacks have increased

from 3 to 10% in urban Indians and from 2 to 4 % in rural Indians with women having rates similar to men.

Risk Factors

Conventional factors for heart attacks are smoking, high blood pressure, diabetes, high levels of blood cholesterol, obesity, reduced physical activity (and infection by certain bacteria's - H Pylori and Chl. Pneumonia and virus). These risk factors are modifiable. Other conventional risk factors which are not modifiable are strong family history of heart attacks, aging and male sex. The risk factors operate in continuum of progressively increasing risk than all or none relationship; for example a systolic blood pressure of 140 mm. Hg. carries lower risk than a systolic blood pressure of 180 mm. Hg. but greater than 130 to 139 mm. Hg. Multiple risk factors confirm magnified risk; for example a smoker with moderate elevation of blood pressure and cholesterol has greater risk than a nonsmoker with severe high blood pressure and elevated blood cholesterol level. Risk of heart attacks among Indians is greater than in local whites of northern Europe at any given level and / or combination of conventional risk factors - at least double that of Americans and several fold higher than other Asians - resulting in heart attacks in Indians under 40 years 3 to 10 times higher.

“Indian Ethnicity” - A Risk Factor

Conventional risk factors although important are not sufficient to explain the increased prevalence of heart attacks among Indians. In addition, there are other known and unknown causes. ‘Indian ethnicity ’ by itself is a risk factor—and whether they are genetic or acquired trait? In one study it was found that Punjabi immigrants in London had greater number of conventional risk factors-like obesity, high blood pressure and high cholesterol levels and diabetes compared to their siblings in rural Punjab, but their siblings in Punjab were also prone for to diabetes.

“A Serious Concern”

Magnitude of the prevalence of heart attack among Indians is so high as to draw the attention of the President of India - Sri. A.P.J Abdul Kalam who while inaugurating the 6th International Congress of Asian Vascular Society, on 5th of November 2004, at Bangalore, expressed his serious concern and said “I call upon you all to take it as a mission to find the reasons for the high susceptibility of cardiovascular disease among Indians.....You will

have to put a smile on the lips of patients and provide them right medical care at the right place”.

Risk Factors In Indians

The ‘Answer ‘ to this serious concern lies in the fact that Indians are blessed with “Bad Genes”. These are also known as “Thrifty Genes”. Our ancestors had genes to convert food to fat and store as fuel during “famines”. Now “famines” is gone and bad diet is in and no physical activity, the result is “Truncal Obesity” (X syndrome)- also called as metabolic syndrome. In this syndrome fat accumulates in the abdomen giving body an ‘apple’ shaped habitus. The result is the circumference of the abdomen taken around navel level exceeds the circumference measured at the waist level (Waist Hip Ratio - WHR). Apple shaped body habitus is associated with insulin resistance (diabetes), high blood pressure, high levels of blood cholesterol and heart attacks. In one study WHR was higher in South Asian men living in UK than in Europeans.

In another study among Delhi urbanites, 7.1% of them had gross central (apple shaped) obesity; and average WHR of rural population was less than urban Indians but they were more centrally obese than their European counterparts. Apple type of obesity and diabetes are two fold higher among Asian Indians living in United Kingdom compared to local whites and in another study the ratio was 4 to 5 times higher among immigrant Indians.

In India prevalence of diabetes in the year 1970 was 2.1%. By 2000 it was 12.1 % (five fold increase) and in the year 2003 there were 32 million diabetics in India (China and USA 2nd and 3rd place). It is estimated that by 2030 AD India will be having 100 million diabetics (300% increased from 1995) indicating India will be: “The Diabetes Capital” of the world – one third of global diabetic burden will be India’s share.

Search For Newer Risk Factors

There has been a vigorous attempt in search of newer risk factors among Indians for the increasing incidence of heart attacks. The factors that are at work are diabetes - covert or manifest, truncal obesity, increase in the levels of blood cholesterol and cholesterol related factors such as high levels low and very low density lipoprotein cholesterol and triglycerdies. High density lipoprotein cholesterol (HDL – c) is the substance that carries

the cholesterol deposited in the inner layers of arterial blood vessels back to the liver and hence this is a good cholesterol., higher levels of HDL-cholesterol have protective action against heart attacks. Among several known and unknown risk factors the two most evident risk factors among Indians are elevated levels of lipoprotein (a) and homocysteine. These two substances carry 32 fold higher risk for heart attack.

Increased amounts of homocysteine in the body is very important cause for heart attacks and strokes among Indians. Higher the level of homocysteine greater the chances of having heart attacks and strokes - a graded response. Homocysteine damages the blood vessels and increases the chances of occlusion of their lumen by a variety of mechanisms. Causes for increase in homocysteine could be genetic in some persons but in most of the cases it is due to deficiency of nutrients – folic acid and Vit B₁₂. Treatment of the condition is supplementation or food fortification with small quantities folic acid and Vit. B₁₂- cheap and simple.

Indians also have a genetic predisposition to heart attacks mediated by a factor called lipoprotein (a). Lipoprotein (a) was found to be much higher among Indian siblings living in West London under identical circumstances compared to the native whites. Similar findings are observed among Indians living in other western countries too.

Hence Lipoprotein (a) is yet another independent risk factor and independent of age. Elevated lipoprotein (a) is ten times more atherogenic (deposition of cholesterol in the inner layers blood vessels) than LDL cholesterol (deadly cholesterol).

Lipoprotein (a) accumulates in the inner layers of blood vessel wall and damages by a variety of processes. Thus Indians have a genetic predisposition to heart attacks mediated by lipoprotein (a).

Prevention : A Matter of Urgency

The sheer size of the problem of heart attack, the insidious onset early in life and the fact that prevention confirms actual extension of life and benefits individuals are sufficient reasons to prevent the disease as a matter of urgency and on a war footing. Strategy for prevention of disease are–
1. Population strategy 2. High risk strategy 3. Secondary prevention and 4. Primordial prevention. Population strategy consists of explaining the preventive measures and promoting healthy life style by every member of

society from paediatric to geriatric age. Importance of primary prevention- *i.e.*, prevention of the disease right from the beginning can be driven home by the fact that quarter (25%) new cases of heart attacks present as sudden death - as the very first symptom of the disease. Secondary prevention aims at those persons who have survived the heart attack. In this class of patients morbidity and mortality from heart attack have considerable social and financial implications for individuals and communities. Surely, a “window of opportunity”: exists when we examine primordial and primary prevention. A case in point is tribal and rural communities who have low levels of conventional risk factors.

The cessation of smoking, vigorous lifestyle modification, increasing physical activity and balanced diet are crucial in prevention of heart attacks.

Stress Management

Stress related to social and occupational factors is thought to be associated with an increased risk of heart disease. Poor coping skills may influence consumption of alcohol and cigarettes. Coronary Prone behaviour (Type A behaviour) which is characterised by aggressive competitiveness, together with an intense sustained drive for achievement, a pressing sense of urgency and hostility is one of the risk factors for heart disease. In programmes concerned with identifying and counselling persons with coronary prone behaviour steps should be taken to give them adequate explanation and support in order to allay anxiety.

Physical Activity

Regular exercise at work and leisure protects against heart attack. Exercise provides healthier life constitution, reduces frequency of ectopic beats (abnormal heart beats), increases HDL cholesterol (good cholesterol) reduces bad and deadly cholesterol and other risk factors and obesity, strengthens bones, provides fitness and elegance to body and mind, slows ageing and beneficial to all ages. Fresh air is better than a tonic.

Prudent Diet

‘A man is what he eats’: Diet is the major environmental cause for heart attacks particularly in susceptible individuals. In the past few years obesity has doubled in adults, quadrupled in teenagers. It is a world wide

nutritional disorder - a burden upon health care delivery. Most vulnerable class are neo-rich. **Fast food kills fast.**

The best suited diet is that which is adequate in calories, proteins, poly and monounsaturated fats, complex carbohydrates, soluble fibre and natural antioxidants—fresh vegetables and fruits. Cholesterol is found only in animal kingdom. Contribution of dietary cholesterol to blood cholesterol is small (< 10 mg / litre) world wide. Saturated fats in diet contribute to high blood cholesterol levels three times more than polyunsaturated fats. Monounsaturated fats lower deadly cholesterol. Hence intake of polyunsaturated fats in the diet should be equal to or less than saturated fats. Soya, sunflower, cottonseed oils, fish and nuts (except coconuts), olive oil, mustard which are rich in polyunsaturated fats are to be preferred to dairy products, egg yolk and mutton fat, coconut which are rich in saturated fats.

Small quantities (a spoon or two daily) of butter or ghee which are rich in monounsaturated fats are welcome. Transfatty acids (solid and semisolid fats) are most dangerous. Hydrogenated fats—vanaspathi and margarine and deep frying are most dangerous—hence bakery products, all crispy and crunchy foods, french fries. Diet should have restricted saturated fats (fats that solidify in cold), cholesterol and refined carbohydrates and limited alcohol if at all (not to start if one has not already done so). Alcohol is a drug and is dangerous.

Nuts (particularly almonds) are energy dense and most of the fats in nuts are highly beneficial monounsaturated and polyunsaturated fats and are rich in proteins, antioxidants, fibre and vitamins and minerals and should replace unhealthy calories. Green or black tea is rich in flavonoids and reduces LDL cholesterol.

Dietary and life style modifications begun since childhood are likely to have benefits later in one's life.

In recent times a high protein and low carbohydrate diet (Atkin's Diet) has become popular although long term benefits of Atkin's Diet is doubtful.

Risk Intervention

Risk intervention of lipids (cholesterol) consists of keeping the ugly cholesterol-(LDL cholesterol) to less than 100 mg/dl (per litre of blood)

HDL cholesterol above 35 mg/dl and triglycerides to less than 150 mg/dl. This is achieved by proper diet, reduction in body mass index (BMI = Body Weight in kgs/ Height in metres²), appropriate and regular physical exercise and diet assisted by drugs wherever needed. Nicotinic acid (Niacin), statins, fibrates and ezetimibe are the drugs available to reduce the blood lipids – most popular among them are statins. These drugs mostly arrest the production of cholesterol in the liver. Ezetimibe prevents absorption of cholesterol from the gut. Statins also help in reducing atherosclerosis. These drugs are not without side effects (though under played). In some people side effects of statins /niacin could be severe in the form of muscle pains or liver damage. Niacin reduces Lipoprotein (a) significantly but could produce side effects like flushing and itching etc.

High blood pressure hardly produces any symptoms but if uncontrolled could result in heart attacks, strokes, kidney failure over a period of time.

Hence high blood pressure is considered as the biggest silent killer. Good and sustained control of blood pressure, surely gives great dividends in preventing the dreaded complications. Every person should have his/her blood pressure recorded periodically and if found high, should get it reduced by practicing healthy life style and assisted by appropriate drugs. In recent times the accent is to bring down the systolic blood pressure (upper figure) rather than concentrating on the lower one (diastolic pressure). This is particularly important in elderly persons where invariably the systolic pressure is high.

Diabetes is a very important cause for heart attacks. Uncontrolled, diabetes encourages atherosclerosis of blood vessels (arteries) resulting in narrowing of their lumen and ultimately complete obstruction resulting in heart attack and other vascular complications. Screening of population for diabetes by estimating blood and urine sugar as well as meticulous control of diabetes by diet, exercise, maintaining the right body weight, practice of healthy life style supplemented with appropriate drugs are a must to control diabetes and its complications.

It is not unusual that several risk factors - high blood pressure, diabetes and elevated cholesterol co-exist in a single individual needing multi pronged approach and management.

Community Approach

Multifactor approach instead of single factor has to be evolved. The approach should emphasise the intervention to change the whole community by health education and on matters such as nutrition and eating patterns - low fat dairy products, changed diet in institutions, prohibition of smoking, physical activity at work and leisure and special training of health personnel. Use of mass media in health education is an important cost effective method to enhance community participation.

Therapeutic Targets in Brain and Fat

Recent research has revealed that it is the brain which controls the appetite by a relay of both 'eating' and 'stop eating' mechanism. A substance named "Ghrelin" derived from the stomach before eating, acting upon a group of nerve cells in the brain stimulates appetite— consumption of calories. It is interesting to note that the fat cells (adipose tissue) in the body is not all that dull and inert but regulate energy balance by modulating uptake of food by producing important hormonal factors. One such factor produced by fat cells is leptin. Leptin released from fat cells acting on nerve cells in the brain produces sense of satiety while eating - 'stop eating': Another major product also produced by fat cells is "Adiponectin". Low levels of adiponectin is found in patients with diabetes (type 2). Treatment with adiponectin improves diabetes and reduces body fat and triglycerides.

'Have the Cake and Eat it Too'

Recent research has revealed the existence of certain enzymes Arcane enzyme 11B-hydroxysteroid dehydrogenase Type 11B-HSD-1 in the body, which acting through hormones are found to be helpful in increasing fat in the fat cells and thus obesity. Inhibitors of this factor could reduce obesity. These findings of research are sure to be exploited and lend hope in controlling obesity and diabetes in the years to come; if and when materialised one can have the Cake and Eat it too and still have lean body mass (low body mass index)

Century Club

Requisites to free oneself from heart attacks are– 1). complete cessation of smoking; 2). eat less and walk more; 3). keep the Body Mass Index (body weight in kilo / height in metres)² below 23 and / or Waist Hip Ratio (circumference of waist to that of hip) less than 0.9 in men and less than 0.8 in women; 4). blood pressure below 140/90 mm. Hg. (ideal: 130/80 mm.Hg); 5). fasting blood sugar less than 100 mg per cent; and 6) LDL cholesterol level less than 100 mg percent and thus avoid heart attacks and qualify to be a member of Century Club (to live for 100 years).