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Letter to the Editor

Cardiovascular Diseases and its Treatment

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Introduction

Cardiovascular Diseases (CVDs) encompass any medical conditions related to the heart and blood vessels. Majority of CVD conditions are caused by plaque buildup in the walls of the arteries. This condition is referred to as atherosclerosis.

Cardiovascular diseases remain the biggest cause of deaths worldwide. According to World Health Organization (WHO) report, Cardiovascular Disease (CVD) is the world's largest and India's number one killer, claiming 17.3 million lives in 2012, which represents 31 % of all global death (WHO, 2015). In terms of attributable deaths, the leading cardiovascular risk factor globally is raised blood pressure (to which 13% of global deaths is attributed), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%) and overweight and obesity (5%). Cardiovascular disease accounts for about 60% of all mortality in people with diabetes.

Hypercholesterolemia is the presence of high levels of cholesterol in the blood. It is well known that hypertriglyceridemia and hypercholesterolemia are responsible for oxidative alteration of Low Density Lipoprotein Cholesterol (LDL-C), protein glycation and glucose-autooxidation through excess production of free radicals and lipidperoxidation products which represent major risk factors for ischemic heart diseases.

Recent researches on CVD decipher new markers for cardio vascular risk assessment an important one of which is Small dense LDL cholesterol (sd LDL-C). Small, dense LDL cholesterol is a type of LDL that is smaller, higher penetration rate, less antioxidant activity and heavier than typical LDL cholesterol found in blood. A predominance of small, dense low-density lipoprotein is a major component of an atherogenic lipoprotein phenotype, and a source of increased risk for coronary heart disease. (e) The ratio of sd-LDL-C is 30% of total LDL-C in blood. In hyperlipidemic subjects this ratio is increased by several folds depending upon the degree of hyperlipidemia.

Oxidation of LDL-C and small dense LDL-C

Oxidative stress, caused by an imbalance between antioxidant systems and the production of oxidants, including ROS, seems to be associated with many multifactorial diseases, especially cancers, cardiovascular diseases and inflammatory disorders. Oxidized biomolecules including oxidized LDL capable of converting macrophages into foam cells. Whereas, sd-LDL have strong atherogenicity because of easier penetration into the artery wall through endothelial cells to form macrophage foam cells due to a higher affinity for proteoglycan, which stimulates oxidization of sd-LDL by exposure to reactive oxygen species.

There are several other associated diagnostic markers such as:

Low-density lipoprotein, Lipoprotein (a), Apolipoprotein A1, Apolipoprotein B, Myeloperoxidase. Currently, biomarkers which may reflect a higher risk of cardiovascular disease include: Higher fibrinogen and PAI-1 blood concentrations, Elevated homocysteine, or even upper half of normal, Elevated blood levels of asymmetric dimethylarginine, Inflammation as measured by C-reactive protein (Greater than 3.0 mg/L) Elevated blood levels of brain natriuretic peptide (also known as B-type) (BNP).

Treatment

Drugs, collectively known as statins that lower cholesterol level mainly works by inhibiting the β-Hydroxy-β-Methylglutaryl-CoA (HMG-CoA) reductase, rate limiting enzyme in the cholesterol biosynthesis and catalyzes the conversion of HMG-CoA to mevalonic acid.

Triglyceride-lowering-drugs

The most potent statins can lower triglycerides by 40 per cent. Niacin, a B vitamin, lowers triglycerides by 30 to 40 per cent. Fibrates lower triglycerides by a similar amount and are generally well-tolerated.

Statins

Statins are used to treat high levels of LDL-cholesterol. Statins include medications such as rosuvastatin (Crestor®), atorvastatin (Lipitor®), fluvastatin (Lescol®), lovastatin (Mevacor®), pravastatin (Pravachol®), and simvastatin (Zocor®).

Fibrates

Fibrates are used to treat high levels of blood triglycerides with or without high levels of LDL-cholesterol and to treat low levels of HDL-cholesterol. Among the fibrates are bezafibrate (Bezalip®), fenofibrate (Lipidil®), and gemfibrozil (Lopid®).

Niacin

Niacin is used to treat low levels of HDL-cholesterol, elevated triglycerides, and LDL-cholesterol. Niacin is a B vitamin.

Specific Drugs for sd LDL-C

Eicosapentaenoic Acid (EPA), one representative of n-3 unsaturated fatty acids (n-3 PUFAs), is clinically used for its lipid-lowering effects, significantly reduces serum sd-LDL and CRP in the metabolic syndrome.

Others

Ezetimibe (Ezetrol®) inhibit cholesterol.

Role of natural products in treatment

Increased use of natural products like fruits and vegetables may protect against free radical-mediated LDL oxidation and lipidperoxidation by providing dietary sources of antioxidants, such as vitamin E. Vitamin E consists of four tocotrienol isomers (α-, β-, γ-, and δ-) and four tocopherol isomers (vitamin E) which are found mainly in cereal grains, rice bran and palm oil and all of them are membrane soluble antioxidants.

Fish-Oils such as Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA), available in the form of salmon oil capsules (1,000 mg three to four times/day), can be a useful dietary supplement to lower triglycerides.

Soluble-Fibre like Psyllium (Metamucil®), hemp, flaxseed, oat bran, guar gum, and pectin help to lower LDL-cholesterol.

Soy-Protein

protein can also reduce LDL-cholesterol levels.

Cholest Guard capsules, (Good care Pharma) helps in reducing Cholesterol naturally composed of Guggul purified (Commiphora mukul), Arjun chall, Lehsun (Allium sativum), etc.

Ginger (Zingiber officinale) has a tonic effect on the heart, lowers cholesterol and inhibits blood platelet collection. Ayurvedic physicians suggest that eating a little bit of ginger every day will help to prevent heart attack.

Arjuna (Terminalia arjuna): Arjuna is a coronary vasodilator. It protects the heart, strengthens circulation, and helps to maintain the tone and health of the heart muscle. It is also useful in stopping bleeding and to promote healing after a heart attack.

Garlic (Allium sativum), (Lasuna): Garlic is a wonder drug for heart. Clinical trials have shown that fresh garlic and garlic supplements may lower cholesterol levels, prevent blood clots, and destroy plaque. When people with high blood pressure were given one clove of garlic a day for 12 weeks, their diastolic blood pressure and cholesterol levels were significantly reduced.

Ashwagandha (Withania somnifera): A unique herb with anti-stress adaptogenic action that leads to better physical fitness and helps cope with life's daily stress. It is especially beneficial in stress related disorders such as arthritis, hypertension, diabetes, general debility.

Guggul (Commiphora mukul): It has been shown to lower blood-fat levels while raising levels of HDL, the so called "good cholesterol". It is useful in atherosclerosis, psoriasis and cardiac ischemia.

Management

As a healthy heart is at the centre of our lives, we need to ensure we do take proper care of it. Heart disease is not something that should be taken lightly. It can be fatal. If you have concerns about your heart health conditions, you should going for some routine checkups.

Excessive-stress

Don't push yourself too hard. Stress will definitely raise your blood pressure and adding burdens to your heart. Try to look things from bring side, for there's no big deal other than our healthy body. .

Tobacco Use

Smokers have twice the risk of heart attack as nonsmokers. One-fifth of the annual 1,000,000 deaths from CVD are attributable to smoking. In the first year of quitting smoking, the risk of heart attacks can drop by 50 percent.

Physical Activity

People who are sedentary have twice the risk of heart disease as those who are physically active.

Nutrition

Between 20% and 30% of the nation's adults (some 58 million people) are obese and thus have a higher risk for heart disease, high blood pressure, high cholesterol, and other chronic diseases and conditions.

Oily foods

Saturated and Trans fats increase blood cholesterol and heart attack rates. Polyunsaturated and monounsaturated fats lower the risk of heart attacks.

Oily fish

It has a mackerel, sardines, tuna and salmon which contain omega-3 fatty acids. This type of fat has been shown to decrease triglycerides and increase HDL-cholesterol levels, improves blood vessel elasticity and thins the blood, making it less likely to clot and block blood flow.

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