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Dietary management of cardiovascular diseases

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Abstract
Cardiovascular disease (CVD) is the leading cause of death in the Developing countries. A healthy diet and appropriate physical activity can help reduce the risk for CVD. However, many people do not follow recommendations for these behaviours. A lifestyle that includes a healthy diet, weight control, and appropriate physical activity can dramatically reduce the risk of heart diseases. A dietary pattern that focuses on vegetables, fruits, low and nonfat dairy foods, whole grains, legumes, fish, and lean meats helps to reduce cholesterol levels and lower blood pressure, leading to an overall reduction in CVD risk. Increasing physical activity similarly helps to improve weight control and reduce risk of developing CVD in women. Yet few people are leading heart-healthy lifestyles.
Strategic tactics to reduce CVD risk involve the development and evaluation of educational and behavioral programs that can be implemented by organizations in communities where many people at high risk can be reached. To develop effective interventions, it is important to understand the target population in relation to the behaviors.

Keywords: cardiovascular diseases, types, dietary modification, prevention

Introduction

The heart and blood vessels comprise the cardiovascular system and together establish and maintain the circulation. The heart is a muscular organ which functions a pump. The heart and blood vessels are so arranged as to link the systemic circulation peripheral blood vessels and the pulmonary circulation blood vessels of the lungs.

The primary function of the cardiovascular systems is to be deliver oxygen required for aerobic metabolism, from the lungs to the other organs. [Brain, Kidneys, Liver & Skeletal muscle] and on return to transport carbon dioxide as metabolic waste, back to the lungs. There functions are auto regulated by complex feedback mechanism between the heart and blood vessels on the one hand and the metabolic demands of the organism for oxygen on the other hand.

Disease of the cardiovascular system affect the heart and it's components [Heart valves, conduction system and myocardium] and the blood vessels, primarily the arteries.

Heart disease affects people of all ages, but is most frequent in middle age and is most often caused by atherosclerosis. Disease of the heart may affect the pericardium, myocardium or endocardium. In addition the blood vessels with in the heart. Heart values maybe diseased. A heart attack and stroke are to be no means always fatal.

In arteriosclerosis the walls of small arteries become thickened to ageing or due to hypertension. The word atherosclerosis is derived from Greek, ortho means gruel and sclerosis means hardening.

Congestive heart failure is chronic inability of the heart to maintain an adequate output of blood from one or both ventricles. This results in congestion and over distension of certain veins and organs with blood and in an inadequate blood supply to the body tissues. Though this occurs in old age, myocardial infarction can also lead congestion heart failure.

Role of Fat in the Development of Heart Disease

Cholesterol and triglycerides are the main forms of fat carried in the blood stream. These fats or lipids come partly from food partly from the body's own production in the liver in the gastrointestinal tract and in almost all body cells that have muscles.

Cholesterol is found only in animal products and specifically in animal fat and organ meats, skim milk and egg whites; although both animal products have no measurable fat and therefore

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no significant amount of cholesterol. Plant fats such as peanut butter do not contain any cholesterol.

The liver places cholesterol in to packages called lipoproteins, made from lipids and protein. There are mainly four kinds of lipoprotein namely chylomicrons, VLDL, LDL and HDL. High density lipoprotein has more protein content.

Chylomicrons
Carry triglycerides whose fatty acids contain more than 10-12 carbon atoms, mono glycerides, glycerol and small amount of cholesterol and phospholipids.

VLDL
Transport triglycerides but mainly endogenous triglycerides formed in the liver. The VLDL travels through the blood vessels to unload fat throughout the body.

LDL
It is main the carrier of cholesterol some LDL pieces get stock to the blood vessel walls, narrowing the same. LDL is called "Bad Cholesterol"

HDL
Plays in the role reverse transport of cholesterol from tissues throughout the body back to the liver for conversion to bile acids or excretion as biliary cholesterol HDL is called "Good Cholesterol".

Risk Factors for Cardiovascular Disease
- Elevated LDL cholesterol –(Less than 100 mg/dl)
- Cigarette smoking.
- Hyper tension(blood pressure of 140/90)
- Low HDL cholesterol – Less than 40 mg/dl.
- Family history
- Age (men-45 yrs., women -55 yrs. older)
- Diabetes Mellitus.
- Lack of physical activity.
- Obesity.
- Gout.
- Economically stress full situations.
- Post-menopausal status in women.
- Stress.

Clinical Effects
➢ Impairment of heart is manifested by dyspnoea on exertion, weakness and pain in the chest.
➢ In severe failure is marked dilation of the heart.
➢ The circulation to the tissue through the kidney is so impaired that sodium and water are held in tissue spaces.
➢ An oedema fluid collects first in the extremities and with increasing failure in the abdominal and chest cavities.

Types
Rheumatic heart disease
Rheumatic fever is an inflammatory disease affecting the heart, connective tissue and brain. That occurs in three % of patients after untreated pharyngitis caused by the group A beta – haemolytic streptococcus. It may be prevented by adequate treatment of "strep throat" with penicillin. Major complications result from inflammation of the heart valves and heart muscle leading to chronic rheumatic heart disease.

Malnutrition may result in increased rates of infection and therefore may correlate with a higher incidence of rheumatic fever among those are malnourished

Ischaemic heart disease
This terms cover a group of clinical syndromes characterised by symptoms arising principally from failure of the coronary arteries to supply sufficient blood to the myocardium.

They include myocardial infarction, angina pectoris and sudden without infraction.

Myocardial infarction
This is death part of heart muscle due to failure of the blood supply. It may lead to sudden death or may heal leaving a scar in the heart. Patients with such healed lesions may be severally disabled or may be able to return to their normal life with little or no restriction of their physical activities, but they carry an increased risk of a second infarct. The infarction is usually due to a thrombus forming in an atherosclerotic coronary artery and blocking the lumen. Sometimes there is no thrombus and the infract arises because the lumen of a coronary artery has been so narrowed by atherosclerosis that the blood flow is insufficient to supply the oxygen needed to maintain a hyperactive cardiac muscle.

Angina Pectoris (Pain in the chest)
In this condition exercise or excitement provokes severe cardiac pain and so limits the patient's physical activities. Patients may live for many years and remain free of any disability, so long as they keep within the limits of their exercise tolerance.

Emotional Stress may also bring on angina.

Sudden Death
A high proportion of cases of sudden death occur in people who have had angina pectoris of myocardial infarction. Their death is presumed to be due to IHD. In others death is unexpected but autopsy shows evidence of old myocardial infarction of extensive atheroma of the coronary arteries. They are also presumed to have died of IHD.

Atherosclerosis
Mammals and many other natural orders are subject to degenerative arterial disease such as age advance. There is good evidence or retard the age changes and it is possible that this may be related to the habitual diet, through the natural of the fatty acids present in the lipids of serum and tissue. Atherosclerosis constitutes an important part of the degenerative arterial disease which affects man.

Epidemiological and experimental studies leave no doubt as to the important correlations which exist in man between diet and the fatty acid composition of the lipid in his serum and tissues.

Stages of Development
The four stages described below are based on a classification by the WHO 1958.

Stage I: First seen as fatty streaks or spots. These are thickenings of the intima which appear as slightly raised flattened yellow streaks, usually running longitudinally along the vessel under the microscope it can be seen that the elevation is caused by a new formation of **connective tissue** cells with in the intima and many of their cells are distended with droplets of fat and contain cholesterol.

Stage II: Fibrous plaque Developed between the intima and the media. These are circumscribed, elevated initial thickenings, which are firm and grey or pearly white. They vary in size from one up to several millimetres in diameter and are irregular in shape.

Stage III: Finally their surface of the plaque breaks down and an atheromatous ulcer with ragged irregular edges develops.

Stage IV: Fibrous tissue formed at the base of such an ulcer leads to scarring which may and distort further the vessel. Calcium salts may be deposited in the base of the ulcer and haemorrhage may occur.

Dietary Management
Objectives
* Maximum rest for the heart
* Maintenance of good Nutrition
* Acceptability of the programme.

Principles of Diet
How calorie, low fat particularly low saturated fat, low cholesterol, high in poly unsaturated fatty acid, low CHO, normal protein and vitamins, minerals are suggested high fibre diet is also recommended.

Energy
Those patients whose weight is at a desirable level are permitted a maintenance level of calories during convalescence and their return to activity.
The total calories should be restricted so as to reduce the weight to the expected normal for the height, sex and age.
Usually a 1000 to 1200 calorie diet is suitable for an obese patient in bed.
Loss of weight by the obese leads to a considerable reduction in the work of the heart because the basal metabolism is at a lower level. There is a slowing of the heart rate, a drop in blood pressure, and there by improved cardiac efficiency.

Fat
Restriction of fats to no more than 20% of the total calories consumed. It is not restrict all forms of fat as severe restrictions result in mental and physical depression. In the diet the proportion of saturated to mono unsaturated to poly unsaturated fat should be 5 : 6 : 4

Poly Unsaturated Fatty Acids
PUFA promote esterification of cholesterol and put it into easily utilisable form.
Linoleic acid prevents accumulation of cholesterol in blood stream and walls of blood vessels and plays a key role of transport in cholesterol.

Cholesterol
The diet should not exceed 300mg, Liver synthesis as much as 2g of cholesterol per day. If cholesterol levels are above 260mg/dl, it is almost impossible to bring about a drop by diet alone.
Mustard and soybean oil are rich in (n-3) alpha linoleic acid safflower and corn oil are rich in (n-6) linolenic acid.

Carbohydrates
Since total calories are restricted carbohydrates intake would be reduced. By reducing sugar intake, serum triglycerides decrease.

Proteins, Vitamins & Minerals
Normal allowances are recommended. Animal protein are not suggested for an atherosclerotic patient.
Since total fat, animal fat, organ meats, eggs and sea food are restricted.
Vitamin –A deficiency may occur. Therefore supplement of vitamin- A is essential.

Sodium
It is restricted when there is hypertension; usually a restriction of sodium of 1600 to 2300 mg is satisfactory in patients with CHD.
When sodium is restricted other sources of iodine should be prescribed. A severe restriction of sodium also reduces the intake of vitamin A because egg and green leafy vegetable that are high in sodium, are restricted.

Low Glycaemic Foods
A negative relation between glycaemic index and HDL cholesterol suggesting that low – glycaemic index diets may preserve HDL cholesterol and this have a potentially positive effect in reducing CHD risk.
Low GI diets may reduce plasma fatty acids and may suppress production of release of signalling hormones from adipose tissue in turn tending to reverse dyslipidaemia and insulin resistance.
* LDL concentration reduced with low glycaemic index diets preserve HDL cholesterol
* Benefit of low glycaemic index is for those with greater degree of insulin resistance.

Fibre
* High fibre in the diet reduces cholesterol pectin (apples, guavas) lowers the level of serum cholesterol and enhance the excretion of faecal steroids.
* Legumes, vegetables and fruits can lower the level of serum cholesterol, but the effect usually small compared with the well-known effect on HDL and serum triglycerides.
* Psyllium which contains soluble fibre reduces cholesterol.
* Oat products, which contain high amount beta glucan content has hypo cholesterol emic effect.

Dietary Guidelines
* Patient should maintain slightly lower than the standard weight. Accordingly total calories should be restricted.
* The diet should be rich in fibre by including foods like raw salads, fruits, green leafy vegetables and whole grains.
* Five servings of fruits and vegetables included in the diet not only to meet the nutritional requirements but also to meet antioxidants and fibre.
* Inclusion of fish in the diet is beneficial as they contain omega-3-fatty acids.
* Concentrated foods like sweats, chocolates cakes, pastries, ice creams and fried foods should be restricted or avoided.
* Foods giving empty calories like CHO beverages' alcohol, sugar and sago are totally avoided.
* Coffee and tea can be taken in moderate amount excess amount of coffin increase the heart rate.
* Animal foods like meat and pork which contain high amount of saturated fat should be avoided.
* Shrimps and crabs have less amount of fat and can be included in the diet.
* If the patient is suffering from hypertension, sodium should be restricted.
* Constipation should be prevented by including plenty of water and fibre in the diet.
* Heavy meals should be avoided small and frequent meals are preferred.
* Taking out side meals should be avoided as mostly they high in fat.

- Along with dietary and life modifications, exercise proper medication can reduce the risk of atherosclerosis

Conclusion

Heart disease is a debilitating condition for many People. According to the Centres for Disease Control and Prevention (CDC), it's the leading cause of death in the United States. Certain risk factors make some individuals more likely to have heart disease. Risk factors fall into two categories. Modifiable risk factors are ones you can control such as weight. Non-modifiable risk factors are ones you can't control, like genetics.

The good news is that choices can influence the heart health. Through lifestyle changes like smoking cessation, healthy eating, restricted fat intake, exercise, and managing diabetes, blood pressure and stress, this can greatly reduce the chance of heart disease. The most crucial step to take to lower the risk of heart disease is to quit smoking. Smoking is one of the leading risk factors for coronary heart disease, heart attack, and stroke. Smoking causes a build-up of a fatty substance (plaque) in the arteries, which eventually leads to a hardening of the arteries (atherosclerosis). Smoking damages organs and worsens many other risk factors for heart disease. It reduces the amount of good cholesterol (HDL) and raises blood pressure, which can cause increased stress on arteries. Regular physical activity results in a variety of favourable effects on cardiovascular and general health, with incremental benefits evident with increasing exercise dose.

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