

Diet in Diabetes with Heart Disease

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INTRODUCTION

Among the diet-related non-communicable diseases, diabetes and coronary artery disease (CAD) account for high morbidity and mortality. In recent years, these diseases are emerging as a major public health problem even in developing countries like India. CAD, cardiomyopathy and congestive heart failure are more prevalent among diabetics [1]. It is reported that more than 50% of diabetics develop CAD[2]. Many metabolic abnormalities of the diabetic state such as hyperinsulinaemia, hyperlipidaemia, increased platelet aggregation, coagulation and reduced fibrinolysis adversely affects the processes of atherosclerosis and thrombosis, which are the basic underlying mechanisms responsible for various cardiovascular diseases. Special attention should be given to the risk factors such as hypertension, obesity, diabetes, higher serum lipids, sedentary habits and smoking, which are known to enhance these processes. Diet plays an important role in all these risk factors, except for smoking and sedentary activity and can, in fact, modify the risk. It is therefore important to consider and comprehend dietary issues and formulate guidelines, which will help in management as well as in the prevention of these diseases. In this article, an attempt is made to provide dietary guidelines for diabetics with heart disease, particularly emphasising the control of dietary factors, which are aetiologically related to hyperglycaemia and hyperlipidaemia.

Healthy dietary practices, recommended for normal population, also hold good for diabetics with heart disease, except for restriction of foods which increase blood glucose and serum lipids. The macronutrients (carbohydrates, fats, proteins) and micronutrients (vitamins and minerals) should be provided in adequate amounts, as suggested in balanced diets, to meet the physiological needs of the body [3].

Carbohydrates

Generally, in Indian diets, carbohydrates provide 60-65% calories. Diabetics with heart disease need not restrict carbohydrate intake, but they may have to alter the type of carbohydrate in their diet. Complex carbohydrates, present in cereals and pulses have a low glycaemic index and are better

than simple carbohydrates, present in jam, jellies, sugars, jaggery and sweets. Calories from simple sugars should be restricted to less than 10%. Rice and wheat have similar glycaemic index. Therefore, rice, if consumed in moderate quantities, is as good as wheat. Certain foods, containing high fat such as milk, ice cream, nuts, though have a low glycaemic index, are not good for diabetics with heart disease. Contrary to some reports[4], suggesting that excess dietary carbohydrate results in hypertriglyceridaemia thus increasing risk for CAD, it has been shown that a generous supply of carbohydrate, when given along with high dietary fibre, has no adverse effect [5]. In fact, such diets improve glucose tolerance, as a result of improved insulin sensitivity.

Fats

The diet of an average Indian is usually high in carbohydrates and low in fat. Thus, the traditional Indian diet is ideally suited for a diabetic with heart disease. However, in recent years, with increasing affluence and urbanisation, there has been an increase in fat intake with a concomitant reduction in carbohydrates. A high fat diet increases body weight and adversely affects glucose tolerance and insulin sensitivity. It also increases serum lipids and atherosclerosis. In addition, diabetics generally have hyperlipidaemia. Therefore, special attention should be given in determining the quality and quantity of fat in the diet of a diabetic with heart disease [6].

Apart from visible fats derived from vegetable oils and animal fats ((butter, ghee), invisible fats from cereals, pulses, nuts, oil seeds, flesh foods, milk and milk products also provide half of the fat requirements in our diet. Generally, visible and invisible fats derived from all plant foods, except coconut and palm kernel, mainly provide unsaturated fats, either mono (MUFA) or polyunsaturated fatty acids (PUFA), which have no deleterious effect on serum lipids, when taken in moderate quantities. Fats from animal sources on the other hand, except from fish liver, are rich sources of saturated fats. The saturated fats include coconut oil, hydrogenated oils (vanaspati) and fats from animal sources. Groundnut and olive oil are rich sources of MUFA, whereas cotton seed, corn, sunflower and safflower oils are rich sources of PUFA. Sesame and rice bran contain both MUFA and PUFA.

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It is recommended that 15-30% of total calories be derived from fat. For diabetics with heart disease, the fat intake should be restricted to 15% of the total calories. Since 50% of fat requirements are met from invisible fats, for a person on 2400 Kcal, 20 g of visible fat will be enough. These fat calories could be derived equally from saturated, polyunsaturated and monounsaturated fats. However, the saturated fat should not exceed 8-10% of the total calories and PUFA 6-8% of calories. As a result, the fat intake should ensure polyunsaturated/saturated (P/S) ratio of 0.8 to 1. Higher (>12% calories) intake of PUFA, apart from reducing LDL-cholesterol, also results in an undesirable reduction in HDL-cholesterol.

In addition to saturation of oils, the ratio of linoleic acid (LS n-6) and alpha-linolenic acid (ALNA n-3) is also important, as these two essential fatty acids contribute to the formation of eicosonoids. However, eicosonoids formed from n-3 PUFA have more effective antithrombotic and vasodilatory properties than that formed from n-6 PUFA. Therefore, it is recommended that in our diet, LA/ALNA ratio is around 5-10, LA contributing a minimum 3% energy and ALNA contributing a minimum 0.5% energy. Based on these guidelines, diabetics with heart disease can take groundnut oil or ricebran oil singly or a combination of safflower or sunflower oil with either palm or mustard oil in moderate amounts [7].

Fish provides long chain n-3 fatty acids, which have beneficial effects on platelet aggregation and triglycerides. Therefore, non-vegetarians can take 100-200g of fish twice a week instead of red meat, shrimps, prawns and egg yolk, which add saturated fat and cholesterol to the diet. Though the upper limit for dietary cholesterol is 300mg/day [8], it is better that diabetics with heart disease restrict this limit to 100-150 mg/day. Hence, vegetarians can take fenugreek, mustard, green leafy vegetables, blackgram, wheat, which are rich sources of this fatty acid.

Proteins

It is generally recommended that 15-20% of the total calories be derived from proteins. The recommended dietary allowance for protein is 0.8-1 g/kg body weight. Proteins from vegetable sources are better than from flesh foods as they provide fibre, and do not contribute cholesterol to the diet. The added advantage is that progression of renal disease is lower with vegetable proteins than those from animal foods [9].

Calories

Daily caloric requirements are calculated on the basis of age, sex, weight, height, nature of physical activity and physiological needs [10]. The recommended caloric requirement for an undernourished (body mass index <18.5) is 40 Kcal/kg ideal body weight, for normal (BMI 18.5-25) is 30 Kcal and for overweight (BMI > 25) is 20 Kcal/kg ideal body weight. The calculated caloric requirement should allow the patient to achieve normal BMI by either losing or gaining body weight. A person above the age of 50 years requires 10% less calories for each decade increase in age.

Obesity is an established risk factor for several chronic diseases [11]. It not only increases glucose intolerance, but also increases hyperlipidaemia and heart disease, particularly hypertension. It is important for obese individuals to maintain BMI in the normal range by reducing calories and increasing physical activity. Reduction in body weight improves glucose tolerance and reduces blood pressure. In addition, it also brings about a favourable lipid profile, reducing total cholesterol and LDL-cholesterol and increasing HDL-cholesterol. Although, for weight reduction, it is advisable to combine diet restriction with exercise, a diabetic with heart disease, should first consult a physician before undertaking the exercise to determine the nature, frequency and duration of exercise.

Fibre

The beneficial effects of dietary fibre in the dietary management of diabetes and CHD have been well-recognised [12]. Among the two types, soluble fibre (pectin, gums and mucilages) present in vegetables, fruits and legumes, is more effective in controlling blood glucose and serum lipids than insoluble fibre (cellulose, hemicellulose, lignin) present in cereals and millets. Apart from soluble fibre, vegetables, fruits and legumes also provide antioxidants and n-3 fatty acids; their intake should therefore be encouraged. Traditional Indian Foods, generally prepared with whole grains, pulses and vegetables, will have more fibre and antioxidants. Foods with high dietary fibre, particularly with soluble fibre, have a low glycaemic index and are also effective in reducing blood glucose and serum lipids. Compared to fast foods and modern refined foods, our traditional foods are more useful to patients with diabetes and cardiovascular disease. It is preferable to have 25g/1000 Kcal or 40 g of fibre in our daily diet.

Salt

Salt intake is closely associated with hypertension and beneficial effects of salt restriction in the management of hypertension has been demonstrated. Although, daily salt requirements are only around 6-7 g, Indians are habituated to take higher amounts of salt, ranging from 10 to 15 g/day. Therefore, even normal subjects should cut down any additional salt. In addition, diabetics with hypertension and congestive heart failure should avoid high sodium containing foods such as pickles, papads, potato chips, salted biscuits and canned foods. It is recommended that daily intake of sodium should not exceed 1000 mg/1000 Kcals or the overall intake should not exceed 3000 mg.

Vitamins and Minerals

Since recent evidences strongly implicate free radicals and oxidised LDL in atherosclerosis, foods rich in antioxidants are likely to have a beneficial effect in diabetics with heart disease. Green leafy vegetables, yellow and orange vegetables, fresh fruits, cereals and pulses are rich sources of antioxidants such as beta-carotene, selenium, vitamins A, C and E. High fibre diets, prescribed for diabetics, may interfere with absorption of minerals such as zinc and magnesium and vitamins C and D. Similarly, low calorie diets, prescribed to obese individuals, may not provide enough micronutrients and hence their diets should be supplemented with required micronutrients.

Spices and condiments

Spices and condiments constitute an important part of the Indian diets. Though our ancient medicine described medicinal properties of spices and condiments, only recently, their beneficial effects were scientifically evaluated and demonstrated. Garlic and onion have fibrinolytic action and reduce platelet aggregation. In addition, they have hypoglycaemic and hypolipidaemic actions. About 50g onion and 1-3g of fresh garlic are adequate in the daily diet. Cloves and turmeric also possess antioxidant properties and are useful in controlling free radical damage. Fenugreek seeds contain 50% total fibre, 20% soluble fibre and n-3 fatty acids and are very effective in reducing blood glucose, serum cholesterol and triglycerides. Therefore, diabetics with heart disease could be advised to take 25 g of fenugreek seeds in three divided doses along with breakfast, lunch and dinner [13].

Beverages

In view of its caffeine content, increased coffee consumption is associated with increase in blood pressure and arrhythmias. It is better to restrict coffee consumption to 3 cups per day. Since tea contains less caffeine than coffee, it is preferable for diabetics with heart disease to consume tea rather than coffee. Another advantage with tea is that it provides less calories than coffee. Cola drinks also contain caffeine and they should be consumed in moderation. Consumption of other soft drinks should also be restricted as they add empty calories and increase body weight. Artificial sweeteners such as saccharin and aspartame could be used in beverages instead of sugar. These non-caloric sweeteners are preferable than nutritive sweeteners like sorbitol and fructose.

Alcoholic beverages provide empty calories and increase triglycerides, body weight and blood pressure. Although some reports suggest that alcohol increases HDL-cholesterol, it does not increase the HDL₂ fraction, which is known to provide protection against CAD. Dietary compliance is poor in patients taking alcohol. In addition, alcohol is likely to interact with anti-diabetic drugs. Heavy drinking increases blood pressure, causes peripheral neuropathy, alcoholic cardiomyopathy and cirrhosis of liver. Therefore, it is better for diabetics with heart disease to avoid alcohol, a drug of common abuse.

CONCLUSION

In summary, diabetics with heart disease can freely use all leafy vegetables, vegetable salads, coarse grains, sprouted grams, spices and all other foods, which are rich in fibre and antioxidants. They can use in moderate amounts low fat milk and milk products, vegetable oils with MUFA and PUFA, flesh foods (fish, chicken without skin, white of the egg) and artificial sweeteners. However, diabetics with heart disease should avoid alcohol, sugar, saturated fats and foods that are refined, processed, salt-rich, cholesterol- rich and deep-fried.

Diabetes and CAD are multifactorial in origin. Therefore, apart from following the above dietary guidelines, diabetics with heart disease should adopt an integrated approach with overall modification of lifestyle to reduce risk factors such as smoking and hypertension. They should have regular exercise, maintain ideal body weight,

practice yoga and meditation, which would help not only in prevention but also in the optimum management of these diseases and their complications.

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