Non-pharmacological Management of Diabetes: The Role of Diet and Exercise

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Diabetes is a common disease in the elderly. While pharmacological management is important, the need for and benefits of non-pharmacological therapy should not be underestimated in this population. Such therapy includes nutrition therapy, physical activity, smoking cessation and diabetic education. This article reviews, in detail, current recommendations for nutrition therapy and physical activity in elderly patients with Type 2 diabetes, including specific recommendations for all types of food groups and specific recommendations for pre-exercise evaluation.

Key words: elderly, diabetes mellitus Type 2, nutrition therapy, diet, physical activity, exercise.

Introduction

Diabetes mellitus is a chronic disease for which self-management is of the utmost importance. This fact is emphasized in the 1998 Clinical Practice Guidelines for the Management of Diabetes in Canada, in which Step 1 of the approach to Type 2 diabetes is non-pharmacological therapy consisting of lifestyle modifications such as nutrition therapy, physical activity, avoidance of smoking and diabetic education. If individualized goals for glucose control are not achieved after two to four months of such therapy, only then are oral agents and/or insulin usually recommended for most newly-diagnosed patients. For patients with Type 2 diabetes, including elderly patients, individualized attention to food portions and weight management, combined with physical activity, may help to improve glycemic control. This article will review the recommendations for the non-pharmacological management of diabetes in elderly Type 2 diabetics.

Nutrition

Nutrition, referred to as the “cornerstone of diabetes care”, is a complex, controversial and evolving area. Nutritional management of diabetes has the goal of improving or maintaining quality of life, in addition to the physiological and nutritional status of patients. In general, nutrition recommendations for elderly patients with diabetes follow the principles of Canada’s Guidelines for Healthy Eating. These include enjoying a variety of foods from the four food groups, while emphasizing cereals, breads, whole grains, vegetables and fruits. In addition, the choice of lower-fat dairy products, leaner meats and foods prepared without fat are stressed. Achieving and maintaining a healthy body weight and limiting salt, alcohol and caffeine intake are also points of focus.

Nutrition therapy seeks to improve glycemic control by balancing a patient's food intake with their endogenous insulin levels. Current recommendations suggest that all patients with diabetes should receive individualized nutrition counseling from a registered dietician who can make specific dietary recommendations according to the patient’s preferences, type and severity of disease, medication use, complications, lifestyle, socioeconomic status and degree of obesity. In Type 2 diabetes, these recommendations are aimed at improving glucose and lipid levels through diet modification and weight loss where appropriate.

Carbohydrates, Sugars and Sweeteners

Carbohydrates from cereals, breads and other grain products, vegetables, fruits, legumes, dairy products as well as any added sugars, should provide 50–60% of the individual’s energy requirements. Emphasizing carbohydrates with a low glycemic index may be helpful in controlling blood glucose. Glycemic index expresses the rise in blood glucose elicited by a carbohydrate food as a percentage of the rise that would occur if an equal amount of carbohydrate from white bread or glucose was consumed. The website of the Canadian Diabetes Association (www.diabetes.ca) offers a tool that clinicians can use to help educate patients about glycemic index. Examples of foods that have a low glycemic index include 100% stone ground whole wheat bread, oatmeal cereal, yams and legumes such as lentils and chickpeas.

Up to 10% of the daily energy requirement can take the form of added sugars, such as table sugar and/or sugar-containing products, without impairing diabetes control in most Type 2 patients. The moderate use of nutritive (sucrose, fructose, xylitol, mannitol, sorbitol, isomalt, lactitol, maltitol, aspartame) and non-nutritive sweeteners (sucralose) also can be part of a well balanced diabetic diet.

Fibre

Achieving a total dietary fibre intake of approximately 30g per day from a variety of sources is recommended. A soluble fibre intake of 5–10g per day from oats, barley and legumes can reduce serum cholesterol by up to 10%. In addition, insoluble fibres from cereals may reduce the risk of coronary heart disease by up to 30% for each 10g increase in intake.
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Protein
The recommended protein intake for patients with diabetes is the same as for other healthy adults: 0.86g/kg per day. Excessive protein intake represents a load on the kidneys and may contribute to diabetic nephropathy. Vegetable protein should be considered as a favoured alternative to animal protein with respect to reducing cholesterol and improving nephropathy.

Fats
The current recommendations for fat intake in patients with diabetes mirrors those for the general population: total fat should be limited to less than or equal to 30% of daily energy requirements. Saturated and polyunsaturated fats each should contribute less than or equal to 10% of daily energy requirements. Monounsaturated fats should be used whenever possible and the use of foods containing saturated or trans-fatty acids should be avoided. Fish containing omega-3 fatty acids may reduce serum cholesterol and should be consumed at least once per week.

Alcohol
Moderate use of alcohol (less than or equal to 5% of total daily energy intake or up to two standard drinks per day) can be part of the diet of diabetics with well controlled blood glucose, lipids and blood pressure.

Micronutrients
The daily vitamin and mineral requirements for patients with diabetes should be obtained from a well-balanced diet, as there is no conclusive evidence recommending the routine use of vitamin or mineral supplements.

Physical Activity
There are numerous benefits of physical activity in patients with diabetes, and these extend to the elderly. The benefits include increased insulin sensitivity, improved glycemic control, weight loss or maintenance, lower blood pressure, improved cardiovascular fitness, improved lipid profile and an increased sense of well-being.

Recommended Meal Plan for Type 2 Diabetics

Nutrition therapy seeks to improve glycemic control.
These benefits may even result in a decreased need for medications. In general, a stepwise increase in physical activity that becomes an extension of the person’s lifestyle should be part of the treatment plan for every patient with Type 2 diabetes who is able to increase activity. Individualized modifications need to be made for patients with occlusive vascular disease (or even a high risk of subclinical disease), significant sensory neuropathy or microvascular complications.

Before an exercise program is initiated, each patient with diabetes should undergo a detailed medical evaluation with appropriate diagnostic studies. Special consideration is given to screening for macro- and microvascular complications that may be exacerbated by exercise. The history and physical examination should focus on the heart and blood vessels, eyes, kidneys and nervous system. A graded exercise stress test should be considered if the patient is about to start a moderate-to-high-intensity exercise program, and is at high risk for cardiovascular disease based on having one of the criteria presented in Table 1.

If non-specific ECG changes occur in response to exercise or if there are non-specific ST and T wave changes on the resting ECG, alternative tests such as radionuclide stress testing may be necessary.

Canada’s Physical Activity Guide to Healthy Active Living provides exercise recommendations for patients with uncomplicated diabetes and no other related medical conditions. The 1998 clinical practice guidelines for the management of diabetes in Canada also provide excellent general advice for physical activity in patients with diabetes, including the use of proper footwear and daily foot assessment, avoiding exercise when metabolic control is poor, ingesting a rapidly absorbed carbohydrate if pre-exercise blood glucose is less than 5mmol/L, and avoiding exercise in extreme weather conditions.

The American Diabetes Association provides some recommendations for exercise prescription in the face of diabetic complications. For instance, patients with known coronary artery disease should undergo a supervised evaluation of ischemic response to exercise, ischemic threshold and the propensity to arrhythmia during exercise. The basic treatment for peripheral arterial disease is smoking cessation and a supervised exercise program. For patients with active, proliferative diabetic retinopathy, strenuous activity may cause vitreous hemorrhage or retinal detachment. As a result, such patients should avoid anaerobic exercise and exercise with straining, jarring or valsalva maneuvers. Strenuous exercise also should likely be curtailed in patients with overt nephropathy. Peripheral neuropathy may result in loss of sensation to the feet, and is an indication to limit weight-bearing exercise.

**Conclusion**

Diabetes mellitus Type 2 is a common and important chronic disease affecting the elderly. In addition to pharmacological management, non-pharmacological measures such as nutrition counseling and physical activity play an important role in improving disease control and limiting disease-related complications. Specific recommendations regarding these lifestyle measures for the elderly are similar to those made for adults in general. This article has reviewed current recommendations in these areas, with Internet links to provide the clinician with some practical resources (see references).

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**Table 1**
Criteria Indicating Patients with Diabetes are at High Risk of Cardiovascular Disease

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<tr>
<th>Criteria</th>
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<td>Age &gt; 35</td>
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<td>Type 2 diabetes for &gt; 10 years duration</td>
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<tr>
<td>Presence of any additional risk factor for coronary artery disease</td>
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<td>Presence of microvascular disease (proliferative retinopathy or nephropathy, including microalbuminuria)</td>
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<td>Peripheral vascular disease</td>
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<td>Autonomic neuropathy</td>
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**References**