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Nutrition in diabetic nephropathy

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Abstract

Introduction and purpose of the work. Diabetic kidney disease usually occurs at a late stage of diabetes and is often the result of long-term disease failure. As in diabetes alone, the diet used by the patient has a significant influence on how quickly the nephropathy will proceed. The aim of the study is to present issues related to dietary management in kidney diseases being complication of diabetes. Brief description of the state of knowledge. People with type 2 diabetes usually struggle with overweight or obesity and hypertension. Obesity is one of the factors that causes the progression of diabetic kidney disease. A diet for such people requires a negative energy balance. Insulin itself increases appetite and the frequent occurrence of hypoglycaemia is the reason for increasing the number of meals.

Summary. Diet is a very important element in the treatment of diabetes. It determines the maintenance of proper blood glucose and lipid (lipid) levels and optimal blood pressure values. A well-chosen diet reduces the risk of diabetic complications, as well as reduces the risk of vascular diseases. The right model of nutrition also plays an important role in the prevention and treatment of chronic diabetes complications.

Keywords: diet, nutrition, diabetic, nephropathy

Introduction

Diabetic nephropathy is becoming an increasing clinical problem. Very often it leads to end-stage renal failure and thus is a huge problem for patients. Diabetes as a civilization disease carries a high risk of complications, and the consequences associated with this disease are cumbersome and expensive treatment.

Diabetic kidney disease determines the complication of diabetes, which as a result of persistent hyperglycemia, leads to dysfunction and morphological changes in the kidneys. Such disorders with coexisting hypertension (causative agent) cause deterioration of organ function and have a significant impact on the increase of morbidity and mortality in people suffering from diabetes. Initially, this is manifested by microalbuminuria, which over time progresses and leads to macroalbuminuria that can cause kidney failure. Diabetic kidney disease qualifies for the so-called microangiopathic complications of diabetes [1, 3]. In Europe, patients with diabetic kidney disease account for 30%, and in the United States almost 50% of all patients treated with kidney replacement. Among diabetic patients, the incidence of microalbuminuria is 10-30% after 20 years of the disease. The probability of renal failure is definitely higher in diabetic patients than in patients suffering from other diseases [1,4]. It is estimated that it will develop in about 30-40% of patients with type 1 diabetes [1,5] and in approximately 15-20% of patients with type 2 diabetes [6]. Diet is a very important element in the treatment of diabetes. It determines the maintenance of proper blood glucose and lipid (lipid) levels and optimal blood pressure values. A well-chosen diet reduces the risk of diabetic complications, as well as reduces the risk of vascular diseases. The proper model of nutrition also plays an important role in the prevention and treatment of chronic complications of diabetes (microangiopathy, retinopathy and diabetic nephropathy) [4].

The aim of the study is to present issues related to dietary management in kidney diseases being a complication of diabetes.

Description of the state of knowledge

Diabetic nephropathy (DN) is characterized by albuminuria, which is usually accompanied by hypertension, progressive increase of proteinuria (albuminuria> 0.5 g / 24h) and decrease in renal function [8,10]. Long-term complications of diabetes include: macro-vascular disease (coronary disease), cerebrovascular disease, peripheral artery disease and retinopathy of small vessel disease and nephropathy. Diabetic nephropathy carries a 20- to 40-fold increased risk of cardiovascular mortality (CV) [9]. To delay the progression of DN, it is

recommended to:

a) good control of blood glucose

b) low-protein diet

c) control of hypertension

d) restriction of dietary salt, phosphorus and potassium in advanced cases

e) hyperfiltration control, usually by ACE inhibitors or ARBs. ACE inhibitors reduce proteinuria and glomerulosclerosis [1,7].

In the case of diabetes, the type of carbohydrates is of particular importance. It should be significantly reduced, and if possible - completely eliminate carbohydrates (sugars) simple.

These include cakes, sweet rolls, chocolate, candies, as well as sweetened fruit preserves and honey.

The basis of the menu should be complex carbohydrates:

•dark bread made from wholemeal flour

•Graham bread

•Oatmeal

•thick groats (buckwheat,barley,pearlbarley)

•Brown rice

•pasta prepared al dente and wholemeal.

They contain a lot of dietary fiber, improving the parameters of lipid metabolism (reduce total cholesterol and LDL atherosclerotic fraction) and regulate the functioning of the gastrointestinal tract. An important factor in the selection of products is the glycemic index of carbohydrates. Consume carbohydrates with the lowest glycemic index. Carbohydrates with a high glycemic index rapidly increase blood glucose levels, which in turn contributes to the discharge of insulin and a sudden reduction in glucose. This intensifies the feeling of hunger, and then the consumption of uncontrolled food is very likely [9]. People with diabetes should consume mainly carbohydrates with a low glycemic index. They give a greater feeling of fullness, minimize the secretion of insulin after a meal, thus delaying the onset of hunger. Numerous studies also indicate that a diet with a low glycemic index improves insulin sensitivity(i.e. tissue sensitivity to insulin) [1].

Fats are a very heterogeneous group of chemically and they differ significantly in their health properties. It is necessary to limit the consumption of animal fats, so-called saturated fatty acids, because they increase the concentration total blood cholesterol, especially its atherosclerotic fraction - LDL. This group of products includes: full-fat milk, butter, cream, bacon, lard, as well as fatty meats and cheeses (full-fat yellow cheeses and blue cheese). You should also avoid pates, sausages, liver pate, brawn, ham, bacon, salami and rural sausages.

Trans fatty acids, present mainly in short-fat fats, fast food and hard margarine, are also dangerous for health [2]. A separate group consists of mono- and polyunsaturated fatty acids. Numerous studies attribute to them pro-health properties. They reduce total and LDL cholesterol. Particular importance is given to the multi-unsaturated n-3 fatty acids found in fish, and n-6, present mainly in vegetable oils. The largest amounts of polyunsaturated n-3 acids are found in marine fish. These include salmon, tuna, sardines, herring and mackerel. These acids have a beneficial effect not only on the cardiovascular system. Numerous studies indicate that they also affect the proper functioning of the nervous system, especially the brain and the eye, and strengthen the immune system [3,4]. The source of multi-unsaturated n-6 acids are: corn, sunflower, soy oil, walnuts and pumpkin seeds.

Nutritional treatment is one of the most important elements in the management of patients with diabetes. It is very difficult to get proper diabetes adjustment in patients who do not comply with the nutritional recommendations, and, on the other hand, the implementation of a proper diet results in a significant and rapid improvement of alignment, especially glycemia. Implementation proper dietary management must be a process [1,7]. Patients forget about recommendations, they are guided by appetite, taste, social conditions, financial and time constraints. All this makes it very difficult to maintain a proper diet at home. Repetitive training is necessary, taking into account financial, personal and cultural preferences of the patient. It is important that the diet determined for a given patient includes the pleasure that the patient draws from eating, limiting his choice only where it is really motivated and necessary. It is also extremely important to include in the therapeutic process the patient's family and education of all household members, not only the patient himself. Such a procedure requires sacrifice by the team (diabetologist, dietitian, psychologist) of time as well as high regularity [2].

The different stages of the procedure may be:

- analysis of eating habits, food preferences, lifestyle, financial possibilities, etc., as well as assessment of readiness of the patient and his family to implement a proper diet and identification of possible obstacles (eg the need to eat outside the home, working conditions, etc.);
- establishing a treatment plan (formulation of therapeutic goals and ways to achieve them
- modification of the diet, lifestyle, physical activity; -education of the patient and his family;
- modification of the treatment plan depending on the attitude of the patient and the household members to the implemented changes, periodic control, repeated training,

further modifications of the frequency and severity of the treatment effects dependent on the assessed [3].

The primary goals of medical nutritional therapy are:

1. Maintaining almost normal blood glucose levels (glycemic control) by controlling intake and physical activity
2. Obtaining optimal lipids and blood pressure in the serum to reduce the risk of cardiovascular disease
3. Weight management.
4. Maintaining biochemical parameters and fluid status
5. Prevention of long-term complications
6. Prevention of malnutrition and strategies for controlling diabetic gastroparesis [1,2,3]. Checking the level of glucose in the blood

An important indicator of good diabetes therapy is that the blood glucose level is below the kidney threshold (250 mg / dl), so that it is not passed to the urine. Insulin resistance and glucose intolerance are characteristic features of patients with kidney disease.

The HbA1C target should be ≤7.0%. However, in CKD values may be falsely increased or decreased. The amount and type of carbohydrates (CHO) in food affects the level of glucose in the blood [5,6]]. The glycemic index tries to classify foods according to their impact on the level of glucose in the blood. Foods with GI below 55 are considered low GI food, GI foods 56-69 are referred to as moderate GI and high GI with GI> 70. Therefore, patients should be educated about the importance of the glycemic index (GI).) and glycemic load for better control of blood sugar levels. Consumption of fiber may reduce blood sugar in patients with diabetes [6]. ADA recommends fiber intake of 14g / 1000 kcal, which can be increased to 35g. Soluble and insoluble fiber reduces transit time in the gastrointestinal tract, which improves insulin sensitivity by slowing the absorption of carbohydrates. Energy requirements vary depending on age, sex and activity level. Energy requirements should be calculated depending on whether the goal is: weight reduction, weight maintenance or weight gain [5,8]. The energy consumption should not exceed 30 kcal / kg / d, of which 50-60% of the total nutritional energy should come from carbohydrates, 30% from fat and 20% from protein. It is recommended to choose low-fat and low-fat dairy products and to limit foods containing partially hydrogenated vegetable oils to reduce the trans fat content in the diet. Lowering saturated fat to no more than 5 to 6 percent of the total calories is recommended to lower cholesterol. Consumption of drinks and sugar should be limited (ADA). Cholesterol should be limited to <200 mg / day. Unsaturated fats from the Omega-3 series are supplied naturally in fish and other seafood, and the intake of these foods does not have to be limited in people with diabetes [5,8].

Recommendations on protein and phosphorus intake. Dietary protein.

A good source of protein in the diet will be lean meats and meats and lean dairy products. Once in a while, lean beef and veal are also allowed. For the second breakfast it is worth to include yogurt, kefir or buttermilk, but it is best natural.

There are also legume seeds rich in vegetable protein, unfortunately a bit forgotten in our kitchen. Eat peas, lentils and soybeans at least once a week. In addition to the large amount of protein, it is also a valuable source of vitamins (from group B) and minerals (calcium, phosphorus, iron).

Several studies in patients with diabetic nephropathy showed that the prescribed diet with a protein restriction of 0.6 g / kg per day (subjects actually achieved only a limit of 0.8 g / kg / day) delays the rate of GFR decline [8]. The protein demand for dialysis patients dependent on diabetes increases to 1.2 g / kg / d due to dialysis-related hyper-catabolic and protein loss. Accumulation of AGE due to hyperglycemia causes degenerative changes in the retina [4,5,7]. AGE also reduces the bioavailability of nitric oxide. The protein has a linear relationship with phosphorus. The amount of phosphorous to be taken should not exceed 800-1000 mg / day to control hyperphosphatemia in patients with predialysis and dialysis. Avoid foods with high protein content to phosphorus. Milk and dairy products, cola drinks, frozen meat, processed foods (cheese) with phosphorus as an additive have a high content of phosphorus. Patients should be advised to take vegetarian protein because they absorb only 50-60% of phosphorus from the plant source. Calcium intake should be limited to <2000 mg / d including supplementation. Ideally, it should not exceed 1200 mg if the patient is being treated for a lack of vitamin D [4].

Summary

Hyperglycemia plays an important role in the development of DN. Positive family history and poor glycemic control significantly increase the risk of developing DN [1]. It is recommended that patients with diabetic nephropathy should have good glycemic control. Diabetics should eat at set times and eat a few small meals a day, because the blood sugar level is the highest one to two hours after eating a meal, after which the level drops. Preference should be given to snacks between meals [3]. Meals should be well balanced, containing the right proportion of starch, fruits and vegetables, proteins and fats. Patients should be advised to maintain a constant amount of carbohydrates at every meal and snack to regulate blood sugar levels. It is important to coordinate meals and medicines to avoid hyperglycemia and hypoglycemia. Too little food as compared to diabetes medicines may result in low blood glucose (hypoglycemia). On the contrary, too large portions of meals at the same time can cause an increase in blood glucose (hyperglycemia). Phosphate binders are a must during meals. Folic acid and iron supplements are a must [7]. The best method of cooking is cooking, braising,

grilling, baking without adding fat, preparing in foil, baking in the oven and using dishes that do not require fat. Limit: cream, which we replace with natural yoghurt, choose lean meats, meats and cheeses. High temperature and prolonged cooking time increase the glycemic index of the food. The fruit should be consumed in limited quantities (up to 300 g per day) and as little as possible. The more the fruit is ripe, the higher the glycemic index is. Unfortunately, a person with diabetes should not consume alcohol. Alcohol inhibits the production and secretion of glucose by the liver, which in turn may lead to hypoglycemia. Occasionally, you can afford to drink a glass of dry wine with a meal, preferably diluted with water.

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