CASE REPORT

Atherogenic Dyslipidemia and Residual Vascular Risk in Practice of Family Doctor

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ABSTRACT

Objective: Timely recognition and optimal management of atherogenic dyslipidemia (AD) and residual vascular risk (RVR) in family medicine. **Background:** The global increase of the incidence of obesity is accompanied by an increase in the incidence of many metabolic and lipoprotein disorders, in particular AD, as an typical feature of obesity, metabolic syndrome, insulin resistance and diabetes type 2. AD is an important factor in cardio metabolic risk, and is characterized by a lipoprotein profile with low levels of high-density lipoprotein (HDL), high levels of triglycerides (TG) and high levels of low-density lipoprotein (LDL) cholesterol. Standard cardiometabolic risk assessment using the Framingham risk score and standard treatment with statins is usually sufficient, but not always that effective, because it does not reduce RVR that is attributed to elevated TG and reduced HDL cholesterol. RVR is subject to reduction through lifestyle changes or by pharmacological interventions. In some studies it was concluded that dietary interventions should aim to reduce the intake of calories, simple carbohydrates and saturated fats, with the goal of reaching cardiometabolic suitability, rather than weight reduction. Other studies have found that the reduction of carbohydrates in the diet or weight loss can alleviate AD changes, while changes in intake of total or saturated fat had no significant influence. In our presented case, a lifestyle change was advised as a suitable diet with reduced intake of carbohydrates and a moderate physical activity of walking for at least 180 minutes per week, with an recommendation for daily intake of calories alignment with the total daily (24-hour) energy expenditure (24-EE), depending on the degree of physical activity, type of food and the current health condition. Such lifestyle changes together with combined medical therapy with Statins, Fibrates and Omega-3 fatty acids, resulted in significant improvement in atherogenic lipid parameters. **Conclusion:** Unsuitable atherogenic nutrition and insufficient physical activity are the new risk factors characteristic for AD. Nutritional interventions such as diet with reduced intake of carbohydrates and calories, moderate physical activity, combined with pharmacotherapy can improve atherogenic dyslipidemic profile and lead to loss of weight. Although one gram of fat release twice more kilo calories compared to carbohydrates, carbohydrates seems to have a greater atherogenic potential, which should be explored in future.

Keywords: atherogenic dyslipidemia, residual vascular risk, lifestyle changes, statins, fibrates, omega-3 fatty acids

1. INTRODUCTION

Obesity is an independent risk factor for a number of chronic diseases, including hypertension, diabetes, metabolic syndrome, pancreatitis, chronic fatigue and premature death (1). The global increase of the incidence of obesity is accompanied by an increase in the incidence of many metabolic, as well as lipoprotein disorders, in particular AD. AD is characteristic for patients with obe-

sity, metabolic syndrome, insulin resistance and type 2 diabetes (2), and it is an important marker for increased cardiometabolic risk. It is characterized by lipoprotein profile with low levels of HDL, high levels of TG and high levels of LDL cholesterol. It is qualified by the new risk factors, including the features of the metabolic syndrome, atherogenic nutrition and lack of physical activity. A numerous genes have been associated with this form of lipoprotein disorders and understanding the genetic and nutritional impact onto AD foundation may give indications to improve interventions in order to reduce the risk of cardiovascular disease in the individuals at high-risk. Patients with increased cardiometabolic risk are identified by the unique physical and laboratory parameters. Standard cardiometabolic risk assessment using the Framingham risk score and standard treatment with statins is usually sufficient, but not always that effective, because it does not reduce RVR that is attributed to elevated TG and reduced HDL cholesterol. After identification, AD requires special attention to be given to improper nutrition, physical activity and smoking, and changes in management can further reduce major cardiovascular events (3). In some studies it was concluded that dietary interventions should aim to reduce the intake of calories, simple carbohydrates and saturated fats, with the goal of reaching cardiometabolic suitability, rather than weight reduction (4). Other studies have found that the reduction of carbohydrates in the diet or weight loss can alleviate AD changes, while changes in intake of total or saturated fat had no significant influence (5). Since the longevity and the aging of the population increases, the incidence of chronic diseases in the population also increases, creating pressure on the health system, increasing importance of having a modifications in clinical practice that are designed to minimize risk factors (6). While obesity, metabolic syndrome and diabetes may increase cardiometabolic risk by conventional risk factors, there are risk factors that play an increasing role in the RVR, which is subject to reduction through lifestyle modifications or by pharmacological interventions. When an patient with AD is identified and his behavior toward lifestyle changes is optimized, the pharmacological interventions should be tried in continuing treatment if the target values of lipid parameters has not been achieved.

2. OBJECTIVE

Timely recognition and optimal management of AD and RVR in family medicine.

3. CASE PRESENTATION

48-year old patient, suffering from pre-diabetes, metabolic syndrome and mild hypertension. Does not smoke cigarettes, is not physically active and likes to eat. His body mass index (BMI) was 28 kg/m², and the waist size 101 cm. Blood pressure was 145/90 mm Hg. Due to moderate hypertension he is taking 2.5 mg of Ramipril daily. He has a family history of heart disease. His father died from a heart attack at the age of 50. There is pathological finding in lipidograms, which was discovered during preventive laboratory testing, and showed a combined dyslipidemia: TG 4.1 mmol/L, total cholesterol 7.4 mmol/L, LDL 6.6 mmol/L, HDL 0.7 mmol/L, Glucose 6.8 mmol/L, AST 34 U/L, ALT 38 U/L.

The status: abdominal-type obesity, typical xanthomatous changes on the eyelids are visible. The therapy included 40 mg of Atorvastatin, with recommendations for modification of the lifestyle by an advice on diet with reduced intake of carbohydrates and moderate physical activity of walking at least 180 minutes per week. The changes in eating habits are also advised, with recommendation for alignment of daily intake of calories with total 24-hour energy expenditure (24-EE), depending on the degree of physical activity, type of food consumed and the current health condition. Two weeks later the patient reported to the ordination because of muscle pain in the legs, when he was given an advice and was encouraged to continue taking Atorvastatin 10 mg. After 3 months, the new lab tests were performed with following results: TG 3.1 mmol/L, total cholesterol 5.2 mmol/L, LDL 2.9 mmol/L, HDL 0.8 mmol/L, Glucose 6.0 mmol/L. Waist size was reduced to 97 cm. BMI 27 kg/m². Blood pressure 140/85 mm Hg. There were no changes in liver enzymes.

The revision of the case, 3 months later: Obtained values of laboratory parameters has not met the goals of treatment, and the patient was encouraged to continue with the lifestyle changes. Regarding medication, it was recommended to continue using 10 mg of Atorvastatin with Fenofibrate 160 mg and Omega-3 fatty acids. After another 3 months, new lab tests were performed with the results as follows: TG 1.8 mmol/L, total cholesterol 4.3 mmol/L, LDL 2.5 mmol/L, HDL 1.5 mmol/L, Glucose 5.5 mmol/L, BMI 26 kg/m², waist size 95 cm. Liver enzymes were within normal range. Advised to consider the possibility of discontinuing treatment with Statins and Fibrates, if he is ready to continue and improve his eating habits and increase the level of physical activity.

4. DISCUSSION

AD is characterized by the new risk factors, including the features of the metabolic syndrome, atherogenic nutrition and lack of physical activity, and after identification of AD, special attention is required to improper nutritional habits, physical activity and smoking. Increased energy intake by inappropriate atherogenic nutrition and reduced energy consumption by insufficient physical activity, distorts the energy balance of the organism (7), which leads to weight gain and its metabolic complications. However, it's been conclusively proved that increased intake of carbohydrates changes the lipoprotein profile toward development of AD (8). This observation suggests that a consumption of food rich in carbohydrates is the main starter of AD (9). The quantity and quality of fats in the nutrition (assuming there was no change in the number of calories obtained from carbohydrates) has minimal effect on the atherogenic lipoprotein phenotype (10). In our case, a suitable diet with reduced carbohydrate and moderate physical activity for at least 180 minutes of walking per week, led to slight improvement of dyslipidemic parameters. Sometimes it

is necessary to include pharmacological interventions in the treatment of AD. There is strong evidence that aggressive therapy with statins has the greatest impact on improving AD condition (11). Also, the treatment with combined therapy with statins and fenofibrate, in cases of combined dyslipidemia, reduces the risk of death or cardiovascular diseases (12). Several studies have proven that the use of fenofibrate together with statins, in order to reduce cardiovascular events or mortality is justified, but only in patients with low levels of HDL and high TG (13). In addition, minimal interaction of statins with fenofibrate was proven (14). In our case, the combined pharmacotherapy with statins, fibrates and omega-3 fatty acids, resulted in a significant improvement in atherogenic lipid parameters.

5. CONCLUSION

Unsuitable atherogenic nutrition and insufficient physical activity are the new risk factors that are characteristic for AD. Nutritional interventions such as reduced intake of carbohydrates, moderate physical activity, combined with pharmacotherapy improve atherogenic dyslipidemia profile and lead to weight loss. Although one gram of fat release twice more kilo calories compared to carbohydrates, carbohydrates seems to have a greater atherogenic potential, which should be explored in future.

CONFLICT OF INTEREST: NONE DECLARED.

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