ASPECTS REGARDING THE INTERRELATION BETWEEN DYSLIPIDEMIA AND SILENT ISCHEMIC HEART DISEASE

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Abstract: *Dyslipidemia is a real public health problem worldwide, which is justified by its increased prevalence and incidence, its complex pathogenic and clinical consequences, as well as the costs involved. Dyslipidemia does not cause direct clinical manifestations, but is a major risk factor for atherosclerotic cardiovascular disorders, in our case silent ischemic heart disease. In this sense, we analyzed in a personal study the lipid profile, the atherogenicity indices, as well as the prevalence of silent ischemic heart disease in the studied group and we noted the significant correlation between dyslipidemia (hypercholesterolemia) – a major cardiovascular risk factor, and silent ischemia.*

Cuvinte cheie: *dislipidemie, cardiopatie ischemică silenţioasă, factor de risc cardiovascular*

Rezumat: *Pe plan mondial, dislipidemiile se constituie într-o reală problemă de sănătate publică, aspect justificat de prevalenţa şi incidenţa crescută, consecinţele complexe patogenice şi clinice, precum şi de costurile implicate. Dislipidemiile nu determină manifestări clinice directe dar reprezintă factor de risc major pentru afecţiuni cardiovasculare aterosclerotice, în cazul nostru cardiopatia ischemică silenţioasă. În acest sens, am analizat, într-un studiu personal, profilul lipidic, indici de aterogenitate, precum şi prevalenţa cardiopatiei ischemice silenţioase în lotul studiat, şi am remarcat corelaţia semnificativă dintre dislipidemie (hipercolesterolemie) - factor major de risc cardiovascular şi ischemia silenţioasă.*

INTRODUCTION

Dyslipidemia is a disorder of plasma lipoprotein metabolism, characterized by abnormal increases in some cholesterol fractions, due to their excessive production or deficient metabolization and epuration.

Dyslipidemia plays a major role in atherogenesis, which has been experimentally, epidemiologically and clinically demonstrated. The main lipid component incriminated in atherogenesis was and is cholesterol, particularly in the form of LDL-cholesterol.

There is a direct relationship between serum cholesterol concentrations and atherogenesis. A 10% reduction in total plasma cholesterol is followed by a 25% reduction in the incidence of coronary disease after 5 years, and a reduction of 1 mmol/L (approx. 40 mg/dl) in LDL-cholesterol is accompanied by a 20% reduction of coronary events (1).

Observational data in UKPDS demonstrated that an increase of 1 mmol/L (38.7 mg/dl) in LDL-cholesterol was associated with a 57% increase of cardiovascular disease. Low HDL-cholesterol is also an important predictor of vascular disease. An increase of 0.01 mmol/L (4 mg/dl) is associated with a 15% reduction of cardiovascular disease (2).

The independent relation of increased triglycerides with vascular risk is controversial.

In a meta-analysis of some population cohort studies, the mean risk excess associated with an increase of 1 mmol/L (89 mg/dl) in triglycerides was 32% in men and 76% in women (3). After the adjustment for HDL-cholesterol, the risk excess was two times lower, 37% in women and 14% in men, but remained statistically significant.

High triglyceride and low HDL-cholesterol levels were significantly related to all coronary events in a large cohort of patients with type 2 diabetes mellitus followed up for 7 years (4).

Based on evidence resulting from randomized controlled trials, the Third Joint European Societies Task Force on Cardiovascular Disease Prevention in Clinical Practice (5) recommended total cholesterol therapeutic objectives for patients with cardiovascular disease of < 4.5 mmol/L (174 mg/dl) and LDL-cholesterol therapeutic objectives < 2.5 mmol/L (97 mg/dl). This LDL-cholesterol objective is similar to that of Adult Treatment Panel III (ATP III) of the Cholesterol Education Programme in the light of recent RCTs (6). Thus, for patients at extremely high risk, including those with diabetes mellitus and symptomatic cardiovascular disease, an LDL-cholesterol therapeutic objective ≤ 1.8 mmol/L (70 mg/dl) is suggested.

Given the lack of information derived from randomized controlled trials, the guides are less specific regarding HDL-cholesterol and triglyceride therapeutic objectives (7).

Anyway, common European guides recognize low HDL-cholesterol (< 1 mmol/L (39 mg/dl) in men and < 1.2 mmol/L (46 mg /dl) in women and fasting triglycerides > 1.7 mmol/L (151 mg/dl) as markers of high cardiovascular risk.

Silent ischemic heart disease is a form of transient, asymptomatic acute myocardial ischemia, in the absence of angina pectoris or an equivalent of angina, which can be demonstrated by paraclinical investigations.

The detection of silent ischemia in the apparently healthy population aged over 40 years showed a 2.5-5% prevalence, depending on the method of detection used.

Silent myocardial ischemia is one of the forms of manifestation of ischemic coronary disease determined by

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atherosclerosis; however, current evidence does not identify different significant risk factors for different forms. Nevertheless, in certain studies, closer correlations with various risk factors appear.

Thus, the MISAD Group (Milan Study on Atherosclerosis and Diabetes Group) (8) noted a closer correlation with age and total cholesterol.

The importance of the evaluation of risk factors in patients with silent ischemia was extremely well illustrated in the study of Laukkannen et al. (9), which followed for 10 years the prognostic significance of silent ischemia detected by the exercise test in asymptomatic men with several risk factors. Silent ischemia was associated with an increase in relative death risk of 5.9 in smokers, 3.8 in hypercholesterolemic patients, and 4.7 in hypertensive patients. The relative risk for an acute coronary event in the same groups of patients was 3.0 in smokers, 1.9 in hypercholesterolemic patients and 2.2 in hypertensive patients.

THE AIM OF THE STUDY

We analyzed in a personal study the lipid profile, the atherogenicity indices, as well as the prevalence of silent ischemic heart disease in the studied group and we noted the significant correlation between dyslipidemia (hypercholesterolemia) – a major cardiovascular risk factor, and silent ischemia.

MATERIAL AND METHOD

The study included 188 asymptomatic patients (without known ischemic coronary disease), who presented cardiovascular risk factors and were selected at the family medicine practice and the ambulatory service of Medical Clinic I Cluj-Napoca, meeting the criteria of inclusion in the study.

Inclusion criteria: absence of symptomatic ischemic coronary disease (angina or an angina equivalent); capacity of the patient to perform the exercise test.

Exclusion criteria: patients with severe associated disorders; patients with interpretable ECG on the exercise test (major left bundle branch block, atrial fibrillation); patients undergoing surgery during the past weeks.

Each patient had a standard record drawn up.

For the evaluation of the lipid profile, total cholesterol, HDL-cholesterol, LDL-cholesterol and triglycerides were determined. Cholesterol was dosed using the enzymatic method, with a threshold serum cholesterol value <190 mg/dl (<5 mmol/L); HDL-cholesterol was dosed from the supernatant obtained by the selective precipitation of the other lipid fractions (LDL, VLDL, chilomicrons); the normal value was considered > 40 mg/dl (1 mmol/L); LDL-cholesterol was calculated using Friedewald's formula, with a threshold value <100 mg/dl; triglycerides were dosed from plasma by the enzymatic method, with normal values <150 mg/dl (<1.7 mmol/L).

Silent ischemic heart disease was diagnosed by cardiological examination, ECG at rest, echocardiography, exercise test.

RESULTS AND DISCUTIONS

By relating the presence or the absence of dyslipidemia to the biographical data of the studied patients, we obtained the following results:

Table no. 1. Distribution of cases depending on sex

Sex	No.	%
Women	102	54.3
Men	86	45.7

In our study group, women were dominant (54.3%), the female/male ratio being 1.2:1.

Table no. 2. Distribution of cases depending on age

Age	No.	%
< 40 years	9	4.8
41-50 years	14	7.4
51-60 years	48	25.5
61-70 years	57	30.3
>70 years	60	31.9

The distribution depending on age shows a small percentage of patients aged less than 50 years (12.2%), the majority being over 60 years old (62.2%).

Table no. 3. Distribution of cases depending on risk factors

Risk factors	No.	%
AHT	22	11.7
Obesity	19	10.1
Sedentary life	15	8.0
Associated risk factors	87	46.3
Tobacco	10	5.3
Alcohol	5	2.7
Stress	14	7.4
Coffee	16	8.5

In our study group, dyslipidemia was determined in 80 patients, a prevalence of 42.6% being obtained.

Table no. 4. Prevalence of dyslipidemia depending on sex

Sex	No.	%
Women	45	44.1
Men	35	40.7

The prevalence of dyslipidemia was higher in women than in men, without significant differences (p=0.793).

Table no. 5. Prevalence of dyslipidemia depending on age

Age	No.	%
< 40 years	2	22.2
41-50 years	4	28.6
51-60 years	18	37.5
61-70 years	27	47.4
>70 years	29	48.3

The prevalence of dyslipidemia increased with age (from 22.2% to 48.3%). The presence of dyslipidemia was found in young adults (22.2% at ages younger than 40 years and 28.6% at ages ranging between 41-50 years).

Table no. 6. Distribution of cases depending on the number of risk factors depending on the presence of dyslipidemia

Risk factors	With DLP		Without DLP	
	No.	%	No.	%
1 RF	55	68.7	46	32.6
≥ 2 RF	25	31.3	62	57.4

Silent ischemic heart disease was detected in 70 patients, a prevalence of 37.2% being obtained.

In the group of dyslipidemic patients, the prevalence of silent ischemic heart disease was 42.5%, 1.3 times higher than in the group of non-dyslipidemic patients (33.3%) (p=0.042).

Table no. 7. The atherogenicity index in patients with and without dyslipidemia

	DLP	Without DLP
Atherogenicity index	5.39±0.78	3.71±0.64

The atherogenicity index was significantly higher in patients with dyslipidemia compared to non-dyslipidemic patients (5.39 versus 3.71) (p=0.021), the risk of cardiovascular events increasing in this way (AMI, CVA).

Table no. 8. Prevalence of silent ischemic heart disease depending on risk factors

Risk factors	With DLP		Without DLP	
	No.	%	No.	%
1 RF	23	41.8	13	28.3
≥ 2 RF	11	44.0	23	37.1
	34		36	

In patients with one risk factor, the prevalence of silent ischemic heart disease was 41.8% in dyslipidemic patients compared to 28.3% in non-dyslipidemic patients, and in the case of patients with 2 or more associated risk factors, it was 44.0% in dyslipidemic patients compared to 37.1% in non-dyslipidemic patients.

The risk of silent heart disease was almost 1.3 times higher in dyslipidemic patients with an associated risk factor compared to non-dyslipidemic patients with one risk factor (RR=1.25), and in patients with 2 or more associated risk factors, the risk of silent ischemia was more than 1.3 times higher in dyslipidemic patients compared to non-dyslipidemic patients (RR=1.34).

CONCLUSIONS

1. The prevalence of dyslipidemia is more frequent in women and increases with age, being also found in young adults.
2. The prevalence of silent ischemia is significantly higher in dyslipidemic patients compared to non-dyslipidemic patients.
3. The atherogenicity index is significantly higher in patients with dyslipidemia compared to non-dyslipidemic patients (5.39 versus 3.71) (p=0.021).
4. The risk of silent ischemic heart disease is almost 1.3 times higher in dyslipidemic patients with an associated risk factor compared to non-dyslipidemic patients with one risk factor (RR=1.25), and in patients with 2 or more associated risk factors, the risk of silent ischemia is more than 1.3 times higher in dyslipidemic compared to non-dyslipidemic patients (RR=1.34).
5. Dyslipidemia represents an important risk factor for silent ischemic heart disease.
6. The results obtained are in accordance with the literature data.

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