TRIGLYCERIDES – INDEPENDENT RISK FACTOR FOR CORONARY HEART DISEASE

GINETA PIRON[1], G. I. SCRIDON[2]

[1]The Faculty of Medicine and Pharmacy of Oradea, [2]Military Hospital of Oradea

Abstract: *Hypertriglyceridemia is a major risk factor which triggers, alone or associated with other cardiovascular risk factors, cardiovascular disease or complications of this, having an impact on society and family. Our study refers to 250 patients with different forms of coronary disease who were evaluated for a period of five years (2000-2005); within this research, the levels of triglycerides, the average number of hospitalizations and the morality rate due to the coronary heart disease were randomized.*

Keywords: *coronary heart disease, hypertriglyceridemia, cardiovascular risk factors.*

Rezumat: *Hipertrigliceridemia este un factor de risc major ce produce, singur sau asociat cu alţi factori de risc cardiovascular, boli cardiovasculare sau complicaţii ale acestora, cu impact social şi familial. Au fost luaţi în studiu 250 de pacienţi cu diferite forme de cardiopatie ischemică dureroasă şi monitorizaţi timp de 5 ani (2000-2005); s-au urmărit valoarea medie a trigliceridelor, media internărilor şi rata deceselor prin boală ischemică coronariană.*

Cuvinte cheie: *cardiopatie ischemică, hipertrigliceridemie, factori de risc cardiovascular*

INTRODUCTION

Hypertriglyceridemia is correlated with the increase of the heart diseases risk. To support the assumption of the triglycerides implication in changing the cardiovascular risk, there are epidemiological studies and physiopathologic mechanisms of the atherogenity of triglyceride-rich lipoproteins.

Purpose of research. Identifying and evaluating the effect of the triglycerides association with certain cardiovascular risk factors (age, sex, body mass index, arterial hypertension, diabetes mellitus, smoking) on the evolution of the painful ischemic heart disease (atherosclerotic heart disease).

MATERIALS AND METHOD

After the evaluation of more than 6000 clinical observation sheets of patients with heart diseases, hospitalized in the cardiology section of the Clinical County Hospital of Oradea during the year 2000 – we aleatorily established two research batches of 250 patients each: *Batch no. I* – patients diagnosed with ischemic heart disease with the following clinical forms: silent ischemic heart disease, painful ischemic heart disease with effort angina, painful ischemic heart disease with unstable angina, painful ischemic heart disease with myocardial infarction. *Batch II* – was made up of 250 patients hospitalized in the same section of cardiology and who were discharged from the hospital during the same year, whose anamnestic, clinical, imagistic and bioumoral examination excluded the ischemic character (coronary, cerebral, peripheral), serving as witness batch. The two batches resembled in terms of age average, sex distribution and dwelling place.

The clinical observation and the examinations made after discharge were periodically continued in relation with the family doctor and the cardiologist of the general hospital for 5 years when the final examination took place. Only the patients of the first batch (the initial values and the final ones after 5 years) were taken into consideration in this essay. The examination of the clinical documentation regarding the inclusion in the research batch was rigorously made, taking into account and registering on individual sheets in dynamics, the results of the bioumoral examinations during the hospitalization period of time, the heredo-colateral and personal antecedents, lifestyle elements, the results of the imagistic examination, the therapeutic recommendations for the ambulatory treatment and the recommendations regarding the rhythm of the control examination. According to the addresses mentioned in the clinical observation sheet, we identified the patients' location and the family doctors they belong to.

Then, we visit the respective family doctors – we established the collaboration protocol according to which the patient's evidence and guidance regarding the prescription of drugs and the observance of other protocols recommended to patients at the moment of their discharge from the hospital – remain in the responsibility of the family doctor.

We had the possibility of collaborating with the patients in order to obtain information on their clinical evolution, as well as in order to obtain information and documents on other examinations, the right to advise them on a proper lifestyle (diet, smoking, alcohol consumption, physical activity, treatment discipline). This type of collaboration was agreed by all family doctors. The natural movement of patients within the evidence of our batch was checked yearly until 2005, when the final examination took place. Once this final examination having been made, the bioumoral examinations were also performed in comparison with those of 2000. A certain number of patients were hospitalized in 2005 too, and

regarding the others, the ambulatory examinations represented the basis of the assessment.

The scale of quantitative assessment (mg⁄dL) of triglycerides was that proposed within the NCEP-ATP III/2002 classification which was also accepted in 2004 by the European Society of Cardiology.

Table I – Triglyceridemia classification

TGL (mg/dL)	
< 150	Normal
150-199	Limit/Bound
200-499	High
> 500	Very high

The average value of seric triglycerides at the moment of the patients' discharge from the section of cardiology in 2000 and the cardiovascular risk factors associated to each patient in comparison with the year 2005 are presented in the following tables. During the 5 years, the number of patients of the initial batch (250) decreased year to year, either as a result of recovery and professional reinsertion (68 patients), or because of the abandon; a number of 19 patients refused to collaborate and 42 patients died, thus the final batch of 2005 reached the number of 121 patients, of which 67 were hospitalized during the year 2005 and 54 patients were examined and evaluated ambulatorily.

Research development:

The epidemiological structure: The total number of patients: 250, of which 119 (47,6%) were women and 131 (52,4%) were men. The average age of the batch was of 55,5, years old with extreme values of 28 years old and 83 years old. Regarding the area origin, 145 (58%) came from the urban environment and 105 (42%) came from the rural environment.

The cardiovascular risk factors taken into consideration regarding this research, in prevalence order, together with hypertriglyceridemia are: overweight (obesity), arterial hypertension and hyperglycemia (>110 mg/dl); smoking.

Technical data: triglycerides were divided into doses in the clinical laboratory of the Clinical County Hospital of Oradea during hospitalisation and the control result was dosed either in the laboratory of the county diagnostic centre or in the private laboratory within the country, where the patients of our research benefited from different consultations. The classification base was NCEP-ATP III⁄2002, also accepted in 2004 by the European Society of Cardiology (table I).

RESULTS AND DISCUSSION

The distribution of the average values of the seric triglycerides (mg⁄dL) at the beginning and at the end of the research (2000-2005) taking into account the gender and the dwelling place, as well as the prevalence of the cases with triglycerides value over 200 mg⁄dL are presented in table II.

Table II – Distribution of the average values of triglycerides (mg⁄dL)

	Year 2000			Year 2005	
Patients	TGL	Prevalence of cases > 200mg/dL		TGL	Prevalence of cases >200mg/dL
Women	196,18	13 (5,2%)		166,40	6 (2,4%)
Men	179,34	18 (7,2%)		158,86	9 (3,6%)
Urban	189,00	6 (2,4%)		147,14	10(4,0)
Rural	186,52	11 (4,4 %)		171,82	11(4,4)
Total average	187,76			161,05	

Within the research, high values of triglycerides were not recorded, the majority of them being grouped between 140-200 mg⁄dL, and the excess over 200 mg⁄dL, expressed by the above prevalent values was small.

Whereas the incidence of the ischemic heart disease and coronary accidents shifted lately to lower age groups, we checked the distribution of the cardiovascular risk factors, taking into account the age groups.

Table III – The distribution of the average values of triglycerides (mg⁄dL) by age groups, gender and area origin in comparison with the interval 2000-2005

Age	The total average value of TGL in mg/dL for the year 2000			
	women	men	urban	rural
28-40 years old	198,12	177,60	190,92	176,14
41-50 years old	206,28	193,14	198,80	199,18
51-60 years old	198,40	180,00	196,40	198,76
61-70 years old	188,78	179,76	179,50	181,80
Over 70 years old	189,96	166,44	177,16	171,74
Age	The total average value of TGL in mg/dL for the year 2005			
	women	men	urban	rural
28-40 years old	146,60	158,42	143,96	150,16
41-50 years old	145,86	139,34	151,34	133,46
51-60 years old	170,18	165,84	151,66	153,94
61-70 years old	174,10	160,20	163,16	156,80
Over 70 years old	188,60	168,66	129,86	160,16

No abstract statistics of these values was made. After sorting the values registered in the clinical observation sheets, we processed them and explained their significance to the patients.

We offered them advice for 5 years from the lifestyle point of view as a risk factor for the ischemic heart disease (type of food, given the large number of obese people, smoking, the alcohol excess, sedentary life).

Table IV – Evolution of the distribution of the average values of triglycerides (mg⁄dL), taking into account the body mass index, as an associated risk factor, by gender and dwelling place, comparatively for the years 2000-2005

Batch 2000	Average value of triglycerides mg/dL			
BMI (Kg/m²)	women	men	urban	rural
< 25	159,18	128,44	141,18	143,16
25-29,9	188,04	176,28	181,96	166,14
> 30	218,06	180,60	198,10	201,42
Batch 2005	Average value of triglycerides mg/dL			
BMI (Kg/m²)	women	men	urban	rural
< 25	134,66	121,18	127,06	119,90
25-29,9	151,24	140,44	126,40	150,18
> 30	160,19	179,16	144,42	156,74

The practical value of advising the patients regarding their lifestyle is important for the adjustment of food, for its caloric value, as well as for the renouncement to the sedentary life and the materialization into favourable body mass indexes and reasonable values of triglycerides. The relation between the values of the blood pressure and the average value of triglycerides is presented in table V.

Table V – The distribution of the average values of triglycerides (mg⁄dL) taking into account the arterial hypertension (AH)

Batch 2000	The average value of triglycerides mg/dL			
AH value (mm/Hg)	women	men	urban	rural
< 140/90	149,36	150,30	125,90	160,26
> 140/90	168,60	176,40	160,12	166,20
Batch 2005	The average value of triglycerides mg/dL			
AH value (mm/Hg)	women	men	urban	rural
< 140/90	130,00	148,76	138,10	139,40
> 140/90	160,76	156,66	172,14	158,90

In all cases of arterial hypertension, irrespective of the clinical stage, the seric level of triglycerides was significantly higher than the normotensive people, both at the batch of 2000 and at the batch of 2005 and the values of triglycerides of the people with hypertension within the batch of 2005 were lower than those with hypertension of the batch 2000, taking into consideration the general monitoring of lifestyle associated with the specific therapy.

In the case of the patients with hyperglycemia (> 110 mg⁄dL), the level of triglycerides was significantly higher, especially in women (table VI).

Table VI – The distribution of the average values of triglycerides (mg⁄dL), taking into account the hypertension as an associated risk factor.

Batch 2000	The average value of triglycerides mg/dL			
Glycemia (mg/dL)	women	men	urban	rural
< 110	151,36	135,90	144,66	159,90
> 110	204,18	169,88	176,40	181,18
Batch 2005	The average value of triglycerides mg/dL			
Glycemia (mg/dL)	women	men	urban	rural
< 110	137,40	130,14	126,60	131,28
> 110	179,14	144,28	158,22	140,74

Two cases were identified – both were male, obese, glucose intolerance, high blood pressure and hypertriglyceridemia – with major coronary accidents, one of the patients having repeated infraction.

Smoking as a cardiovascular risk factor in direct relation with triglycerides is known as favouring the postprandial increase of these and of the chylomicrons as well as of the seric level of triglycerides and of cholesterol together with the decrease of the cholesterol-HDL, thus rising the atherogenic character of dislypidemia. The average values of the seric triglycerides are presented in table VII, regarding the smokers and the non-smokers of the research batch.

Table VII – The distribution of the average values of triglycerides (mg⁄dL) and smoking

Batch 2000	The average value of triglycerides mg/dL			
	women	men	urban	rural
Non-smokers	152,29	138,66	149,40	155,36
Smokers	199,66	158,20	178,60	162,30

It was observed that the average values of triglycerides were significantly higher in women smokers as against the men smokers, respectively in the urban environment as against the rural one, what was kept even after 5 years. The identified cardiovascular risk factors were established on the hierarchic system according to the prevalence of the patients of the research batch (table VIII).

Table VIII – The weight of the cardiovascular risk factors

The risk factor	Total	Women	Men
Overweight	165 (66%)	74 (29,6%)	91 (36,4%)
Hypertriglyceridemia	137 (54,8%)	66 (26,4%)	71 (28,4%)
Arterial hypertension	129 (51,6%)	55 (22%)	74 (29,6%)
Hyperglycemia (>110 mg/dL)	119 (47,6%)	69 (27,6%)	50 (20%)
Smoking	78 (31,2%)	17 (6,8%)	61 (24,4%)

CLINICAL ASPECTS

The most frequent associations of the risk factors encountered to the patients of the research are presented in table IX.

Table IX

Associated risk factor	Total	Women	Men
Overweight, Hypertriglyceridemia	39 (15,6%)	11 (4,4%)	28 (11,2%)
Overweight, Arterial hypertension	33 (13,2%)	17 (6,8%)	16 (6,4%)
Overweight, Hypertriglyceridemia, Arterial hypertension	28 (11,2%)	9 (3,6%)	19 (7,6%)
Overweight, Hypertriglyceridemia, Smoking	27 (10,8%)	11 (4,4%)	16 (6,4%)
Hypertriglyceridemia, Hyperglycemia Smoking	13 (5,2%)	6 (2,4%)	5 (2%)

The number of patients included in the initial research of the year 2000 decreased due to varied reasons, presented at the beginning of the paper. The next table emphasizes this image together with the annual average of the hospitalizations per patient and the evolution of morality due to the ischemic heart disease.

Tabel X – The patients' movement of the research batch – 2000 – for a period of 5 years of clinical observation, the evolution of the annual average value and the evolution of deaths due to the coronary heart disease

Year	Total	W	M	The annual average value of TGL (mg/dL)		Average number hospitalizations/patient		No of deaths, yearly			
				women	men	women	men	women	men	urban	rural
2000	250	119	131	196,18	179,34	0	0	0	0	0	0
2001	231	103	128	191,44	183,60	3,3	3,7	2	5	4	3
2002	176	78	98	166,30	156,09	2,4	1,9	5	4	4	5
2003	119	55	64	148,14	165,42	1,2	1,6	4	4	6	2
2004	108	63	45	161,66	159,18	0,7	2,6	4	7	9	2
2005	67	34	33	166,4	158,86	0,54	1,1	5	2	4	3

The morality due to the coronary heart disease in patients of the batch registered 42 deaths during the 5 years, that is 16,8%. The data were taken from the death register of the family doctors or during the hospitalizations and the average of hospitalizations was made based on the medical sheet kept by the family doctors.

CONCLUSIONS

1. Lifestyle importance – the type of food, the caloric value, the sedentary life played a major part as risk factors, these bringing about the patients' overweight with a prevalence of 66%.
2. The lifestyle produced and highly increased another risk factor associated to the coronary heart disease – hypertriglyceridemia.
3. The arterial hypertension generated and maintained by overweight with the errors of lifestyle turned into a risk factor associated to the ischemic heart disease. In all cases with pathologic blood pressure values, triglycerides registered high levels.
4. The glycemia values à jeun of 110-130 mg/dL dominated (prevalence of 88,8%) being accompanied by moderated values of triglycerides. Although, these values were higher in women.
5. Smoking, especially to women, was accompanied by high values of triglyceridemia. The women smokers from the urban environment are dominant as against the ones of the rural environment.
6. The influence of advising the patients ambulatorily contributed essentially to the adjustment of lifestyle, to the improvement of the triglycerides values year by year, as well as of other risk factors (AH, hyperglycemia, smoking, BMI), which can be observed in the above tables.
7. On one hand, the progressive decrease of the number of patients is due to their clinical recovery, with professional reinsertion and on the other hand preferring the collaboration with other specialized surgeries.
8. The lower average number of hospitalizations during the 5 years emphasized that the ambulatory advice treatment along with the medicines fond treatment satisfies a corresponding clinical state.
9. The number of deaths was not significantly influenced, remaining almost at the same values. The mortality rate of 16,8% for the chronic coronary heart disease pathology fits the national one.
10. The most affected age segment of coronary heart disease pathology is between 40-50 years old, in our research.

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