

DIFFERENCES IN THE LEVELS OF LIPID STATUS IN PATIENTS WITH ISCHAEMIC HEART DISEASE AND MALIGNANT DISEASE

Beretka Atila, Branislava Brkic, Miodrag Djordjevic and Dragan Zecevic

Arteriosclerosis is the basis of all cardiovascular diseases. Numerous risk factors lead to the rise of malignant and cardiovascular diseases. Those are: elevated artery blood pressure, raised plasma cholesterol and triglycerides, low level of HDL-cholesterol, smoking, diabetes mellitus, diet, lack of physical exercises, heredity, stress, gender.

The aim of the study was to compare the lipid status of patients with cardiovascular disease or malignancy.

The database of the biochemical laboratory and Oncology Counselling Unit of the "Ostrog Clinic" was used. The method of random sampling was used and patients (n=29) of both genders were selected, aged 40 to 47 years, with cardiovascular diseases, and had significant occlusive coronary disease, which required operation or surgical revascularization procedure. The patients were classified in two groups: G1 (n=14) with statin therapy and G2 (n=15) without statin therapy. Both groups were statistically compared with a group of female patients (n=30) with breast cancer, who were between 37 and 69 years of age. Control group comprised 25 healthy subjects. Standard statistical methods were used for processing the lipid status parameters: the arithmetic mean, standard deviation SDn and SDn-1, correlation coefficient, post hoc test and a single factor analysis of variance.

The results obtained pointed to the existence of a marked hyperlipoproteinemia type 4 in the group of cardiovascular patients who did not use statin (G2). In G2, there were higher levels of cholesterol, LDL-cholesterol and plasma triglycerides in comparison with the control and G1, while the value of HDL-cholesterol was within the range of referent values. The obvious suppressing effect of statin on cholesterol and LDL-cholesterol was observed in G1. Group G3 had, in comparison with the control and cardiovascular patients, significantly lower levels of cholesterol and triglycerides in plasma, as well as lower index of atherosclerosis and lower risk factors for the development of atherosclerosis.

Elevated levels of cholesterol, LDL-C and LDL/HDL-C are the important risk factors for atherosclerosis development. These lipids' risk factors could be modified, especially in the primary prevention of cardiovascular diseases. Lower values of lipid parameters in patients with malignancy compared to patients with cardiovascular diseases indicated possible lower risk for malignancy in these patients. *Acta Medica Medianae 2008;47(4):20-23.*

Key words: *lipid status, cardiovascular disease, risk factors, malignant disease*

US Medical School Belgrade¹
Special hospital for heart and blood vessels "Ostrog" Belgrade²

Contact: Beretka Atila
35 Niska Street
11000 Beograd,
E-mail: atila@sbb.co.yu

Introduction

Atherosclerosis lies at the basis of cardiovascular diseases. Risk factors leading to the development of malignant and cardiovascular diseases are numerous. On the basis of anamnestic studies in our country (1) and abroad (2,3,4), the following are meant to be the risk factors:

Artery blood pressure - elevated levels of artery blood pressure are associated with progressive risk increase of coronary disease development. The reduction in diastolic blood pressure by only 7.5 mmHg reduces the risk of coronary disease by 28% and the risk of cerebrovascular disease by 44%.

- Cholesterol – the connection between a coronary disease and the level of plasma cholesterol is continuously graded. The risk is the highest in the middle age and relatively decreases with the aging of men and increases with the aging of women.
- Triglycerides – elevated levels of triglycerides in plasma, especially if linked with lower HDL levels, constitute a high risk factor for the development of a coronary disease.
- HDL is hereditary, independent and strong risk factor for coronary diseases; lower HDL levels are associated with high risk.
- Smoking – directly associated with the risk for coronary disease development.
- Diabetes mellitus – associated with excessive risk for the development of coronary disease.
- Diet – diet rich in saturated fats and cholesterol is a great risk factor – obesity is an independent risk factor.
- Physical inactivity – relationship inversely proportionate to the development of a coronary disease.

- Inheritance-familial susceptibility.
- Stress.
- Gender – women are less likely to suffer and die from the disease in pre-menopause period which is explained by the protective role of estrogen. On the basis of case-control studies carried out abroad and in this country and the above-mentioned data, the following common risk factors for malignant and cardiovascular diseases have been drawn up (5) (Table 1).

Table 1. Common risk factors for malignant neoplasms and cardiovascular diseases (5)

| Common risk factors | Relative risk | | Interval of confidence | |
|---------------------|---------------------|-----|------------------------|----------|
| | MN | KVO | MN | KVO |
| Age | Increase with aging | | 5.0-0.8 | 4.9-8.1 |
| Smoking | 10.1 | 9.8 | 7.3-11. | 8.0-10.7 |
| Alcohol | 2.9 | 9.8 | 1.9-5.0 | - |
| Diet (lipids) | 6.2 | 7.1 | 4.0-7.0 | 5.8-9.8 |
| Hormones | 5.3 | - | 3.07.0 | 5.8-9.6 |
| Infection | 3.1 | - | - | - |
| Immunology | 2.9 | - | 0.8-4.2 | - |
| Drugs | 3.1 | - | 2.0-9.0 | - |
| Hereditary | 3.6 | 3.7 | 1.9-6.0 | 2.9-5.6 |
| Stress | 1.9 | 2.3 | 0.8-6.0 | 1.2-5.9 |
| Fatness level | 2.8 | 3.1 | 1.4-5.2 | 1.9-4.7 |
| Exercise level | 3.1 | 3.8 | 1.6-4.8 | 1.3-5.9 |
| Radiation | 5.6 | - | 4.0-11.0 | - |

Aims

The aim of the paper was to compare the lipid status of patients with cardiovascular and malignant disease.

Material and methods

The database of the biochemical laboratory and the Oncology Counselling Unit of the "Ostrog Clinic" was used. The method of random sampling was used, and the patients (n=29) of both genders were selected, aged 40 to 47, with cardiovascular diseases (CVD) – namely, with significant occlusive coronary disease, which required an operation or surgical revascularization procedure. The patients were classified in two groups: G1 (n=14) with statin therapy and G2 (n=15) without statin therapy. Both groups were statistically compared

with a group of female patients (n=30) with breast cancer, who were between 37 and 69 years of age. Control group comprised 25 healthy individuals.

The lipid status parameters were determined on the biochemistry analyzer "Hitachi 902" using the following methods: Cholesterol (6), HDL-cholesterol (direct) (7), LDL-cholesterol (direct), CHOD-PAP method reagent "Bioanalytica", triglycerides GPO-PAP reagent "Bioanalytica", total lipids method with sulfovanillin acid (8), risk factors and atherosclerosis index are calculated by the following formula: Atherosclerosis index = LDL-C/HDL Chol; Risk factor=Cholesterol/HDL-C.

Standard statistical methods were used for processing the lipid status parameters, namely: the arithmetic mean, standard deviation SDn and SDn-1, correlation coefficient, post hoc test and a single factor analysis of variance.

Results

General characteristics of examined patients are shown in Table 2.

Table 2. General characteristics of examined patients

| | women n(%) | men n(%) | age (year) (x±SD) |
|---------|---------------|-------------|----------------------|
| control | 20 | 5 | 52±4 |
| Group 1 | 8 | 6 | 57±6 |
| Group 2 | 10 | 5 | 59±7 |
| Group 3 | 30* | 0 | 50±4 |

*p<0.05 vs. other groups

Women were more frequent in the group with breast malignancy compared to groups with cardiovascular patients (p<0.05). There was not statistical significance in average age between groups.

The paper compared the lipid status parameters of the group of patients with cardiovascular diseases (G1 with statin therapy and G2 without statin therapy) with a group of patients with breast carcinoma (G3) (Table 3).

In G2 group compared to control, higher level of cholesterol (p<0.01), LDL-C (p<0.05) and triglycerids in plasma were obtained (p<0.01), while concentration of HDL-C was within normal range. Group G3 compared to control had lower cholesterol (p<0.01) and triglyceride (p<0.01) concentration. Total lipids were significantly higher in patients with cardiovascular diseases (p<0.01).

Table 3. Lipid status parameters

| | Cholesterol | (mmol/L) HDL-C | (mmol/L) LDL-C | (mmol/L) Total lipids | (g/L) Triglycerids |
|---------|-------------|-------------------|-------------------|--------------------------|-----------------------|
| control | 4.7±0.6 | 1.3±0.14 | 2.5±0.8 | 5.6±1.2 | 1.2±1 |
| Group 1 | 4.41±0.66&& | 1.20±0.17 | 2.45±0.40&& | 7.21±1.37**& | 1.79±1.02&& |
| Group 2 | 5.99±1.21** | 1.46±0.14 | 3.29±0.92* | 10.14±2.08** | 3.19±1.52* |
| Group 3 | 3.47±0.59** | 1.08±0.20 | 3.03±0.57 | 5.64±0.97 | 0.96±0.36** |

*p<0.05; **p<0.01 vs control; &p<0.05, &&p<0.01 vs. G2

The single-factor analysis of variance showed that the type of disease has considerable effect on the difference in lipid status between groups G2 and G3. In the group of cardiovascular patients, statins significantly reduced the total cholesterol, LDL cholesterol, triglycerides ($p < 0.01$) and total lipids concentration ($p < 0.05$) (Table 3).

Atherogenic indexes are shown in Table 4.

Table 4. Atherogenic indexes

| | index of atherosclerosis | risk factor |
|---------|--------------------------|---------------|
| control | 2.1±0.3 | 2.53±0.6 |
| Group 1 | 2.08±0.40 | 3.92±0.62**&& |
| Group 2 | 2.16±0.51 | 4.09±0.69**&& |
| Group 3 | 1.77±0.29* | 1.90±0.83* |

* $p < 0.05$, ** $p < 0.01$ vs. control; && $p < 0.01$ vs. G3

Group G3 had, in comparison with control and cardiovascular patients, significantly lower index of atherosclerosis and lower risk factor for the development of atherosclerosis ($p < 0.05$, $p < 0.01$, prospectively). Risk factor was significantly higher in G1 and G2 group compared to control ($p < 0.01$) (Table 4).

The results obtained pointed to the existence of a marked hyperlipoproteinemia (HLP) type 4 in the group of cardiovascular patients not using statin (G2).

Discussion

It is well-known that hyperlipoproteinemia (HLP) is one of the causes leading to the development of cardiovascular diseases (9, 10, 11). This fact has been confirmed by the results obtained in this paper. HLP IV is present in the group of patients with cardiovascular disease not using statin. The same type of HLP was shared by the G1 patients before they started with statin therapy.

By correlating patients with cardiovascular diseases and those with breast cancer, the

confounding factor of interference of other elements (12) was expressed.

According to some authors (1, 13, 14), the lipid status is a protective factor against malignant diseases and the results obtained in this paper are in correlation with it. These results might correspond to a hypothesis that chronic cardiovascular patients suffer less from carcinoma in comparison with the rest of the patients' population. Other authors (15,16) also point to these facts. Some publications (17,18) state that one of the most important common risk factors for cardiovascular diseases is age (every 10 years there is an arithmetic progression of tumour). Our group of patients with cardiovascular diseases, aged between 40 and 70, was small to be divided in 10-year periods and to correspond to the statements of the authors (17,18).

On the basis of the results obtained and the epidemiological researches of the Oncology Counselling Unit of the Ostrog Clinic, we may conclude that chronic cardiovascular patients suffer 10 to 15 times less from malignant diseases.

The reason, inter alia, may be angiostatin and endostatin from the endothelium of blood vessels of cardiovascular patients that prevent primary vascularisation of the initial group of formed malignant cells (17,18).

Conclusion

The results show that lipids' risk factors for atherosclerosis could be modified by statins therapy, especially in the primary prevention of cardiovascular diseases.

Elevated levels of cholesterol, LDL-cholesterol as well as elevated LDL/HDL ratio are significant risk factors for the development of atherosclerosis as well as for the assessment of atherogenic risks of lipid origin.

Patients with breast malignancy had lower values of lipid parameters compared to cardiovascular patients and controls which indicated somewhat lower risk for malignancies in these patients.

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RAZLIKE U NIVOIMA LIPIDNOG STATUSA KOD BOLESNIKA SA ISHEMIJSKIM BOLESTIMA SRCA I MALIGNIH OBOLJENJA

Beretka Atila, Branislava Brkić, Miodrag Đorđević i Dragan Zečević

U osnovi kardiovaskularnih oboljenja stoji arterioskleroza. Faktori rizika za nastanak malignih oboljenja i kardiovaskularnih oboljenja su brojni. Tu spadaju: povišene vrednosti arterijskog krvnog pritiska, povišen holesterol i trigliceridi u plazmi, nizak nivo HDL-holesterola, pušenje, šećerna bolest, način ishrane, fizička neaktivnost, nasleđe, stres, pol.

Cilj rada bio je upoređivanje lipidnih faktora rizika kod kardiovaskularnih i malignih bolesnika.

Korišćena je baza podataka biohemijske laboratorije i onkološkog savetovališta bolnice "Ostrog". Metodom slučajnog uzorka izabrani su bolesnici (n=29) oba pola, starosne dobi 40-47 godina, sa kardiovaskularnim oboljenjima (KVB) - koji su imali značajnu koronarnu okluzivnu bolest, koja je zahtevala interventnu kardiološku ili kardiohiruršku revaskularizacionu proceduru. Ovi bolesnici su podeljeni u dve grupe: G1 (n=14) na terapiji statinima i G2 (n=15) bez terapije statinima. Obe grupe su statistički poredene sa grupom bolesnika (n=30) koje su imale karcinom dojke, starosne dobi 37-69 godina. Kontrolu je činilo 25 zdravih ispitanika. Za obradu parametara lipidnog statusa korišćene su standardne statističke metode: aritmetička sredina, standardna devijacija SDn i SDn-1, koeficijent korelacije R, post hoc test i jedenofaktorska analiza varijanse.

Analizom dobijenih rezultata zapaža se izražena hiperlipoproteinemija (HLP) tip IV u grupi kardiovaskularnih bolesnika (KVB) koji nisu koristili statine (G2). U ovoj grupi nađene su povećane vrednosti holesterola, LDL-holesterola i triglicerida u plazmi, dok je vrednost HDL-holesterola bila u opsegu referentnih raspona. U G1 grupi evidentno je suprimirajuće dejstvo statina na koncentraciju holesterola i LDL-holesterola. Grupa G3 imala je, u odnosu na kontrolu i kardiovaskularne bolesnike, izrazito snižene vrednosti holesterola i triglicerida u plazmi, kao i smanjene vrednosti indeksa arterioskleroze.

Povećani nivoi holesterola, LDL-holesterola, kao i povišen odnos LDL/HDL, značajni su faktori rizika za nastanak ateroskleroze, kao i za procenu aterogenog rizika lipidnog porekla. Na ove faktore se može uspešno uticati primenom statina, posebno u primarnoj prevenciji kardiovaskularnih oboljenja. Niže vrednosti lipidnih pokazatelja kod bolesnika sa karcinomom u odnosu na kardiovaskularne bolesnike može ukazivati na nešto manji rizik za pojavu malignih oboljenja kod u ovih bolesnika. *Acta Medica Medianae* 2008;47(4):20-23.

Cljučne reči: lipidni status, kardiovaskularna oboljenja, faktori rizika, maligna oboljenja