CARDIOVASCULAR RISK ASSESSMENT IN ELDERLY PATIENTS

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Abstract. The aim of study was the investigation of particularities of the cardiovascular risk factors in elderly compared with middle-aged patients. The subjects were divided into two groups: group A consisting of 61 patients aged ≥ 65 years old and group B consisting of 58 patients aged between 50 and 64 years old. The subjects were admitted in our Department for the following cardiovascular diseases: angina, miocardial infarction, hypertension, and heart failure. Patients diagnosed with arrhythmias, different types of atrioventricular blocks or valvular diseases have been excluded. The cardiovascular risk factors studied were: obesity, dyslipidemia (characterized by a high total/HDL cholesterol ratio), isolated systolic hypertension, diabetes, sinus tachycardia (heart rate > 80 beats/min at rest) and smoking. A detailed questionnaire have been administered at hospital admission, followed by clinical and laboratory investigations. After one year of specific treatment, patient's status have been reevaluated. The spectrum of cardiovascular risk factors in elderly is different from middle-aged patients. So in elderly group predominate basic synusal tachycardia, diabetes and isolated systolic hypertension and for middle aged patients dislipidemia and smoking were lieder factors of risk.
Key words: cardiovascular risk factors, elderly, association of risk factors

Rezumat: Lucrarea îşi propune studiul particularităţilor factorilor de risc cardiovascular la vârstnici comparativ cu segmentul de populaţie de vârstă mijlocie. Studiul s-a efectuat pe două loturi: lotul A, format din 61 de pacienţi cu vârsta ≥ 65 de ani şi lotul B, format din 58 de pacienţi cu vârsta cuprinsă între 50 – 64 de ani. Loturile au fost formate din pacienţii internaţi în Clinica IV Medicală pentru următoarele afecţiuni cardio-vasculare: angină pectorală, infarct de miocard, hipertensiune arterială, insuficienţă cardiacă. Au fost excluşi din studiu pacienţii cu tulburări de ritm şi conducere asociate. Factorii de risc urmăriţi au fost: obezitatea, dislipidemia (exprimată prin creşterea raportului colesterol total/HDL-colesterol), hipertensiunea arterială sistolică izolată, diabetul zaharat, tahicardia sinusală bazală (frecvenţa cardiacă în repaus > 80 bătăi/min) şi statutul de fumător. Determinările au fost făcute pe baza chestionarelor individualizate şi a investigaţiilor efectuate la prima internare şi după un an de tratament. Spectrul factorilor de risc cardio-vascular la vârstnic este diferit faţă de grupa de vârstă 50-64 ani prin scăderea ponderii statutului de fumător şi dislipidemici în favoarea apariţiei tahicardiei sinusale bazale, diabetului zaharat şi HTA sistolică izolată.
Cuvinte cheie: factor de risc cardiovascular, vârstnic, asociaţii de factori

INTRODUCTION

As our population age, death and disability from cardiovascular diseases have become a major problem. Epidemiological investigation has indicated that this high incidence as age advances is attributable to an increasing burden of identified risk factors and a lesser ability to cope with them (1- 3).

Diabetes, hypertension and left ventricular hypertrophy increase with age beyond age 65 years.

Hypertension prevalence is high in the elderly and isolated systolic hypertension that predominates in the elderly is a distinct hazard for development of coronary disease, stroke, heart failure and peripheral artery disease (4).

Dyslipidemia remains relevant for assessing risk of coronary disease in the elderly. Although the impact of the total serum cholesterol (TC) tends to wane with advancing age, the TC/HDL cholesterol ratio continues to be highly predictive. This ratio is now established as the most efficient lipid assessment for predicting coronary disease, equaling in efficiency the theoretically superior LDL/HDL cholesterol ratio (5,6).

Interest in diabetes now focuses on the insulin resistance syndrome promoted by abdominal obesity. Diabetes has a more powerful influence in women, eliminating their cardiovascular disease incidence advantage over men (7-10). These factors can be curbed by modifying the lifestyle of the elderly to be less sedentary, control weight, stop smoking and consume less fat and more fruits and vegetables (11).

Persons who develop cardiovascular diseases typically have more than one of the predisposing risk factors. All the major risk factors tend to cluster because they are metabolically linked. The risk associated with any particular risk factor varies widely depending on the number and intensity of the other risk factors likely to accompany it. Some 30% of coronary events that occur in men and 56% in women have clusters of three or more risk factors (12 - 14).

SUBJECTS AND METHOD

During 01.01.1999 - 31.12.2000, 119 patients admitted for the following cardiovascular diseases: angina pectoris, miocardial infarction, hypertension and heart failure have been selected. Patients previously diagnosed with arrhythmias or different types of atrioventricular blocks have been excluded.

The subjects were divided into group A, consisting of 61 patients $\geq$ 65 years old and group B, consisting of 58 patients aged between 50–64 years old.

For risk factors assessment a detailed questionnaire as well as laboratory tests have been used.

The cardiovascular risk factors studied were: obesity (body mass index > 30 kg/m^2), total cholesterol/HDL cholesterol ratio (TC/HDL) $\geq$ 6, basic synusal tachycardia (heart rate at rest > 80 beats/minute), diabetes (fastening blood glucose > 140 mg%) and smoking.

The risk factors were evaluated in both groups when first admitted in the study (I) and after one year of treatment (II).

The frequencies of each risk factor as well as their clustering have been calculated for both groups.

RESULTS

Age and sex distribution of patients by categories of cardiovascular diseases in the two groups is presented in Table 1.

Table 1. Age and sex distribution of patients by categories of cardiovascular diseases

Cardiovascular disease	Group A			Group B		
	Total n (%)	M n (%)	F n (%)	Total n (%)	M n (%)	F n(%)
Angor pectoris	21 (34)	8 (40)	13 (60)	16 (28)	9 (59)	7 (41)
Myocardial infarction	9 (14)	4 (44)	5 (56)	5 (10)	3 (60)	2 (40)
Hypertension	28 (47)	10 (38)	18 (62)	36 (60)	23 (62)	13 (38)
Heart failure	3 (5)	1 (33)	2 (67)	1 (2)	1 (100)	
All	61(100)	23 (38)	38 (62)	58 (100)	36 (62)	22 (38)

Hypertension is the most frequent cardiovascular disease for both groups of patients (47% in A group; 60% in B group, respectively). In second range is angor pectoris with 34% frequency in oldest patients and 28% frequency in B group. Women predominate in the elderly group (62% *vs* 38%) whereas males predominated in other group (62% *vs* 38%).

Epidemiological studies showed that the cardiovascular disease incidence tend to rise in women by age. Undergoing the menopause promptly increases women's coronary disease risk three-fold over that of women the same age who are still menstruating (7,9,14). Hormone replacement therapy is needed in order to diminish this risk, but none of our patients had any hormonal replacement therapy.

Table 2 indicates the frequencies of individual risk factors investigated and their outcome evaluation after one year of follow up. Initial evaluation, at hospital admittance (I) shows some differences between patients' groups A and B, as risk factor frequencies.

Basic synusal tachycardia followed by diabetes mellitus and isolated systolic hypertension had highest frequencies in elderly group: 85; 80 and 51, respectively.

For middle aged patients TC/HDL cholesterol ratio and smoking were the most frequently found as risk factor (68 and 66, respectively).

Different frequencies of smoking between A and B groups (36 *vs* 66%; p=0.008) could be due to differences in sex distribution of patients.

Isolated systolic hypertension (ISH) was the risk factor significantly influenced by an year of specific treatment (20 *vs* 51%; p=0.001).

We mention that we didn't succeed in treating of dyslipidemia and obesity due to patients incapacity to change their life style (especially in A group).

Although, the frequency of basic synusal tachycardia (BTS) decreased after 1 year more evidently for middle aged patients in comparison with elderly group, it is clear that the reduction of this risk factor was unsignificantly both in A group and B group.

Table 2. The frequencies of individual risk factors investigated at hospital admittance (I) and after 1 y of follow-up (II)

Risk factor	Initial evaluation (I)			Evaluation of risk factors after 1 y of treatment					
	no. of cases (%)		P	**A**: no.of cases (%)		p	**B**: no.of cases (%)		p
	A	B		I	II		I	II	
Obesity (BMI>30kg/m^2)	26 (43)	30 (53)	N.S.	26 (43)	24 (39)	N.S.	30 (53)	24 (42)	N.S.
TC /HDL cholesterol ratio $\geq$ 6	20 (33)	39 (68)	0.0002	20 (33)	18 (30)	N.S.	39 (68)	27 (47)	N.S.
Basic synusal tachycardia	52 (85)	15 (26)	0.0000	52 (85)	48 (79)	N.S.	15 (26)	9 (16)	N.S.
Isolated systolic hypertension	31 (51)	0 (0)	0.0000	31 (51)	12 (20)	0.001	0 (0)	0 (0)	-
Diabetes mellitus	49 (80)	6 (10)	0.0000	49 (80)	41 (67)	N.S.	6 (10)	3 (5)	N.S.
Smoking	22 (36)	38 (66)	0.008	22 (36)	16 (26)	N.S.	38 (66)	29 (50)	N.S.

Although the frequency of diabetes lowered in both groups of patients, this tendency was more evident for B group because of a better response to drugs and diet. However, the decrease was insignificantly due to the lower frequency of this risk factor in B group. The association of different risk factors is presented in table 3.

Table 3. Cluster of risk factors

Risk factor association	Initial evaluation (I)			Evaluation of risk factors after 1 y of treatment					
	no. of cases (%)		p	**A**: no.of cases (%)		p	**B**: no.of cases (%)		p
	A	B		I	II		I	II	
1	48 (79)	6 (10)	0.0000	48 (79)	12 (20)	0.0000	6 (10)	3 (5)	N.S.
2	46 (75)	6 (10)	0.0000	46 (75)	40 (66)	N.S.	6 (10)	3 (5)	N.S.
3	20 (33)	38 (66)	0.0005	20 (33)	12 (20)	N.S.	38 (66)	12 (21)	0.0000
4	46 (75)	6 (10)	0.003	46 (75)	39 (65)	N.S.	6 (10)	3 (5)	N.S.
5	20 (33)	6 (10)	0.0000	20 (33)	18 (29)	N.S.	6 (10)	3 (5)	N.S.
6	42 (69)	6 (10)	0.0000	42 (69)	39 (64)	N.S.	6 (10)	3 (5)	N.S.
7	39 (64)	5 (9)	0.0000	39 (64)	36 (59)	N.S.	5 (9)	3 (5)	N.S.

1 = ISH + Diabetes + BST
2 = ISH + Diabetes + Obesity
3 = ISH + Smoking + TC/HDL cholesterol ratio $\geq$ 6
4 = Diabetes + Obesity + BST

5 = Diabetes+Obesity+TC/HDL cholesterol ratio$\geq$6
6 = Diabetes + smoking + BST
7 = Diabetes + smoking + ISH + BST

As table 3 data show all risk factor associations, had significantly higher frequencies in elderly patients at hospital admittance.

At the end of follow-up period, the frequency of cluster of isolated systolic hypertension, diabetes and basic synusal tachycardia decreased significantly in A group.

In B group the cluster of isolated systolic hypertension, smoking and dyslipidemia had a significant decrease, also.

DISCUSSION

Cardiovascular disease ranks high among the conditions that take the joy out of reaching advanced age.

Interpretation of prospective epidemiological data in the elderly must take into account the high prevalence of cardiovascular disease at this age, the high mortality rate, associated morbidity and natural selection. Also, underlying undiagnosed severe atherosclerotic disease is very common in the elderly.

Our data showed that cardiovascular morbidity is higher in women of elderly group. In middle-aged group the morbidity was higher in men. We believe that women are undiagnosed until late in age which, added to the fact that menopause increases cardiovascular disease incidence, could explain our data.

Of all cardiovascular risk factors in elderly group, isolated systolic hypertension is the best predictor for coronary artery disease, the frequency of which increase dramatically with age (51% in group A). This isolated systolic hypertension that predominates in elderly is due primarily to an increase in large-artery stiffness and an associated increase in wave reflection amplitude. The benefits of treating isolated systolic hypertension are well proved by evolution of frequencies of this risk factor after one year of treatment ($p < 0.0000$).

Diabetes is a major risk factor in group A (80% of cases) and has a more powerful influence on vulnerability to atherosclerotic cardiovascular disease of elderly women than men. In this group, diabetes was often accompanied by abdominal obesity, dyslipidemia (33% of cases) and isolated systolic hypertension (51% of cases) and was very difficult to treat because of low adherence of these patients to diet and change of lifestyle.

It was difficult to analyze the role of smoking because of the differences in the structure according to sex distribution of the two groups: group A had 62% female patients and group B had 62% male patients.

Although the impact of total serum cholesterol tends to decrease with advancing age, the TC/HDL cholesterol ratio continues to be highly predictive for B group *vs* A group ($p=0.0002$).

A regular physical activity protects against coronary artery disease through its influence on hypertension, lipid profile and obesity and is beneficial for elderly as well as for middle-aged group. Despite this a small number of aged persons is willing to start exercise.

Analyzing the clustering of 3 or 4 risk factors (global risk) in both groups, we found there were important differences

between them: in middle-aged population we found mostly essential hypertension associated with smoking and modification of lipid profile (66%). In elderly we currently found diabetes associated with basic synusal tachycardia and isolated systolic hypertension (79%). These data suggest that the picture of cardiovascular risk factors is different in middle-aged *vs* elderly population: smoking status is less important compared with diabetes and basic tachycardia.

All the major atherogenic risk factors tend to cluster because they are metabolically linked. This tendency to cluster is promoted by weight gain and development of abdominal obesity that promotes insulin resistance. This tendency of risk factors to cluster is an important consideration in evaluating the risk of developing cardiovascular disease.

CONCLUSIONS

1. The frequency of cardiovascular morbidity in elderly is higher in women than in men.
2. The picture of cardiovascular risk factors is different in elderly patients comparatively to middle-aged subjects.
3. One year of specific treatment decreased significantly only the frequency of isolated systolic hypertension in elderly patients.
4. The clustering of risk factors was different in elderly group *vs.* middle-age patients. So, in elderly currently diabetes associated with synusal tachycardia and isolated systolic hypertension, whereas in middle-age patients we found

mostly hypertension associated with smoking and modification of lipid profile.

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