THE JOURNAL OF PREVENTIVE MEDICINE
2001; 9(3): 35-39

DYSLIPIDEMIA IN HYPERTENSIVE PATIENTS IN A PRIMARY CARE UNIT CATCHMENT AREA

Elena Lungu, Iliana Palamaru, Lidia Rusu, Roxana Alexandrescu

Institute of Public Health Iasi

Abstracts. The present study is part of a program with aimed to assess the prevalence of physical, metabolic and behavioural risk factors related to primary hypertension. This cross-sectional survey was conducted in a primary care unit in Iasi city between 1997 and 1999. The mean age of investigated persons was 53.9±9.8 years for the I-st hypertension grade of severity, 62.2±10.6 for the II-nd hypertension grade of severity, 67.3 ± 11.2 years for the III-rd hypertension grade of severity and 55.9±9.0 years for the IV-th hypertension grade of severity. Body mass index (BMI) had average values between 26.5±6.1 and 30.1±4.1 kg/m^2, indicating a moderate risk for cardiovascular disease. According to family history 36% of patients had a hypertensiv history (father and mother). Serum total/HDL – cholesterol ratio was higher than 5 in 12% of cases, indicating an atherogenic risk.

Key words: primary hypertension, body mass index, HDL-cholesterol, LDL-cholesterol, cardiovascular disease.

Rezumat. Prezentul studiu este o parte a unui program care şi-a propus să estimeze prevalenţa factorilor de risc fizici, metabolici şi comportamentali asociaţi hipertensiunii arteriale primare. Acest studiu tip transversal a fost efectuat la o unitate de asistenţă medicală primară din municipiul Iaşi în perioada 1997 - 1999. Vârsta medie a persoanelor investigate a fost 53,9 ± 9,8 ani pentru HTA grad I , 62,2 ± 10,6 ani pentru HTA grad II, 67,3 ± 11,2 ani pentru HTA grad III şi 55,9 ± 9,0 ani pentru HTA grad IV. Indicele de masă corporală (IMC) a avut valori cuprinse între 26,5 ± 6,1 şi 30,1 ± 4,1 kg/m^2, indicând un risc moderat de boală cardiovasculară. Aproximativ 36% din pacienţi prezintă un istoric familial de hipertensiune arterială (ambii părinţi). Raportul colesterol total / HDL – colesterol a înregistrat valori mai mari decât 5 la 12% din pacienţi, indicând riscul aterogenic.

Cuvinte cheie: hipertensiune arterială primară, indice de masă corporală, HDL-colesterol, LDL-colesterol, boală cardiovasculară.

INTRODUCTION

Major contribution to development of coronary disease have been identified by epidemiological research, including atherogenic personal attributes, living habits which promote them (1).

The concentration of serum high-density lipoprotein (HDL-cholesterol) is known to be inversely correlated with the risk of ischemic heart disease in developed countries (2-4). Moreover, serum HDL-cholesterol levels are more influential than are serum low-density lipoprotein (LDL-cholesterol) levels in affecting ischemic heart disease risk (2-4). Whereas, a 1% reduction in serum LDL-cholesterol level reduces coronary artery disease by 2%, a comparable 1% increase in serum HDL-cholesterol reduces coronary artery disease risk by 3% to 5% (1).

Both observational and experimental data suggest that several dietary components (carbohydrate, protein, fiber, cholesterol and fat) may affect HDL-cholesterol levels (5). In addition to the HDL-cholesterol and LDL-cholesterol, the role of trygliceride are very atherogenic, especially the small, dense, very low density lipoproteins (VLDL) (1).

Epidemiological research at the Framingham survey has refined the influence of the standard cardiovascular risk factors in the rate of occurrence of coronary disease (1). According to this survey, diabetes and reduced HDL-cholesterol had a better influence in women (1). Some risk factors such as blood lipids, glucose intolerance, uric acid and fibrinogen had a lower relative risk in advanced age. Obesity promotes all the atherogenic factors (1). In this sense obesity had assumed greater importance as a risk factor for coronary heart disease as a result of recent research demonstrating its importance in the insulin resistance syndrome (1). Obesity – induced risk factors include insulin resistance, glucose intolerance, hypertrigliceridemie, reduced HDL-cholesterol and hyper-uricemia (1).

Obesity is associated with several diseases that may result in significant morbidity or may be the primary cause of death (4).

Generally, the obesity is associated with grater metabolic abnormalities, others than total cholesterol, HDL-cholesterol and LDL-cholesterol such as hyperinsulinemia, insulin resistance and glucose tolerance (6).

Body mass index (BMI) grater than 24.4 kg/m^3 is associated with an increased risk for cardiovascular disease. Similar increased risks have been identified for hypertension, cerebral and peripheral vascular disease, hyperlipidemia, biliary tract disease, osteoarthritis and gout (1).

Physical indolence, predisposes also to coronary events in youngs and olds (1).

The total cholesterol / HDL-cholesterol ratio is currently the most convenient and efficient lipid risk profile for coronary heart disease.

More than half of the patients with hypertension or those requiring treatment of hypertension, have a lipid abnormality (2). The more the pressure rises, the greater the likelihood of a lipid problem.

Normalization of elevated total and LDL-cholesterol reduces the progressive of atherosclerosis (7).

The reduction in the cholesterol level, especially HDL-cholesterol, of the obesity and also of high blood pressure are of primary importance in reducing the cardiovascular morbidity.

From the perspective of the public, as opposed to the individual, will need a population approach to the problem of hypertension in the form of lifestyle and dietary changes, in addition to individual treatment for those at high risk for coronary heart disease (7).

SUBJECTS AND METHOD

The present study is part of a program which aimed to assess the prevalence of physical, metabolic and behavioral risk factors related to primary hypertension. This cross-sectional survey was conducted in a primary

medical care unit in Iasi county in the period of 1997-1999. The sample consisted of 50 patients of both sexes randomly selected.

Data were collected from the chronic disease register of primary care unit, followed by an interview, complete physical examination and laboratory tests (serum total cholesterol, serum HDL-cholesterol, serum LDL-cholesterol).

Body Mass Index (BMI) had been also estimated. BMI is one method which correlates most closely with measurements of body composition (body fat content). It consists in ratio of weight in kilograms to height in meters squared (kg/m^2). The normal range for BMI in adults is 19 to 24. Values of BMI between 25 and 30 indicate a moderate obesity, between 30 and 40, a mild obesity and higher than 40, severe obesity.

Definition of hypertension: systolic blood pressure (SBP) ≥ 140 mm/Hg and/or diastolic blood pressure (DBP) ≥ 90 mmHg. We used the classification of hypertension of JNC (Joint National Committee) of USA (8):

Grade of severity of hypertension	SBP mm/Hg	DBP mm/Hg
I	140-159	90-99
II	160-179	100-109
III	180-209	110-119
IV	≥ 210	≥ 120

Total cholesterol level was determined by photocolorimeter method. HDL-cholesterol was determined using similar methods after precipitation of low density lipoprotein (9).

LDL-cholesterol was than calculated according to the Friedewald formula (8).

RESULTS AND DISCUSSION

The mean age of investigated persons was 53.9±9.8 years for the Ist grade of hypertension; 62.2±10.6 years for IInd grade of hypertension; 67.3±11.2 years for IIIrd grade of hypertension and 55.9±9.0 years for IVth grade of hypertension, as table 1 data show.

As the table 1 indicate, most of the patients diagnosed with moderate hypertension (II and III) were old.

Table 1. The distribution of patients by sex, age and BMI

	Grade of severity of hypertension			
	I	II	III	IV
female (%)	8 (16)	12 (24)	8 (16)	8 (16)
male (%)	5 (10)	5 (10)	2 (4)	2 (4)
age (years) (mean ± SD)	53.9 ± 9.8	62.2 ± 10.6	67.3 ± 11.2	55.9 ± 9.0
BMI (kg/m^2) (mean ± SD)	30.1 ± 4.1	29.9 ± 7.5	26.5 ± 6.1	30.0 ± 5.8

BMI had average values between 26.5 ± 6.1 and 30.1 ± 4.1 kg/m^2, indicating a moderate risk for cardiovascular disease. The value of BMI is of a great importance because, in many cases, the decrease of BMI, respectively a decrease in weight, can reduce the individual risk of a coronary event.

According to family history, 36% of patients had hypertension history (father and mother). Diabetes mellitus is present in patients' familial history, less than hypertension (4%-both parents).

Values of cholesterolemia above 240 mg/dl (levels II and IV, respectively 243.1±34.5 and 260.4±45.7 mg/dl) have to be analyzed only in correlation with the other factors.

As table 2 shows, most of the patients had values of HDL-cholesterol grater than 30 mg/dl (61.7±9.3; 59.6±10.9; 58.0±13.5 and 64.2±6.5 according to the different grade of hypertension severity.

Table 2. The frequency of patients by total cholesterol, HDL-cholesterol, LDL-cholesterol and total cholesterol/ HDL-cholesterol ratio

	Grade of severity of hypertension							
	I		**II**		**III**		**IV**	
	F	M	F	M	F	M	F	M
Serum total cholesterol (mg/dl)								
mean ± SD	233.2 ± 40.3		243.1 ± 34.5		216.4 ± 33.0		260.4 ± 45.7	
< 200	-	4	4	2	4	2	2	-
200 – 249	10	4	14	2	8	2	2	4
250 – 300	4	2	6	6	4	-	8	-
> 300	2	-	-	-	-	-	4	-
Serum HDL-cholesterol (mg/dl)								
mean ± SD	61.7 ± 9.3		59.6 ± 10.9		58.0 ± 13.5		64.2 ± 6.5	
< 30	-	-	-	-	-	-	-	-
> 30	16	10	24	10	16	4	16	4
Serum LDL-cholesterol (mg/dl)								
mean ± SD	137.9 ± 36.3		152.7 ± 32.8		128.4 ± 24.5		154.6 ± 33.5	
< 100	-	4	4	-	4	2	4	-
101 – 149	10	4	8	2	8	-	4	4
150 – 190	4	2	10	4	4	2	6	-
> 190	2	-	2	4	-	-	2	-
Total / HDL-cholesterol ratio								
≤ 5	12	10	18	10	14	4	16	4
>5	4	-	6	-	2	-	-	-

Serum HDL-cholesterol is more important than LDL-cholesterol because HDL-cholesterol is more influenced by dietary components (carbohydrate, protein, fiber, cholesterol and fat).

In this way, a dietary education could influence HDL-cholesterol values and eventually the risk of a coronary event (5).

More important than the value of cholesterol is the ratio total/HDL-cholesterol, a ratio grater than 5 indicating a high risk for coronary heart disease (12% of patients).

The total/HDL-cholesterol ratio is recommended as an efficient means for estimating dyslipidemic risks of coronary disease at any level of total or LDL-cholesterol.

Values of LDL-cholesterol above 150 mg/dl, were recorded in the II and IV level of hypertension (152.7±32.8 and 154.6±33.5 mg/dl). Increasing values of LDL-cholesterol are much more

indicating an atherogenic factor when it is associated with low levels of HDL-cholesterol.

As table 2 shows, 12% of hypertensive women had a total/HDL-cholesterol ratio higher than 5, indicating a dyslipidemic risk for coronary artery disease.

It is important to note that most of the hypertensive women presented a higher dyslipidemic risk according to the total/HDL-cholesterol ratio.

Since the majority of the hypertensive population is moderately or outright overweight, both problems could be solved by weight reduction.

CONCLUSIONS

1. Estimation of global risk based on age, sex and major risk factors should be preferred to the individual risk factor levels.
2. This survey showed the dyslipidemic model of some hypertensive patients in a catchment's area of a primary care unit.
3. BMI had values between 26.5±6.1 and 30.1±4.1 kg/m^2, indicating a moderate risk for cardiovascular disease. Even if it was noticed high values for BMI in the hypertensive patients, it is difficult to say for these patients if a decrease of their weight will lead to regulation of blood pressure or lipidic model, because obesity can not be interpreted as a single entity, but a syndrome of varied etiologies.
4. The total/HDL-cholesterol ratio indicated a high risk for coronary disease in 12% patients.

Acknowledgements

Special thanks to Lidia Morosanu MD, who made possible this survey.

REFERENCES

1. Kannel B., D'Agostino R.B. – *Update of old Coronary Risk Factors*. Cardiovascular Risk Factors, 1996, vol.6(5):244-251.
2. Wiesemann A., Heyden S. – *Hypertension and Dyslipidemia*. Cardiovascular Risk Factors, 1996, vol.6(4):215-220.
3. Castelli W.P. – *Redefining CHD Risk Assessment. The Role of New Cardiovascular Risk Factors*. Cardiovascular Risk Factors, 1996, vol.6(4):181-184.
4. *Management of Dyslipidemia in Adults with Diabetes*. American Diabetes Association, 2001, vol.24, supl.1.
5. Soto-Pedre E., Longnecker M.P., Muniz J., Pradas-Montilla C., Juane R., Carbajal A. – *Nutritional correlates of high density Lipoprotein Cholesterol among adults in Northwest Spain: Results from the Brigantium Study*. Cardiovascular Risk Factors, 1996, vol.6(3):172-178.
6. Olefsky J.M., Molma J.M. – *Insulin resistance in Man*. In Rifkin H., Porte D. Diabetes Mellitus. Elsevier-Fourth Edition, 8, 121-150.
7. Soma R., Paoletti R.– *The Future of Cardiovascular Disease Prevention and the Role of Lipid Regulation*. Cardiovascular Risk Factors, 1996, vol 6(5); 262-267.
8. Gherasim L.- *Medicina internă*, Ed. Medicală, Bucureşti, 1996; vol 2; IBSN 973-39-0292-6.
9. Rappaport F., Eichorn F. – *Clin. Chem. Acta*, 1996; 5-160.