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FREQUENCY OF THE METABOLIC SYNDROME AND ITS CLINICAL VARIANTS AT PATIENTS WITH THE VERIFIED CORONARY ATHEROSCLEROSIS IN YAKUTIA

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By results of research it is shown that atherosclerotic lesion of coronary arteries, first of all, is connected with metabolic syndrome, arterial hypertension and dislipidemia are one of leading components of metabolic syndrome in the surveyed ethnic groups.

Keywords: coronary atherosclerosis, metabolic syndrome.

INTRODUCTION

The metabolic syndrome (MS) in recent years draws steadfast attention of doctors of different specialities. By definition of VNOK experts (2009) MS is characterized by increase of visceral fat weight, decrease in sensitivity of peripheral tissues to insulin and hyperinsulinemia which cause development of carbohydrate, lipid, purin metabolism disorders and arterial hypertension (AH) [8]. Occurrence of concept MS (or the X-syndrome) is associated with name of American scientist G. Reaven which in the work published in 1988 has connected development of clinical signs of this syndrome with insulin resistance (IR) [7]. The author hasn't carried abdominal adiposity to number of obligatory signs of MS. However in 1989 J. Kaplan, having described «deadly quartet», has included abdominal adiposity along with AH, glucose tolerance disorder and hypertriglyceridemia in number of important components of syndrome [9]. Medico-social importance of MS is caused by higher frequency (in 4,2 times higher, than in population) of development in patients of vitally dangerous cardiovascular diseases. The MS is a disease of a civilization. Its prevalence in the world according to different researchers makes from 14 to 40 %, increases with the years, especially in average and senior age group (30-40 %) [13, 17]. The clinical importance of MS allocation is caused by convertibility of the given condition, influencing one of components of MS, it is possible to achieve improvement of its other components, and also is connected with the fact that it precedes development of ischemic heart disease and diabetes 2 type which are now principal causes of raised death rate of the population [1, 9, 15]. The MS essentially influences clinical current of IHD, raises risk of coronary complications. At men with MS risk of sudden death from myocardial infarction (MI) is higher even if they don't have symptomatic of IHD. The combination of arterial hypertension, hyperglycemia and hypertrygliceridemia or HDL low level is connected with the maximum coronary risk at MS [12, 14].

Now the tendency to unification of MS definition is observed and there is no uniform criterion of such component of MS as abdominal adiposity, and is recommended to use various specifications, proceeding from regional and ethnic features of concrete populations [10].

Thus, the problem of revealing of MS prevalence is actual for specification of diagnostic criteria of MS taking into account regional features of separate groups of the population, and also for planning of the regional preventive actions directed on decrease of risk of development of cardiovascular diseases taking into account ethnicity.

The purpose of research was studying of frequency of metabolic syndrome and its clinical variants at the IHD patients suffering with the verified coronary atherosclerosis and persons without clinical signs of IHD, representatives of native and non-native population of Yakutia.

MATERIAL AND METHODS

Results of survey of 400 men are included in research at the age of 45-64 years: from them 200 – the patients who were on stationary survey and treatment in cardiological branch of Republican hospital №1-National center of medicine of Yakutsk and 200 – persons without the clinical signs of IHD, surveyed during forwarding actions. 4 groups of men were analyzed: 1 – IHD patients with the verified coronary atherosclerosis, representatives of native nationality of Yakutia ($n=100$, middle age $55,85 \pm 0,97$ years); 2 – IHD patients with the verified coronary atherosclerosis of non-native nationality ($n=100$, middle age $53,15 \pm 1,04$ years); 3 – persons without IHD signs of native nationality ($n=100$, middle age $51,82 \pm 1,50$ years) and 4 – persons without IHD signs of non-native nationality ($n=100$, middle age $51,75 \pm 1,30$ years). Yakuts are considered to be representatives of native nationality, non-native – Russian and Ukrainians living in Yakutia constantly. As criteria of exception of research served: unstable stenocardia, acute myocardial infarction, in comparison groups – presence of IHD clinical signs and electrocardiograms-signs of the old myocardial infarction.

Survey was spent by standard techniques and included following obligatory sections: poll under Rose's questionnaire and the questionnaire developed for estimation of objective condition; the informed consent to carrying out of researches and blood delivery; triple measurement of arterial pressure (AP); anthropometrical survey with measurement of growth, weight and calculation of body mass index (BMI), volumes of waist (VW) and hips (VH) with estimation of the relation VW/VH; electrocardiogram registration in rest; selective coronaroangiography; blood sampling from elbow vein in the morning on empty stomach for revealing of infringements carbohydrate (blood glucose, insulin, C-peptid) and lipid metabolism (HDL, LDL, TG) disorders, the hormonal status (testosterone). Estimation of results spent on the standard classifications. For calculation of index IR used the standard index HOMA-IR (D. Matthews, 1985): Serum insulin on empty stomach (mked/ml) x plasma glucose on empty stomach (mmol/l) / 22,5. Value of index $> 2,27$ is considered as IR presence [16]. For diagnostics of MS criteria IDF (2005), ATP III (2004) and VNOK (2009) were used. At estimation of clinical variants of MS IDF criteria are used. Statistical processing of the received data was held by means of package of computer programs SPSS (version 11.5). The importance of distinctions was estimated with t Student criterion. Results are presented in the form of $M \pm m$, where M – average arithmetic, m – standard error of average. Distinctions were considered statistically significant at $p < 0,05$.

RESULTS AND DISCUSSION

In both groups of patients with coronary atherosclerosis significant increase of frequency of MS by criteria IDF and VNOK in comparison with control groups (accordingly at native 48

and 12 % (IDF, $p < 0,01$) and 52 and 15 % (VNOK, $p < 0,05$), non-native 48 and 18 % (IDF, $p < 0,05$) and 58 and 26 % (VNOK, $p < 0,05$) was marked. Depending on ethnicity significant distinctions are not revealed. With use of standard criteria ATP III underestimated frequency of MS among the surveyed groups of men is received and distinction between patients and persons without IHD were insignificant (accordingly at native 18 and 4 %, non-native 28 and 10 %) (tab. 1). In number of works it has been shown that prevalence of MS even at use of one version of definition fluctuates in very wide limits – from 10-12 % in the general population and to 70 % depending on prevailing pathological conditions in investigated group [7].

The MS in the form of combination of abdominal adiposity, the raised arterial pressure and dislipidemia at patients with the verified coronary atherosclerosis in both ethnic groups was shown in 70,8 % of cases, and in comparison groups – among aboriginals in 66,7 % and non-native in 42,8 % of cases. Clinical variant of MS in the form of combination of abdominal adiposity and dislipidemia (hypertrygliceridemia + hypoalfacholesterolemia) was marked in 25 and 29,2 % of cases among patients with coronary atherosclerosis, and also in 16,7 and 21,8 % of cases among persons without IHD clinical signs accordingly. In groups of patients with the verified coronary atherosclerosis the combination of abdominal adiposity, the raised arterial pressure, dislipidemia and hyperglycemia is revealed at 8,3 % of native and 16,7 % non-native populations. In comparison groups the similar combination was met only at representatives of non native nationality in 10,2 % of cases. The data obtained by us by clinical variants of MS are coordinated with the data of other authors [6].

Average indexes of anthropometrical parameters (BMI and the relation VW/WH) were significantly higher among patients with coronary atherosclerosis in comparison with persons without IHD (accordingly at native – BMI $27,73 \pm 0,89$ and $25,26 \pm 0,73$ kg/m², VW/VH $0,98 \pm 0,01$ and $0,95 \pm 0,007$, $p < 0,05$; non-native – BMI $29,59 \pm 0,73$ and $29,59 \pm 0,73$ kg/m², VW/VH $0,97 \pm 0,11$ and $0,94 \pm 0,006$, $p < 0,01$). Average values of BMI were higher among men of non-native nationality in comparison with aboriginals. The adiposity connected with the central accumulation of fat, is considered to be one of the major factors associating with atherosclerosis development, and as consequence with development of MI and cerebral insult [2].

The average levels of AP systolic pressure (SP) and diastolic pressure (DP) the AP at patients with coronary atherosclerosis exceeded indicators of compared groups with IHD (accordingly at native – the SP $134,7 \pm 1,7$ and $128,0 \pm 1,3$ mm hg, $p < 0,01$, DP $84,9 \pm 0,9$ and $82,1 \pm 0,7$ mm hg, $p < 0,05$; non-native – the SP $134,8 \pm 2,0$ and $129,1 \pm 1,3$ mm hg, $p < 0,05$, DP $84,8 \pm 1,0$ and $81,5 \pm 0,7$ mm hg, $p < 0,01$). Some authors specify in distinctions in influence

of SP and DP concerning development of IHD. So, according to 20-year-old prospective supervision only systolic AH is of great importance in respect of the forecast, and diastolic AH doesn't play role in this process [11].

At the comparative analysis LDL, HDL and TG average levels among patients with coronary atherosclerosis were significantly higher unlike persons without IHD. So, the average levels of studied blood serum lipids have made: LDL accordingly at aboriginals $3,39 \pm 0,1$ and $3,06 \pm 0,1$ mmol/l ($p < 0,05$), non-native – $3,45 \pm 0,1$ and $3,08 \pm 0,1$ mmol/l ($p < 0,01$); HDL accordingly at native – $0,97 \pm 0,03$ and $1,30 \pm 0,03$ mmol/l, non-native – $0,90 \pm 0,03$ and $1,28 \pm 0,03$ mmol/l ($p < 0,001$); TG at native – $1,93 \pm 0,1$ and $1,32 \pm 0,1$ mmol/l ($p < 0,05$), non-native – $2,43 \pm 0,1$ and $1,61 \pm 0,1$ mmol/l ($p < 0,001$). The TG average levels were significantly higher among men of non-native nationality in comparison with aboriginals, $p < 0,001$ (tab. 2). The data obtained by us are coordinated with the literary ones. It has been noticed that except hypercholesterolemia and hypoalphacholesterolemia the role of hypertriglyceridemia in progressing and development of coronary atherosclerosis is significant. At men in the clinical researches spent on system "case-control", at the one-factorial analysis between TG level the positive association is found in plasma, IHD mortality, MI and expressiveness, by coronaroangiography data, coronary atherosclerosis [3-5].

The glucose average levels in all surveyed groups of men were within admissible values, but at the same time at patients with coronary atherosclerosis of native nationality the glucose average level was significantly higher in comparison with persons without IHD ($5,26 \pm 0,26$ and $4,33 \pm 0,14$ accordingly, $p < 0,001$). At glucose indicator on empty stomach above 5,2 mmol/l the risk of development of atherosclerosis increases in blood in 5-8 times. The insulin average levels, C-peptid in groups of men with coronary atherosclerosis were significantly higher in comparison with control groups (accordingly at native – insulin $17,62 \pm 0,52$ and $10,68 \pm 0,51$ mked/ml, C-peptid $2,21 \pm 0,16$ and $1,01 \pm 0,19$ ng/ml, $p < 0,001$; non-native – insulin $16,21 \pm 0,52$ and $7,76 \pm 0,59$ mked/ml, C-peptid $1,98 \pm 0,19$ and $0,71 \pm 0,12$ ng/ml, $p < 0,001$). Index IR HOMA-IR at patients with coronary atherosclerosis exceeded admissible indicator and was significantly higher in comparison with persons without IHD (accordingly at native – $4,18 \pm 0,52$ and $2,12 \pm 0,53$, $p < 0,001$; non-native – $3,85 \pm 0,51$ and $1,82 \pm 0,52$, $p < 0,001$) (tab. 3). Hyperinsulinemia and insulinoresistancy are the basic starting moments of development of MS and, accordingly, atherosclerosis. Significant distinctions in testosterone average levels between compared groups are not revealed (accordingly at native – $15,10 \pm 1,32$ and $13,12 \pm 1,39$; non-native – $12,78 \pm 1,35$ and $10,51 \pm 1,34$, $p > 0,05$). The average levels of insulin, C-peptide, index

HOMA-IR and testosterone were higher at aboriginals unlike non-native at tendency level that demands the further studying.

CONCLUSION

By results of research it is shown that atherosclerotic lesion of coronary arteries first of all is connected with MS, arterial hypertension and dislipidemia are one of leading components of metabolic syndrome in the surveyed ethnic groups of men. At patients with coronary atherosclerosis in comparison with persons without clinical signs of IHD potentially atherogenous distinctions in indicators lipid blood profile are revealed: raised levels of LDL and, especially, TG, and also lowered level HDL. The complex of lipid metabolism indicators testifies about more favorable lipid spectrum of blood at native population of Yakutia, including at patients with coronary pathology.

Table 1

Frequency of metabolic syndrome at patients with coronary atherosclerosis in comparison with persons without IHD signs

Group	IDF, 2005	ATP III, 2004	VNOK, 2009
1 native IHD(+)	48%**	18%	52%*
2 non-native IHD(+)	48%*	28%	58%*
3 native IHD(-)	12%	4%	16%
4 non-native IHD(-)	18%	10%	26%
	** - p(1-3)<0,01		* - p(1-3)<0,05
	* - p(2-4)<0,05		* - p(2-4)<0,05

Table 2

The average levels of the indicators which are part of metabolic syndrome at patients with coronary atherosclerosis in comparison with persons without IHD signs (M±m)

1 Group	BMI, kg/m ²	W, kg	BP, mmHg	DBP, mmHg	LDL, mmol/l	HDL, mmol/l	TG, mmol/l
IHD(+)	24,89*	98,04*	134,71**	84,99*	3,39±0,1*	0,97±0,03***	1,93±0,1*

2 non- native IHD(+)	29,59±0,73**	0,97±0,11**	134,8±2,0*	84,8±1,0**	3,45±0,1**	0,90±0,03***	2,43±0,1***
3 native IHD(-)	25,26±0,73	0,95±0,007	128,0±1,3	82,1±0,7	3,06±0,1	1,30±0,03	1,32±0,1
4 non- native IHD(-)	29,59±0,73	0,94±0,006	129,1±1,3	81,5±0,7	3,08±0,1	1,28±0,03	1,61±0,1***
pИБС(+)- ИБС(-)	* - p<0,05; ** - p<0,01; *** - p<0,001						

Table 3

The average levels of glucose, insulin, C-peptide and testosterone at patients with coronary atherosclerosis in comparison with persons without IHD signs (M±m)

Group	Glucose, mmol/lл	Insulin, mkEd/ml	C-peptid, ng/ml	Testosterone, ng/ml	Index HOMA-IR
1 native IHD(+)	5,26±0,26***	17,62±0,52***	2,21±0,16***	15,10±1,32	4,18±0,52**
2 non-native IHD(+)	5,39±0,24	16,21±0,52***	1,98±0,19***	12,78±1,35	3,85±0,51**
3 native IHD(-)	4,33±0,14	10,68±0,51	1,01±0,19	13,12±1,39	2,12±0,53
4 non-native IHD(-)	5,30±0,15	7,76±0,59	0,71±0,12	10,51±1,34	1,82±0,52
pИБС(+)- ИБС(-)	***p<0,001	***p<0,001			**p<0,01