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SECTION 20. Medicine.

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ELECTROCARDIOGRAPHIC ABNORMALITIES IN SUBJECTS WITH OVERWEIGHT, OBESITY AND ABDOMINAL OBESITY

Abstract: This article presented the prevalence of ECG abnormalities in subjects with overweight, obesity and abdominal obesity.

Key words: electrocardiogram, major and minor abnormalities, obesity

Language: English

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BACKGROUND: Cardiovascular diseases (CVD) are the current problem of the world due to the high morbidity and mortality rate among the employable population. Despite progress in the prevention and treatment of CVD, they are still lead in the structure of morbidity and significantly affect such basic health indicators as morbidity, disability, mortality. As noted by many researchers, the level of cardiovascular morbidity and mortality in developed

countries is reduced from year to year, whereas this figure tends to increase in developing countries [1,2].

Considering the evolution of the CVD, we can establish that mortality from CVD atherosclerotic origin grew rapidly in industrialized countries since World War II. This led to the conduct of epidemiological studies in Europe, which began in 1950, in particular in the USA Framingham study. Three main cardiovascular risk factors - high cholesterol, hypertension and smoking regularly



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appeared in epidemiological studies until 1975. The last twenty years have confirmed the importance of these three risk factors, which are long-term predictors of adverse outcome of CVD. Several polymorphisms of genes have been shown to be associated with increased risk of developing CVD. Despite this, in the 90 years studies devoted to secondary prevention were priority than primary prevention [3-7]. As reported in the MONICA study, due to adequate secondary prevention observed reduction in mortality from myocardial infarction, while the morbidity remains stable. Similar conclusions were reached in the study REACH, which shows the lack of effectiveness of secondary prevention. DREAM study found that none ramipril and rosiglitazone does not reduce the incidence of cardiovascular events [8-10]. All this is of great interest and requires further study cardiovascular risk factors and the development of primary prevention measures.

Together with the study of behavioral and biological risk factors, is currently in the scientific world actively discussed the role of electrocardiographic (ECG) abnormalities, for an objective evaluation of the CVD. It was found that ECG abnormalities are significant prognostic marker of CVD independently of traditional risk factors [11].

Among the risk factors of CVD, obesity is the most common. Risk due to obesity contributes to the development of coronary and cerebral disorders in obese patients. In obesity observed damage of vessels, due to the fact that obesity predisposes to the development of dyslipidemia, diabetes, hypertension and sudden cardiac death. Besides these mechanisms, in obesity cardiomyocytes changes, characterized by degenerative phenomena [12]. ECG pathology more common in obese patients, which are manifested in the form of lower voltage, left ventricular hypertrophy, extension of left atrial [13]. There is evidence that visceral fat causes the appearance of pathologic ECG due to sympathetic activation, and was described cases of arrhythmia in patients with obesity [14]. In addition, weight loss was accompanied by the elimination of ECG abnormalities [15], which is similar to the results of research Colombia and Italy [16, 17].

Along with the association between ECG abnormalities and overweight, obesity, in the study of Korean scientists revealed the relations with the abdominal obesity.

AIM: Aim of present study is to investigate the prevalence of ECG changes depending on body mass index (BMI) and value of waist circumference in residents of Turkestan.

DESIGN, MATERIALS AND METHODS: Design of the study is based on a cross-sectional population-based study conducted in Turkestan region. Out of whole sample (1143 respondents), ECG changes have been studied in 14% (158). Out of all 158 patients, number of men was 48, women 110, respectively. The average rate of age of the studied men and women were 50.1 ± 13.7 and 52.1 ± 13.7 consequently. Height and weight were measured while subjects were wearing light clothing without shoes. Waist circumference was measured midway between the costal margin and the iliac crest at the end of a normal expiration. BMI was calculated as weight in kilograms divided by the square of height in meters.

Standard 12-lead ECGs were recorded with each subject in the supine position using strictly standardized procedures. ECGs were coded by a cardiology specialist using the Minnesota system [18]. ECG abnormalities were divided into minor and major abnormalities based on Minnesota criteria.

Major ECG abnormalities included:

3-1,4-1-Left ventricular hypertrophy (LVH)

4-1, 4-2-Major ST-T abnormalities

7-1-Complete left bundle branch block (LBBB)

8-3-Atrial fibrillation (AF)

Minor ECG abnormalities included:

5-3-Minor ST-T abnormalities

7-3-Incomplete right bundle branch block (RBBB)

7-6-Left posterior fascicular block (LPFB)

7-7-Left anterior fascicular block (LAFB)

8-1-1, 8-1-2, 8-1-3 Extrasystoles

8-7-Sinus tachycardia

9-7-Early repolarization

Sinus arrhythmia

The data was obtained using statistical package of program - Biostat. A chisquare (χ^2) test was used to compare prevalence rates of ECG abnormalities between groups with and without the obesity and abdominal obesity.

RESULTS: Determinants of ECG changes of 158 patients showed in Fig. 1. In 36.7% of patients pathological ECG changes were not registered. Out of major abnormalities the most often pathology was LVH, of minor abnormalities was incomplete bundle branch blocks.

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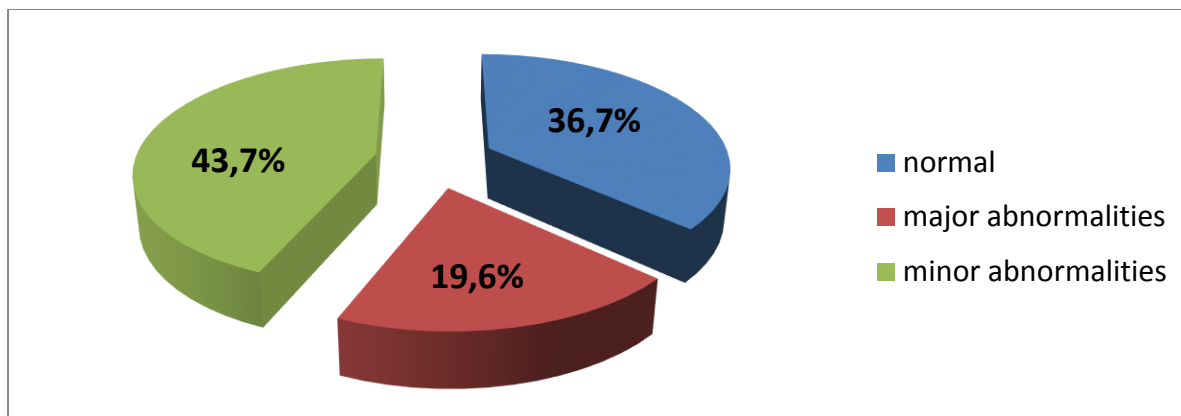


Figure 1 - Structure of ECG changes according to the Minnesota coding system.

Table 1

Prevalence of major and minor ECG abnormalities by Minnesota criteria in subjects with or without overweight and obesity.

Minnesota coding system	ECG abnormalities	BMI < 25		BMI > 25	
		n	%	n	%
Major abnormalities	LVH	10	14,1	16	18,5
	Major ST-T abnormalities	1	1,4	1	1,1
	Complete LBBB	1	1,4	1	1,1
	AF	-	-	1	1,1
Minor abnormalities	Minor ST-T abnormalities	-	-	2	2,3
	Incomplete RBBB	5	7	9	10,4
	LPFB	-	-	1	1,1
	LAFB	21	29,6	20	22,9
	Extrasystoles	1	1,4	2	2,3
	Early repolarization	1	1,4	4	4,7
	Sinus tachycardia	1	1,4	1	1,1
Sinus arrhythmia	-	-	1	1,1	
	Normal	30	42,2	28	32,3
	Overall	71	100	87	100

$\chi^2 = 8,218; p = 0,084$

Table 2 shows that the frequency of ECG abnormalities was not different statistically among individuals with and without overweight and obesity, living in Turkestan region.

Table 2

Prevalence of major and minor ECG abnormalities by Minnesota criteria in subjects with or without abdominal obesity.

Minnesota coding system	ECG abnormalities	WS < 94 men WS < 80 women		WS > 94 men WS > 80 women	
		n	%	n	%
	LVH	9	13,2	17	18,9

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Major abnormalities	Major ST-T abnormalities	1	1,5	1	1,1
	Complete LBBB	1	1,5	1	1,1
	AF	-	-	1	1,1
Minor abnormalities	Minor ST-T abnormalities	-	-	2	2,2
	Incomplete RBBB	5	7,3	9	10
	LPFB	-	-	1	1,1
	LAFB	17	25	24	26,8
	Extrasystoles	-	-	3	3,3
	Early repolarization	2	2,9	3	3,3
	Sinus tachycardia	1	1,5	1	1,1
	Sinus arrhythmia	1	1,5	-	-
Normal		31	45,6	27	30
Overall		68	100	90	100
$\chi^2 = 10,414; p = 0,034$					

In table 2 presented the prevalence of ECG abnormalities depending on value of WS. Both major and minor abnormalities were registered often in persons with abdominal obesity. Particularly in men with WS > 94 cm and women

with WS > 80 cm such abnormalities as LHV, AF, minor ST-T abnormalities, incomplete RBBB, LPFB, LAFB, extrasystoles, early repolarization were more revealed than in residents without abdominal obesity.

CONCLUSION:

1. This population-based study revealed that only 36.7% of people had normal ECGs.
2. Changes in cardiac electrophysiology were not varies by BMI.
3. Both major and minor ECG abnormalities were more often in subjects with abdominal obesity.

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