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Gastroesophageal Reflux Disease in Obese Patients

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ABSTRACT

Based on the analysis of heart rate variability, the characteristic features of autonomic regulation of the cardiovascular system in patients with gastroesophageal reflux disease, obesity and comorbidity were clarified. For the first time, a comparative characteristic of heart rate variability in patients with different body weights with different endoscopic variants of gastroesophageal reflux disease is given. At the same time, it has been established that the change in heart rate variability in patients is due to the nature of the gastroesophageal zone lesion, the patient's body mass index and a number of metabolic disorders. For the first time, it has been shown that as the degree of damage to the esophageal mucosa worsens and/or the patient's body weight increases, there is an increase in blood pressure variability, which is also associated with hyperglycemia. For the first time, cardiovascular risk factors and prognostic formulas for its calculation for patients with gastroesophageal reflux disease, obesity and in case of their combination have been identified.

Keywords: Obesity, gastroesophageal reflux disease, clinical manifestation

INTRODUCTION

Gastroesophageal reflux disease and obesity are fairly new nosological forms of diseases: obesity has received an independent place in the international classification of diseases since 1947, and gastroesophageal reflux disease since 1999. At the same time, the prevalence of these nosologies in the population is high. It is believed that obesity has already acquired the character of a "non-infectious epidemic", and the XXI century is called the "century of reflux disease". Moreover, Gastroesophageal reflux disease and obesity can have complications that pose a threat to the patient's life and this risk increases by 2 times if this duo is combined with arterial hypertension, the prevalence and importance of which in the population cannot be overestimated. At the same time, there is a sufficient number of works characterizing the state of the cardiovascular system in patients with isolated gastroesophageal reflux disease or obesity, as well as in the case of their association with arterial hypertension [1-3].

In the last few decades, both gastroesophageal reflux disease and obesity have been increasing worldwide. Despite a number of works devoted to the study of the possibility of their comorbidity, the understanding of the mechanisms of its formation is still far from complete. When considering the association of gastroesophageal reflux disease and obesity, it should be taken into account that both diseases develop in persons who have problems with nutrition and lifestyle, as well as those who have a genetic predisposition to these nosologies [2-5].

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At present, direct predisposing factors for the development of gastroesophageal reflux disease in people with increased body weight are clearly indicated, often associated with the presence of hiatal hernias. Accumulated data also indicate that patients with a combination of gastroesophageal reflux disease and obesity often have episodes of sleep apnea; systemic inflammation associated with obesity, which occurs when the level of circulating cytokines (interleukin-6, tumor necrosis factor-alpha) increases); oxidative stress; disorders in the secretion of hormones: leptin, adipectin, and resistin, which leads to an aggravation of the pathogenetic mechanisms of the formation and progression of gastroesophageal reflux disease. Moreover, it is possible that these factors may also lead to an increased risk of cardiovascular diseases in individuals with associated gastroesophageal reflux disease and obesity [4-7].

If the discussed nosologies in the case of their isolated course have been sufficiently studied today through the prism of risk factors for cardiovascular events, then it is not completely clear how the features of chronobiological parameters of the cardiovascular system are presented in patients with a combination of gastroesophageal reflux disease and obesity. Meanwhile, this direction is very relevant from the standpoint of modern medicine in the context of comorbidity of diseases [2].

It is known that the analysis of the results of daily monitoring of blood pressure and heart rate variability is today an integral part of the examination of cardiac patients, due to the recognition of the indicators of daily monitoring of blood pressure and heart rate variability as indicators of the state of the body's regulatory systems, which have an important prognostic value in the development of cardiovascular events. At the same time, despite the availability of publications on the features of chronobiological indicators of the cardiovascular system in patients with isolated gastroesophageal reflux disease, peptic ulcer, obesity, arterial hypertension, coronary heart disease, data on the syntropy model of gastroesophageal reflux disease and obesity are not sufficiently presented [7].

MATERIAL AND METHODS

It was a simple open-ended comparative study. In accordance with the purpose and objectives of the study, the following criteria were taken into account when including patients in the observation groups: the patient's age from 18 to 65 years; in the presence of arterial hypertension - its 1st and 2nd stages, 1st and 2nd degrees of arterial pressure; alimentary-constitutional type of obesity; no history of clinically significant cardiac arrhythmias; the possibility of canceling previously prescribed therapy for up to 48 hours. The exclusion criteria were: non-compliance with the inclusion criteria; the presence of cardiovascular pathology with the exception of stage 1 and 2 arterial hypertension; obesity of the 3rd degree; the genesis of obesity is different from the alimentary-constitutional type; concomitant pathology of the digestive system, including peptic ulcer and cholelithiasis, diseases of the pancreas, liver and intestines in the acute stage; diabetes mellitus; infectious and parasitic diseases, malignant neoplasms; pregnancy and lactation.

As a result, 80 patients were included in the study: 56 men (70%) and 24 women (30%) aged 23 to 65 years (mean age 47.1±5.5 years). Of these, 40 patients with gastroesophageal reflux disease constituted the primary follow-up group and 40 patients without gastroesophageal reflux disease constituted the comparison group.

All patients who met the inclusion criteria underwent general clinical methods, including complete blood count, complete urinalysis, biochemical blood tests, and electrocardiography. The metabolic status of the patient was studied separately: anthropometric data, calculation of body mass index, assessment of abdominal obesity criteria, analysis of glycemia and lipid spectrum indicators.

If the questionnaire revealed signs of gastroesophageal reflux disease, the patients underwent esophagogastroduodenoscopy using flexible fiberscopes to clarify the degree of damage to the esophageal mucosa in order to determine the clinical and endoscopic variant of gastroesophageal reflux disease and identify its complications.

With the help of a combined daily monitor, patients were analyzed for heart rate variability during the processing of 24-hour electrocardiography recording, and also studied the chronology of blood pressure features.

Statistical analysis of the data obtained was carried out using the STATISTICA 6.0 program. The obtained values were estimated by the nature of the distribution. Quantitative characteristics with a normal distribution are presented as M±m. To determine the significance of the differences between the two groups of quantitative indicators (paired test), the Student's test was used. Differences at $p<0.05$ were considered significant.

RESULTS AND DISCUSSION

Comparative analysis of the results showed that parasympathetic modulations prevailed in the group of patients with gastroesophageal reflux disease throughout the day, which were higher than in the group of patients without gastroesophageal reflux

disease, especially at night. In turn, in the group without gastroesophageal reflux disease, taking into account the values of SDNN and SDNN - index, sympathetic influences significantly prevailed during the day, and in the case of obesity of the 2nd degree, sympathicotonia persisted at night {p<0.05).

It was separately noted that in patients with gastroesophageal reflux disease, as the body mass index increased (and especially when obesity was reached grade 2), there was a transformation of autonomic modulations that differed from the state in patients with gastroesophageal reflux disease and normal body weight. For example, during the day there was a decrease in parasympathetic and an increase in sympathetic influences (p<0.05).

Variants of the endoscopic form of gastroesophageal reflux disease were characterized by their own features of heart rate variability. Thus, in gastroesophageal reflux disease, the autonomic prevalence shifted towards deep vagotonia, which, in our opinion, creates a certain risk of sinus node dysfunction and disorders in the conduction system of the heart in this category of patients. However, with a combination of gastroesophageal reflux disease and obesity of the 1st and 2nd degrees, this vegetative phenomenon was leveled.

In the study of subgroups with gastroesophageal reflux disease and different body weights, it turned out that such polar conditions as gastroesophageal reflux disease with a normal body mass index and gastroesophageal reflux disease with obesity grade 2 are both characterized by their own characteristics of heart rate variability. If in the first case - due to the "preponderance" of vagal modulations, then in the second - due to the dominance of sympathetic influences (p<0.05).

An equally interesting nature of autonomic oscillations was noted in the group without gastroesophageal reflux disease, but with different body weights of patients. Thus, depending on the body mass index, there was an increase in the values of values characterizing sympathetic influence. The higher the body mass index, the lower the total power of the spectrum components, the smaller the spectrum of high frequencies studied. And if we take the values of persons without gastroesophageal reflux disease and with normal body weight as control figures, it turned out that as the body mass index increases, the vegetative influences change significantly in persons with a normal body mass index, 1.92±08 in overweight persons, 2.04±1.01 in persons with obesity of the 1st degree, 2.99±1.4 in persons with obesity of the 2nd degree. (p<0.05), acquiring the priority of the sympathetic power of the spectrum with a parallel decrease in total power.

At the same time, the group with comorbidity of gastroesophageal reflux disease and excess body weight occupied an intermediate position in the assessment of spectrum components. And the autonomic balance for them was formulated as balanced, as evidenced by the LF/HE index (1.86), while its value in individuals with gastroesophageal reflux disease and a normal body mass index was represented by 1.0, and in the group with obesity without gastroesophageal reflux disease - 2.2.

Correlation analysis between the main characteristics of the temporal and spectral analysis and the nature of the lesion of the esophageal mucosa, including the patient's body mass index values, showed that there are several relationships with different strength and direction among the phenomena discussed. Thus, the value of the body mass index has mainly direct correlations of moderate strength with the values of sympathetic modulations (with SDNN K=0.44, p=0.03), while pronounced damage to the esophageal mucosa in the form of reflux esophagitis is associated with convincing relationships with the characteristics of the parasympathetic wave spectrum and vagal influences (p=0.04). Correlations were also noted between indicators characterizing heart rate variability and the level of serum adiponectin concentration (p<0.05).

Mean blood pressure values in normotensive patients with gastroesophageal reflux disease and gastroesophageal reflux disease did not differ significantly from each other, while only a tendency towards a greater decrease in systolic and diastolic blood pressure values at night was revealed in patients with gastroesophageal reflux disease (systolic blood pressure at night 102.46±44.55 mm Hg, diastolic blood pressure at night 64.44±31.05 mm Hg, and Systolic blood pressure at night is 90.18±41.23 mm Hg, diastolic blood pressure at night is 58.13±26.18 mm Hg. respectively, p>0.05).

The values of mean blood pressure values were significantly lower in the group with gastroesophageal reflux disease. At the same time, the phenomenon of "nocturnal decrease in blood pressure" was observed in both groups. As the body mass index increased in patients with gastroesophageal reflux disease, and especially without gastroesophageal reflux disease, the values of the mean blood pressure from the normotension zone approached the normal elevated blood pressure (p<0.05).

CONCLUSION

Heart rate variability in patients with gastroesophageal reflux disease and obesity is predetermined by the difference in autonomic influences. Gastroesophageal reflux disease is dominated by parasympathetic modulations and high-frequency

spectrum waves, while obesity is characterized by sympathicotonia and a low-frequency wave spectrum. Heart rate variability in patients with gastroesophageal reflux disease and obesity is impaired. The nature of its changes depends on various factors.

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