Gender aspects of the formation of cardiovascular pathology in patients with ankylosing spondylitis

Barotova Shakhlo Orifovna

Bukhara branch of the Republican Scientific Center for Emergency Medical Care, Republic of Uzbekistan, Bukhara

Tel number: +998905102606

shakhodatnurilloyeva92@gmail.com

Annotation: *Ankylosing spondylitis is a disease characterized by damage to the musculo skeletal system with possible involvement of other organs and systems, in particular, it is often accompanied by cardiovascular pathology. Ankylosing spondylitis is more common in men, and therefore the goal of our study is to identify gender-specific features of cardiovascular damage among patients with ankylosing spondylitis. The study involved 79 patients: 61 men and 18 women, who under went echocardiography, measured the variance of the QT interval by electrocardiography and the ankle-brachial index. The results obtained when comparing groups of men and women showed that in men there is a relationship between the activity of ankylosing spondylitis and diastolic dysfunction of the heart, which, in turn, is accompanied by a decrease in blood flow in peripheral vessels. At the same time, in women suffering from ankylosing spondylitis, a correlation was found between functional changes and a decrease in the left ventricular ejection fraction, diastolic dysfunction, decrease in blood flow in peripheral vessels, and an increase in electrical instability of the myocardium.*

Keywords: *ankylosing spondylitis, gender differences, electrical instability of the myocardium, диастодиастолическая дисфункция.*

Аннотация: *Анкилозирующий спондилит- заболевание, характеризующееся поражением опорно-двигательного аппарата с возможным вовлечением и других органов и систем, в частности, оно*

нередко сопровождается сердечно-сосудистой патологией. Анкилозирующий спондилит чаще встречается у мужчин, в связи с чем актуальной является цель нашего исследования - выявить гендерные особенности поражения сердечно-сосудистой системы среди пациентов с анкилозирующим спондилитом. В исследовании принимали участие 79 пациентов: 61 мужчина и 18 женщин, которым проводили эхокардиографию, измеряли дисперсию интервала QT по электрокардиографии и лодыжечно-плечевой индекс. Результаты, получен ные при сравнении групп мужчин и женщин, показали, что у мужчин имеется взаимосвязь между активностью анкилозирующего спондилита и диастолической дисфункцией сердца, которая, в свою очередь, сопровождается снижением кровотока в периферических сосудах. В то же время у женщин, страдающих анкилозирующим спондилитом, обнаружена корреляция между функциональными изменениями и снижением фракции выброса левого желудочка, диастолической дисфункцией, снижением кровотока в периферических сосудах и нарастанием электрической нестабильности миокарда.

Ключевые слова: *анкилозирующий спондилит, гендерные различия, электрическая нестабильность миокарда, диастолическая дисфункция.*

As ankylosing spondylitis worsens, new bone forms as part of the body's attempt to heal. The new bone gradually bridges the gaps between vertebrae and eventually fuses sections of vertebrae together. Fused vertebrae can flatten the natural curves of the spine, which causes an inflexible, hunched posture.

Ankylosing spondylitis (Behterev's disease, AS) is a chronic systemic disease characterized by inflammatory damage to the joints of the spine, paravertebral tissues and sacroiliacjoints with ankylosing spondylitisof the intervertebral joints and the development of calcification of the spinal ligaments. It is known that this pathology affects the musculoskeletal system, but the cardiovascular system is also involved in the pathological process, which is one

of the most common causes of death in patients with ankylosing spondylitis [1]. Cardiovascular pathology is diverse -including early development of coronary artery atherosclerosis, disorders of the heart's conduction system, up to complete atrioventricular block, and myocardial damage that manifests itself in remodeling. This diversity is promoted by comorbid pathology, развиваюwhich develops as a complication of AS. We are talking, for example, about chest rigidity, limited excursion of the lungs, which leads to a violation of bronchial patency, damage to the right heart, severe pneumonia [2].

All these variants of cardiovascular pathology do not arise separately: pathophysiologically, they are intertwined with each other. In particular, re - modeling of the heart promotes rhythmogenesis. Timely and preclinical detection of not only structural and geometric, but also electrophysiological remodeling allows you to predict the future situation, choose preventive measures and start treatment if necessary.

In our study, we were interested in the gender aspect of cardiovascular disorders. The fact is that AS is more common in men, so we are faced with the question: are there any differences in the development of cardiovascular pathology in patients with AS depending on gender?

The aim of our study wasto identify genomic features of the development of pathology of the cardiovascular system in patients with AS.

Material and methods

The study involved 79 patients with AS who met the modified New York criteria for AS who were admitted to the rheumatology Department of the Republican Clinical Hospital of the Ministry of Health of the Republic of Uzbekistan in 2014-2016: 61 men, 18 women, who were included in the corresponding groups -men and women. Both groups were comparable in terms of patient age and disease activity; the study did not include patients with severe concomitant pathology of other organs, including the cardiovascular system, except for controlled stage 1 arterial hypertension.

Functional disorders проводиwere evaluated using the Bath Ankylosing Spondylitis Functional Index (BASFI). The overall assessment of disease activity was carried out using a summary indicator — the BASDAI index (Bath Ankylosing Spondylitis Disease Activity Index), and the ASDAS index (Ankylosing Spondylitis Disease Activity Score).

In addition to standard laboratory tests that are generally accepted in AS, instrumental studies were performed: two-dimensional echocardiography with determination of the left ventricular mass index, relative thickness of the left ventricular wall, E / a (ratio of the rate of early diastolic filling to the rate of late diastolic filling) of trans mitral blood flow, and Simpson ejection fraction. Two-dimensional echocardiography is widely used to assess left ventricular diastolic function using a combined index-the ratio of peak velocities E and A of trans mitral blood flow. If the left ventricular relaxation is disturbed, the decrease in pressure in it during diastole slows down, which in turn leads to a decrease in the rate of early filling (peak E). As a result, there is an increase in the volume of filling and the rate of contraction of the left atrium (peak A), which leads to a decrease in the E/a value [3].

In addition, to assess the electrical instability of the myocardium, we determined the variance of the QT interval. The variance of QT intervals serves as a non-invasive marker of instability of the electrophysiological properties of the myocardium and predisposition to cardiac arrhythmias. It reflects the inhomogeneity of repolarization processes, which is one of the conditions for the occurrence of ventricular arrhythmias [4].

The ankle-brachial index was used to assess peripheral vascular damage. The musculoskeletal-brachial index is the ratio of arterial pressure measured on the arteries of the foot to arterial pressure on the brachial artery. This parameter allows you to assess the adequacy of blood circulation of the I in the lower extremities. If the index is less than 0.9,this indicates a violation of blood flow in the lower extremities [5]. During the physical exam, your health care provider might ask you to bend in different directions to test the range of motion in your

spine. Your provider might try to reproduce your pain by pressing on specific portions of your pelvis or by moving your legs into a particular position. You also may be asked to take a deep breath to see if you have difficulty expanding your chest.

Statistical data processing was performed using the Statistica 10.0 program for Windows. Spearman's nonparametric rank correlation method was used to compare two independent groups by quantitative criteria. Descriptive characteristics are presented in the form of Me [Q1; Q3], where Me is the median, Q1 and Q3 are the 1st and 3rd quartiles; differences were considered significant at $p<0.05$.

Results

On average, the time from the onset of the first symptoms to diagnosis in men was 8.1 years, while in women it was slightly shorter — 6.88 years.

In the group of men, we found a negative correlation between BASDAI disease activity (6,6 [4,7; 7,2]) and the ratio of E/a of transminal blood flow(1,33 [0,97; 1,58]), which indicates that diastolic dysfunction of the left ventricle increases with increasing activity ($p<0.05$).

A positive correlation between the left ventricular mass index (111.7 [96.3; 124.3]), the relative wall thickness of the left ventricle (0.36 [0.33; 0.405]) and the ankle-brachial index(1 [0.94; 1.19]) ($p<0.05$) was found in the study group of men.- a significant correlation between the E/a of transmitral bloodflow (1.33 [0.97; 1.58]) and the ankle-shoulder index (1 [0,94; 1,19]) ($p<0.05$). In other words, an increase in myocardial mass and impaire diastolic function are accompanied by an increase in arterial stiffness in men with AS, the results obtained in the group of women turned out to be different. We did not find any correlation of BASDAI or ASDAS with these or other parametersод, but we found an interesting relationship with BASFI. In particular, an increase in BASFI (5.2 [3.2; 6.05])is accompanied by a decrease in the left ventricular ejection fraction (64.5 [63; 68]) and E / a transmitral blood flow (1.36 [1.21; 1.5]) ($p<0.05$), an increase in the ankle-brachial index (1 [0.94; 1,15]) and variance of the QT

interval (0.36 [0.34; 0.4] ($p<0.05$). This suggests that in women, the worsening of functional changes in AS correlates with decreased cardiac pumping function, diastolic dysfunction, vascular stiffness, and electrical instability of the myocardium.

Thus, after analyzing the results obtained, we concluded that in men there is a relationship between the activity of ankylosing spondylitis and diastolic dysfunction of the heart, which, in turn, is accompanied by an increase in vascular stiffness. At the same time, in women suffering from ankylosing spondylitis, functional changes, rather than disease activity, correlate with a decrease in the left ventricular ejection fraction, diastolic dysfunction, vascular stiffness, and an increase in electrical instability of the myocardium.

Conclusion. Management of patients with ankylosing spondylitis should also include a gender-based approach, since men and women have differences in the impact of disease activity and functional disorders on the development of cardiovascular pathology.

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