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Early Determination of Cardiovascular risk in Patients with Rheumatoid Arthritis

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ABSTRACT

To study early cardiovascular risk in patients with rheumatoid arthritis (RA). We examined 140 RA patients aged 35 to 60 years. The diagnosis of rheumatoid arthritis was made on the basis of the ACR (1987) and ACR / EULAR (2010) criteria. The mSCORE scale (SCORE / EULAR) was used for early detection and prediction of cardiovascular risk. Doppler ultrasound was used to determine the thickness of the intima-media complex (IMC) in the carotid arteries as an early sign of the development of cardiovascular diseases. In patients with RA, hereditary risk factors (RF) for cardiovascular diseases were detected in 31.4%, abdominal obesity in 35%, arterial hypertension (AH) in 63.6%, hypercholesterolemia hypercholesterolemia in 25.7%, and hypodynamia in 37.9% of patients. Smoking accounted for 10.8% of patients in the study, as the majority (82%) of the surveyed were women. At the same time, AH was observed 1.5 times, hypercholesterolemia 2.1 times more often in men than in women. According to the results of the study on the mSCORE scale, 52 (37.1%) had low risk, 64 (45, 7%), a high risk was in 14 (10%), and a very high risk was in 10 (7.2%) patients. Parameters of common carotid artery IMC in patients with RA are associated with the age of patients, the number of risk factors (RF) encounters, disease activity and have a great prognostic value in the early detection of cardiovascular risk. In RA patients, the use of the mSCORE scale enables early diagnosis of cardiovascular risk and timely correction of risk factors. The index of IMC is associated with the age of patients and with the degree of CVD risk, determined by the mSCORE scale.

1. INTRODUCTION

The risk of cardiovascular disease (CVD) in rheumatoid arthritis (RA) is an important problem in modern medicine. RA occupies one of the leading places among rheumatic diseases and belongs to diseases of high medical and social significance, due to the significant prevalence and progressive nature of the course, leading to early disability in patients of working age. According to multicenter studies, cardiovascular morbidity and mortality in patients with rheumatoid arthritis is higher than in the general population [15], [24]. The

immediate cause of death in RA patients is diseases associated with atherosclerotic vascular lesions, namely: coronary heart disease (CHD), cerebrovascular accident (CVA), congestive heart failure [12], [13]. Arterial hypertension (AH) is the most important risk factor for cardiovascular complications; however, in patients with RA, there is a wide scatter in the prevalence of AH (from 16% to 76%), which is associated with an underestimation of the clinical characteristics of patients and the characteristics of antirheumatic therapy [3], [9].

The development of cardiovascular complications in RA patients is associated with the influence of traditional risk factors, systemic inflammation, and side effects of non-steroidal anti-inflammatory drugs taken [14], [16]. In the pathogenesis of these diseases, NSAIDs, by suppressing the activity of cyclooxygenase (COX), can lead to a decrease in the systemic and renal synthesis of vasodilator prostaglandins, which causes an increase in vascular tone and fluid retention, accompanied by an increase in blood pressure (BP) and decompensation of chronic heart failure (CHF) [2], [10]. The association of RA and cardiovascular risk is the subject of close attention of rheumatologists and cardiologists. Studies have shown that the prevalence of RA is about 0.5–1% of the population and cardiovascular disease is the leading cause of mortality in these patients. In a recently published meta-analysis, the authors found that the risk of mortality from cardiovascular disease (ischemic heart disease and stroke) is 50% higher in RA patients compared to the general population [4], [11]. However, it is clear that early atherosclerosis observed in this group of patients cannot be explained only by traditional cardiovascular risk factors. The solution to this problem involves the assessment of the prevalence of CVD, cardiovascular risk factors and metabolic disorders; identification of groups of patients predisposed to the development of cardiovascular complications (CVC); study of the effect of antirheumatic drugs on the cardiovascular system; development of a set of preventive and therapeutic measures aimed at reducing the risk of CVC; creation of a system of dynamic control and monitoring of the development of cardiovascular pathology in this category of patients [23], [4], [18].

Material and methods. We examined 140 RA patients aged 35 to 60 years. The diagnosis of rheumatoid arthritis was made on the basis of the ACR (1987) and ACR / EULAR (2010) criteria. When determining the frequency of cardiovascular risk factors in patients with rheumatoid arthritis, heredity, smoking, rheumatoid factor, hypercholesterolemia, abdominal obesity, C-reactive protein, as well as the incidence of arterial hypertension (AH), coronary heart disease and diabetes mellitus were assessed. The mSCORE scale (SCORE / EULAR) was used for early detection and prediction of cardiovascular risk. SCORE chart: 10-year risk of fatal cardiovascular disease (CVD) in countries at low CVD risk based on the following risk factors: age, sex, smoking, systolic blood pressure, and total cholesterol. To calculate the mSCORE risk index, the value initially collected from the SCORE risk index was multiplied by a factor of 1.5 for RA patients that met two out of the following three criteria: a disease lasting more than 10 years, RF and/or anti-CCP positivity, and finally, patients with extra-articular manifestations. The study did not include patients with coronary heart disease and diabetes mellitus. Doppler ultrasound was used to determine the thickness of the intima-media complex (IMC) in the carotid arteries as an early sign of the development of cardiovascular diseases.

2. FINDINGS AND DISCUSSION

According to the results of the study, 90 (64.3%) of 140 patients with RA were women, whose average age was 51.21 ± 5.63 years, and 50 (35.7%) were men, whose average age was 52.89 ± 5.56. It was determined that 46 patients were 35–49 years old, and 94 patients were 50–60 years old. The results showed that 101 (72.1%) patients were seropositive and 39 (27.9%) were seronegative RA.

The clinical course of the disease in patients was assessed using the pain syndrome scale - VAS and the DAS-28 activity index. On the VAS scale, 25 (17.8) % of patients had moderate pain, 73 (52.1%) had severe pain,

and 42 (30%) had very severe pain. According to the DAS-28 index, 61 (43.6%) patients had II - moderate activity, and 79 (56.4%) - III - high activity.

In patients with RA, hereditary risk factors (RF) for cardiovascular diseases were detected in 31.4%, abdominal obesity in 35%, AH in 63.6%, hypercholesterolemia in 25.7%, and hypodynamia in 37.9% of patients. Smoking accounted for 18.5% of patients in the study, as the majority (64.3%) of the surveyed were women. At the same time, AH was observed 1.5 times, HCS 2.1 times more often in men than in women.

When analyzing the incidence of risk factors in one patient, 113 (80.7%) patients had a risk factor, of which 1 risk factor was detected in 21.4%, 2 risk factors were detected in 25%, and patients with 3 or more risk factors were 34.2%. No risk factors were observed in 19.3% of patients. When risk factors were analyzed by age, patients aged 50-60 had higher rates than patients aged 35-49. It was noted that AH is 2.3 times more common in patients aged 50-60 years than in patients aged 35-49 years.

Cardiovascular risk scores in patients with rheumatoid arthritis were determined using the mSCORE scale. On the basis of performance criteria, patients were considered to have "low risk" less than 1%, "moderate risk" from 1 to 5% (1% ≤ 5%) and "high risk" from 5 to 10% (5% ≤ 10%), ≥ 10% are in the "very high risk" group. According to the results, 52 (37.1%) had a low risk, 64 (45.7%) had a medium risk, 14 (10%) had a high risk, and 10 (7.2%) had a very high risk. patients (Table 1).

Table 1 mSCORE indicators for cardiovascular risk in patients with rheumatoid arthritis

Indicators	mSCORE (n =140)		
	Total (n =140)	Women (n =90)	Men (n =50)
Patient age	54,04±8,82	53,9±8,19	54,28±10,02
Low risk <1%	52(37,1%)	38(42,2%)	14(28%)
Intermediate risk ≤5%	64(45,7%)	42(46,7%)	22(44%)
High risk ≤10%	14(10%)	6(6,7%)	8(16%)
Very high risk >10%	10(7,2%)	4(4,4%)	6(12%)

The increased risk of death from cardiovascular disease is associated with the age of the patient and the presence of additional risk factors. Coronary atherosclerosis and the associated complications largely determine the clinical course and outcome of some rheumatic diseases [19]. In this context, it is important to reduce CVD by assessing RF, overall cardiovascular risk and changing all available RFs [24]. Of the examined patients, 64 were 35-49 years old, 76 patients were 50-60 years old. When these rates were analyzed by age, a low risk of cardiovascular disease was found in 53.1% aged 35-49 years, 23.7% aged 50-60 years old, the intermediate risk aged 35-49 years old was 40.6 % and 50% at the age of 50-60. In the group of patients aged 50-60 years, the risk <10% was 2 times higher than in patients aged 35-49 years, and a very high risk> 10% was found only in patients aged 50-60 years (tab. 2).

Table 2 The incidence of cardiovascular risk in patients with rheumatoid arthritis depending on age

Indicators	mSCORE	
	35-49 years old (n=64)	50-60 years old (n=76)
Low risk <1%	34 (53,1%)	18 (23,7%)*
Intermediate risk ≤5%	26 (40,6)	38(50%)
High risk ≤10%	4 (6,3%)	10 (13,5%)*
Very high risk >10%	0	10(13,5)*

Note: * - reliability of differences in indicators at the age of 35-49 years (* -P <0.001)

According to international guidelines, every patient with a SCORE risk of> 1% should be informed of the presence of risk factors and should work with a physician to address these factors as well as complications from cardiovascular disease [22]. The risk factors can occur in humans over a number of years, and this condition is often the result of non-compliance with healthy birth principles [6]. It is therefore difficult to change the lifestyle that has been practiced over the years and it often requires an individual approach [19].

Early detection and assessment of risk factors for cardiovascular diseases in patients with RA using the mSSORE scale increases the effectiveness of the principles of prevention of cardiovascular diseases by raising public awareness, eliminating risk factors, and promoting a healthy lifestyle [17], [7].

The results obtained showed that 10-year CVD risk indicators depend on arterial hypertension and its level, and risk factors. Assessment of CVD risk using the SCORE scale allows for the timely identification and monitoring of people with high and very high risk of cardiovascular diseases, and also increases the effectiveness of therapeutic and preventive measures [21], [20].

The results obtained when determining the thickness of the intima-media complex (IMC) of the common carotid artery in patients with RA were 0.98 ± 0.18 mm in the right carotid artery and 1.01 ± 0.18 mm in the left carotid artery. A pathological increase in this indicator (>0.9 (mm) was detected in more than half of the patients in the study - 49 (55.1%) cases, and IMC was 1.13 ± 0.07 mm in the right carotid artery and 1, 16 ± 0.07 mm in the left carotid artery. IMC in patients with seronegative RA was 1.12 ± 0.07 mm in the right carotid artery, 1.15 ± 0.07 mm in the left carotid artery, in patients with seropositive RA 1.13 ± 0.07 mm in the right carotid artery, 1.17 ± 0.06 mm in the left carotid artery. Analysis of this indicator based on the age of the patients showed that the mean value (mm) of IMC was 0.82 ± 0.12 mm in the right carotid artery, 0.84 ± 0.12 mm in the left carotid artery in the group of patients aged 35 -49 years old and in the age group of patients 50–60 years old, this indicator was 1.06 ± 0.1 mm in the right carotid artery and 1.08 ± 0.15 mm in the left carotid artery. The analysis showed that the IMC thickness directly correlated with the age of patients (r = 0.64), an increase in IMC > 0.9 mm was observed in 46 (74.2%) patients aged 50–60 years, in the right carotid artery 1.13 ± 0.07 mm, in the left carotid artery 1.16 ± 0.07 mm.

An analysis of the association of IMC with CV risk factors in RA patients showed that in 26.5% of patients with risk factor 1, IMC was >0.9 mm higher, and in patients with risk factors 2 and 3, 28.6 and 42.9%, respectively (Table 3).

Table 3 The occurrence of IMC indicators with factors risk in patients with RA

Indicators	Number of patients (n=89)	IMC ≤ 0,9(mm) (n=40)	IMC >0,9(mm) (n=49)
No risk factor	11 (12,4%)	10(25%)	1(2 %)
1 risk factor	27 (30,3%)	14(35%)	13(26,5%)
2 risk factors	20 (22,5%)	6(15%)	14(28,6%)
≥3 risk factors	31 (34,8%)	10(25%)	21(42,9%)

Assessment of carotid IMC in patients with RA based on the levels of cardiovascular risk determined by the mSCORE scale showed that a pathological increase in IMC in patients in the medium and high risk groups was detected in 67.3% and 14.3% of cases. In patients at very high risk, IMC values greater than >0.9 mm were observed in all patients and were 1.19 ± 0.06 in the left carotid artery, 1.16 ± 0.05 mm in the right carotid artery.

In patients with RA, a pathological increase in IMC (> 0.9 mm) was observed in 55.1% of patients, and it had a correct correlation with the age of patients (r = 0.64), at the age of 50–60 years it was observed in 74.2% patients and was 1.13 ± 0.07 mm in the right carotid artery and 1.16 ± 0.07 mm in the left carotid artery. The IMC index is also associated with CVD risk as measured by the mSCORE scale: a score above >0.9 mm was found in 67.3 in the mean groups. Parameters of common carotid artery IMC in patients with RA are associated with the age of patients, the number of RF encounters, disease activity and have a great prognostic value in the early detection of cardiovascular risk [1].

3. Conclusion

Thus, determination of CVD risk factors in patients with RA, the use of the mSCORE scale makes it possible to early diagnosis of cardiovascular risk, development of preventive measures and timely correction of risk factors. The index of IMC is associated with the age of patients and with the degree of CVD risk, determined by the mSCORE scale.

Conflict of interests. The authors declare no conflicts of interest.

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