Predicting The Risk of Cardiovascular Complications of Cardiovascular Pathology in Patients with Psoriatic Arthritis

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ABSTRACT

According to current researchers, one of the most common comorbid diseases in patients with psoriatic arthritis (PsA) is cardiovascular pathology (CVP). The trend frequency of cardiovascular pathology (CVP) has a high probability of developing cardiovascular complications (CVC), which leads to early disability in PsA patients. This is the reason for in-depth analysis of risk factors and predicting the risk of cardiovascular complications (CVC) in PsA patients.

Keywords: Psoriatic arthritis, cardiovascular complications (CVC), cardiovascular pathology (CVP).

Introduction. Chronic systemic inflammation plays a key role in the pathogenesis of PsA, leading to the production of pro-inflammatory cytokines (interleukin-6, tumor necrosis factor-alpha) and acute phase reactants (C-reactive protein). These molecules contribute to endothelial dysfunction, oxidative stress, and the development of atherosclerotic plaques. In addition, the common genetic predisposition of PsA to cardiovascular disease, as well as a higher prevalence of traditional cardiovascular risk factors, contribute to the increased vulnerability of PsA patients to the development of cardiovascular disease. Lifestyle factors such as sedentary lifestyle, smoking and a diet that promotes inflammation often accompany PsA and also increase the risk of cardiovascular complications in these individuals. All of the above determines the relevance of this problem.

Purpose of the study: prediction of cardiovascular complications in patients with psoriatic arthritis.

Material and methods of the study. The study involved 125 individuals who signed informed written consent. All patients depending on the presence of cardiovascular diseases (CVD) and PsA were randomized into three groups. Group I combined 62 patients with PsA complicated by CVD, group II included 32 patients with psoriatic arthritis (PsA) who did not have concomitant CVD. As an additional comparative (III) group, we included patients with clear signs of CVD without PsA.

All patients in all studied groups underwent clinical, laboratory and instrumental methods of investigation. In all patients risk factors of cardiovascular pathology were determined and the risk of cardiovascular complications was predicted using SCORE, Framingham and QRISK3 scales.

The SCORE (Systemic Coronary Risk Evaluation) scale is an analysis and assessment of traditional risk factors for cardiovascular

complications (CVD). The scale takes into account arterial hypertension (AH), obesity according to body mass index (BMI), smoking, presence of cardiovascular pathology among close relatives, diabetes mellitus, lipid metabolism disorders (increase in total cholesterol (TCH) over 5, 0 mmol/l, low-density lipoprotein (LDL) more than 3.0 mmol/l, triglycerides (TG) more than 1.7 mmol/l, decrease in high-density lipoprotein (HDL) below 1.2 mmol/l in female patients and below 1.0 mmol/l in male patients). Based on the above information, the 10-year risk of developing CVC is calculated. The risk of fatal complications according to the SCORE scale is considered low if it is less than 5%, high if it is between 5% and 10%, and very high if it exceeds 10%.

The Framingham Risk Scale can determine the presence of diseases such as angina, coronary heart disease, myocardial infarction and stroke. Similar to the SCORE scale, this system provides a 10-year prognosis. Framingham's cumulative risk is: low (risk below 10%), medium (risk between 10 and 20%), high (risk above 20%). A value greater than 30% indicates a very high risk of cardiovascular disease. The 10-year risk score in the form of a percentage is used to make a decision about preventing the disease. The scale takes into account gender, age, systolic blood pressure, total cholesterol, HDL, taking medications for hypertension, smoking, and the presence of diabetes mellitus.

Unlike other scales for determining 10-year risk, the QRISK3 can be used to examine patients in the age range of 25 to 84 years. Low risk QRISK3 (less than 10%) means that there is less than a one in ten chance of having a CVC in the next 10 years. Moderate risk QRISK3 (10-20%) and high risk QRISK3 (more than 20%) means that a person has at least a two in ten chance of having a CVC in the next 10 years.

Study Results. We used the SCORE, Framingham and QRISK3 scales to predict and further prevent patients with cardiovascular disease.

The SCORE system scale is a way of assessing traditional risk factors for the development of CVC. The scale takes into account AH, obesity according to BMI, smoking, presence of CVD among close relatives, diabetes, lipid metabolism disorders, increase in TCH over 5.0 mmol/L, LDL over 3.0 mmol/L, TG over 1.7 mmol/L, decrease in HDL below 1.0 mmol/L in patients.

Based on the above information, the 10-year risk of developing CVC is calculated. The risk of fatal complications according to the SCORE scale is considered low if it is less than 5%, high with a value between 5% and 10%, and very high if it exceeds 10% (Table 1).

Table 1
SCORE scale score in I, II, and III (n=105) study groups

10-year risk of developing CVC	I group n=62		II group n=32		III group n=31		Total n=105	
	n	%	n	%	n	%	n	%
Low risk≥5 %	6	9,7	23	71,9	3	9,6	32	30,5
High risk from 5% to 10%	35	56,5	9	28,1	17	53,1	61	58,1
Very high risk≤10 %	21	33,8	-	-	11	34,4	32	30,5

In study group I, 6 (9.7%) patients had low risk, 35 (56.5%) patients had high risk and 21 (33.8%) patients had very high risk of developing CVC. In study group II, 23 (71.9%) patients had a low risk and 9 (28.1%) patients had a high risk of developing CVC. No patients at very high risk of CVC were observed in study group II. In study group III, 3 (9.6%) patients had low risk, 17 (53.1%) patients had high risk and 11 (34.4%) patients had very high risk of developing CVC. Based on these observations, it can be seen that high and very high risk patients were more frequently seen in study groups I and III, in contrast to study group II where low risk patients were more frequently

seen (coefficient of differences for all indices p>0.05).

The Framingham Scale was used to assess the risk of individuals without clinical manifestations of CVD. The scale was also used for primary prevention. Like SCORE, this system makes it possible to make a prognosis for 10 years in advance. Total risk according to the Framingham scale: low (risk below 10%), medium (risk from 10 to 20%), high (risk above 20 to 30%). A value greater than 30% indicates a very high risk of CVD. The scale takes into account gender, age, CBP, TCH, HDL, taking hypertension medication (taking or not), smoking and presence of diabetes mellitus (Table 2).

Table 2
Framingham total risk score in I, II, and III (n=105) study groups

10-year risk of developing CVD	I group n=62		II group n=32		III group n=31		Total n=105	
	n	%	n	%	n	%	n	%
Low risk≥10 %	5	8,1	18	56,3	2	6,5	25	20
Intermediate from 10% to 20%	6	9,7	12	37,5	4	12,9	22	17,6
High risk from 20% to 30%	39	62,9	2	6,3	18	58,1	59	47,2
Very high risk≤30 %	12	19,4	-	-	7	22,6	19	15,2

In study group I, 5 (8.1%) patients had low risk, 6 (9.7%) patients had intermediate risk, 39 (62.9%) patients had high risk and 12 (19.4%) patients had very high risk of CVD. In study group II, 18 (56.3%) patients had low risk, 12 (37.5%) patients had intermediate risk, and 2 (6.3%) patients had high risk of CVD. No patients with very high risk of CVD were observed in study group II. In study group III, 2 (6.5%) patients had low risk, 4 (12.9%) patients had intermediate risk, 18 (58.1%) patients had high risk, and 7 (22.6%) patients had very high risk of CVD. Based on these observations, it can be determined that patients with high and very high risk were more frequently observed in study groups I and III, in contrast to study group II, where patients with low and intermediate risk of CVD development were more frequently observed (coefficient of differences for all indicators p>0.05).

With the QRISK3 scale, we assessed the risk of CVD development over the next 10 years, including the risk of MI, IDH, stroke and transient cerebral circulation disorder. The QRISK3 scale included data - age, sex, smoking, BMI, family history of CVD, treatment with hypotensive drugs, GCS, atypical neuroleptics, presence of CVD, migraine, presence of SLE, severe mental illness, ED, and BP variability score. Unlike other scales for determining 10-year risk, QRISK3 can be used to examine patients in the age range of 25 to 84 years: low risk - less than 10%, moderate risk -10-20% and high risk - more than 20% means (Table 3).

Table 3
QRISK3 system scale score in I, II and III (n=105) study groups

10-year risk of developing CVD	I group n=62		II group n=32		III group n=31		Total n=105	
	n	%	n	%	n	%	n	%
Low risk≥10 %	7	11,3	20	62,5	5	16,1	32	30,5
Moderate risk from 10% to 20%	37	59,6	12	37,5	18	58,1	67	63,8
High risk ≤20%	18	29,1	-	-	8	25,8	26	24,8

In study group I, 7 (11.3%) patients had low risk, 37 (59.6%) patients had moderate risk and 18 (29.1%) patients had high risk of CVD. In study group II, 20 (62.5%) patients had low risk, 12 (37.5%) patients had moderate risk of

CVD. No patients with high risk of CVD were observed in study group II. In study group III, 5 (16.1%) patients had low risk, 18 (58.1%) patients had moderate risk and 8 (25.8%) patients had high risk of CVD. When analyzing the data, it can be observed that more often patients with moderate and high risk were found in groups I and III of the study, in contrast to group II of the study, where patients with low risk were more often observed (coefficient of differences for all indicators p>0.05).

Conclusion. Thus, we used the SCORE, Framingham, and QRISK3 scales to predict and further prevent patients with cardiovascular disease. Based on the SCORE scale, the 10-year risk of developing CVC was calculated. The risk of fatal complications according to the SCORE scale was considered low if it was less than 5%, high if it ranged from 5% to 10%, and very high if it exceeded 10%. Using the SCORE scale, we determined that high- and very high-risk patients were more frequently seen in study groups I and III, in contrast to study group II, where low-risk patients were more frequently seen. Using the Framingham scale, it was determined that high- and very high-risk patients were more frequently seen in study groups I and III, in contrast to study group II, where low- and intermediate-risk patients were more frequently seen. Using the QRISK3 scale, we observed that moderate and high risk patients were more frequently seen in study groups I and III, in contrast to study group II where low risk patients were more frequently seen (coefficient of differences for all measures p>0.05).

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