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Echocardiographic characteristics of patients with rheumatoid arthritis

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Rheumatoid arthritis (RA) is a systemic disease of unknown origin which is characterized by chronic inflammation and mainly leads to the synovial membrane destruction of small and large joints. The prevalence of RA in general population is 0.5-1% and 2 to 3 times is more frequent among women [4]. RA is an invalidating disease which is associated with the life quality changes and decrease of the average duration of life [1].

Cardiovascular (CV) system involvement is an extra-articular complication of RA and a major cause of morbidity and mortality. All heart structures may be affected by various pathogenetic mechanisms and respectively different clinical manifestations may be seen: valvular disease, pulmonary hypertension, rhythm and conduction disturbances, myocarditis/pericarditis, myocardial fibrosis, coronary artery disease (CAD) up to myocardial infarction, heart failure (HF), etc. [5].

HF is a multifactorial clinical syndrome which represents universal end-stage of almost all heart diseases and has a poor prognosis.

In particular, patients with RA have 2-fold higher risk of HF development than those without RA and this high risk is not fully explained by traditional CV risk factors [3].

Materials and Methods

The purpose of our study was the evaluation of echocardiographic parameters in 43 patients with RA and the activity of the disease. Standard transthoracic echocardiography with conventional Doppler and tissue Doppler (TD) imaging was performed to evaluate left ventricular (LV) diastolic function according to EAE/ASE 2009 recommendations [2].

Table 1

Baseline characteristics of the patients

<i>Parameter</i>	<i>n (%)</i>
Male	9 (20.9)
Female	34 (79.1)
Positive RF	43 (100)

Patients' baseline characteristics are given in Table 1. Patients were from 26 to 78 years old. Mean age was 53.0 ± 9.3 years. In particular, the following echocardiographic parameters were assessed: LV ejection fraction (LVEF), LV hypertrophy (LVH), left atrial (LA) volume, right ventricular (RV) size and contractility, valvular regurgitation and stenosis, LV septal and lateral systolic and diastolic velocities by TD imaging. LA dilation was assessed when LA volume ≥ 29 ml/m². LV diastolic dysfunction was assessed both by conventional Doppler and TD. RV systolic function was assessed by tricuspid annular plane systolic excursion (TAPSE) (reference range 1.5-2.0 cm).

Rheumatoid factor (RF) was positive for all patients. The activity of RA is evaluated by Disease Activity Score (DAS)-28 [6], calculated by the following formula:

$$\text{DAS-28} = 0.56 * \sqrt{(\text{tender joints})} + 0.28 * \sqrt{(\text{swollen joints})} + 0.70 * \ln(\text{ESR}) + 0.014 * \text{VAS}$$

VAS (Visual Analogue Scale) is a measurement instrument that tries to measure a characteristics or attitude that is believed to range across a continuum of values and cannot easily be directly measured (e.g., the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain). VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The patient marks on the line the point that he/she feels represents his/her perception of the current state. The VAS score is determined by measuring in millimeters from the left hand end of the line to the point that the patient marks.

28 is the count of 28 joints which are mostly involved (tender and swollen) in RA: shoulders, elbows, wrists, metacarpophalangeal joints, proximal interphalangeal joints and the knees.

As the above-mentioned formula is not simple, we used special Webcalculator for DAS-28 calculation [7].

The DAS-28 provides a number on a scale from 0 to 10 indicating the current activity of RA. A DAS-28 score > 5.1 means high disease activity, whereas a DAS-28 < 3.2 indicates low disease activity. Remission is achieved by a DAS-28 < 2.6 .

Statistical analysis was performed by using SPSS version 16. There was performed independent-samples t-test. Two-sided p values <0.05 were considered to be statistically significant.

Results and Discussion

The echocardiographic study revealed following patterns (Table 2): LVEF mostly was preserved, LV dilation was observed rarely, more than half of the patients had LV hypertrophy. LV diastolic dysfunction (LVDD) was found in 15 patients (34.8%). LA volume increase ($\geq 29 \text{ ml/m}^2$) was revealed in 14 patients (32.5%). RV was not dilated and RV contractility was preserved in all patients. The most common valvular regurgitation was on mitral valve (20.9%). In 2 patients transaortic flow velocity was increased. No valvular stenosis was observed.

The average DAS-28 score was 5.29 ± 0.27 (min=2.94; max=7.04), indicating high disease activity.

Table 2

Echocardiographic findings in RA patients

Parameter	Number of patients (%)
Preserved LVEF ($>50\%$)	39 (90.6)
LVH	23 (53.4)
LA dilation ($\geq 29 \text{ ml/m}^2$)	14 (32.5)
LV diastolic dysfunction	15 (34.8)
LV dilation	2 (4.6)
TAPSE $>2.0 \text{ cm}$	43 (100)
MR (moderate/severe)	9 (20.9)
Valvular stenosis	0

Table 3

Relationship between DAS and LVDD

	LVDD	N	Mean	SD
DAS	yes	15	5.581	0.9338
	no	28	4.904	0.9419

When comparing mean DAS-score between patients with and without LVDD, in the group with LVDD mean DAS-score was significantly higher ($p < 0.05$ ($p = 0.03$)).

Table 4

Relationship between patients' age and LVDD

	LVDD	N	Mean	SD
Age	yes	15	60.60	8.895
	no	28	54.04	9.155

There was also revealed a significant difference between patients' mean age and LVDD: in the group of patients with LVDD, the mean age was higher compared to the group without LVDD ($p < 0.05$ ($p = 0.029$)).

Conclusions

1. For RA patients the development of LV concentric hypertrophy with LA dilation is the most common type of remodeling.
2. HF with preserved EF (HFpEF) (diastolic dysfunction) is typical of RA patients.
3. Moderate/severe mitral regurgitation in RA may indicate valvular degeneration in this disease.
4. RA patients with LVDD have higher DAS-score and are older compared to RA patients without LVDD.

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Ռևմատոիդ արթրիտով հիվանդների արձագանքասրտագրական բնութագիրը

Հ.Ս. Հովհաննիսյան

Միտ-անոթային համակարգի ախտահարումը ռևմատոիդ արթրիտի (ՌԱ) արտահոդային բարդություններից է և հանդիսանում է այս հիվանդների հիվանդացության և մահացության հիմնական պատճառներից մեկը: Մրտի բոլոր կառուցվածքները կարող են ախտահարվել զանազան ախտաֆիզիոլոգիական մեխանիզմներով և, համապատասխանաբար, կարող են դիտվել տարբեր կլինիկական դրսևորումներ: Մասնավորապես, սրտային անբավարարության ռիսկը ՌԱ-ով հի-

վանդների մոտ մոտավորապես 2 անգամ ավելի բարձր է, քան ընդհանուր պոպուլյացիայում, ընդ որում այդ ռիսկը լիովին չի բացատրվում սիրտ-անոթային ռիսկի ավանդական գործոններով: Հետազոտվել են ՌԱ-ով 43 հիվանդների արձագանքասրտագրական ցուցանիշները և հիվանդության ակտիվության աստիճանը:

Эхокардиографическая характеристика больных с ревматоидным артритом

А.С. Оганисян

Из внесуставных осложнений ревматоидного артрита (РА) поражение сердечно-сосудистой системы является одной из основных причин заболеваемости и смертности этих больных. Все структуры сердца могут быть поражены разными патофизиологическими механизмами и соответственно могут наблюдаться разные клинические проявления. В частности, риск сердечной недостаточности у больных с РА почти 2 раза выше, чем в общей популяции, и этот риск не вполне объясняется традиционными факторами сердечно-сосудистого риска. Были изучены эхокардиографические показатели и степень активности заболевания у 43 больных с РА.

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