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ECHOCARDİOGRAPHİC EVALUATİON OF PATİENTS WİTH RHEUMATOİD ARTHRİTİS

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ABSTRACT

Background: Rheumatoid arthritis (RA) is a long-term inflammatory condition affecting the joints that can also cause extra-articular symptoms. Heart-related conditions such as pericarditis, myocarditis, cardiomyopathy, coronary vasculitis, cardiac amyloidosis, arrhythmia, valve disorders, and, most crucially, ischemic heart disease, and congestive heart failure are included in those extra-articular aspects. In comparison to the overall population, RA is interrelated to a higher mortality rate, with cardiovascular illnesses accounting for the bulk of these deaths. **Objective**: To evaluate the frequency of echocardiographic findings in individuals who have been officially diagnosed with rheumatoid arthritis. **Patients and Method**: This cross-sectional study included 50 patients (42 females and 8 males) who were detected with RA based on the ACR/EULAR diagnostic criteria for rheumatoid arthritis. Interviews and questionnaires were used to gather data. Age, gender, length of illness, drugs taken at the moment, rheumatoid factor, anti-CCP, and hemoglobin level. Transthoracic echocardiography was used to assess each individual in order to identify any structural or functional heart abnormalities. **Results**: The patients' mean age was 49.53±11.55 years. In 26 cases (52%), echocardiographic anomalies were discovered. Diastolic dysfunction was the most prevalent abnormality found on echocardiograms. **Conclusion:** According to this study, RA patients' cardiac involvement is significantly more common.

KEYWORDS: Echocardiographic, Rheumatoid Arthritis.

INTRODUCTION

Worldwide, rheumatoid arthritis (RA) is a chronic inflammatory illness with an unknown cause that affects people of all ethnic backgrounds. This is the most prevalent kind, leading to joint injury and physical impairment. Compared to men, females have a 2.5-fold higher chance of being impacted. Incidence rates in the US are 0.5 per 1000 people year.[1,3]

Nonetheless, there exist variations in the incidence rates of RA among several ethnic groups, wherein rural Africans have a greater rate than Pima or Chippewa Indians. It can result in extra-articular symptoms and rises between the ages of 25 and 55 before plateauing at 75.[4]

Extra-articular symptoms in people with RA are widespread and can occurred before the beginning of arthritis, frequently as a result of a history of smoking. These symptoms include subcutaneous nodules, lung nodules, anemia, and secondary Sjogren's syndrome.[5]

The RA is characterized by cardiac involvement, which includes pericarditis, heart block, coronary artery disease (CAD), cardiomyopathy, and aortic regurgitation. Increased blood pressure, smoking, elevated cholesterol, decreased physical activity, NSAIDs, glucocorticoids, and inflammatory cytokines are risk factors. While pericardial involvement is the most prevalent location, less than 10% of individuals experience clinical symptoms. Diastolic dysfunction (DD), myocarditis, or CAD can all lead to cardiomyopathy.[4,5]

In individuals with RA, cardiovascular disease (CVD) is the primary cause of mortality in individuals with RA also have greater rates of carotid atherosclerosis and CAD than people in general. The incidence of congestive heart failure is twice as high in persons with RA. In this cohort, elevated serum inflammatory markers are connected with a raised potential of CVD.[5,6]

By evaluating the anatomy and function of the heart, identifying mild cardiac muscle, ventricular, and

pericardial abnormalities, and even in asymptomatic patients, echocardiography improves cardiological diagnosis. Clinical research has concentrated on its usage in RA and its diagnostic value for CVD.[6]

Aim of the current study

To find the frequency of echocardiographic findings in individuals who have been officially diagnosed with rheumatoid arthritis.

PATIENTS AND METHODS

Study design

This cross-sectional study was carried out from 1st October, 2020, to 30th May 2021, at the Ibn-Sena Teaching Hospital's Rheumatology Unit in Mosul City. The medical department of the University of Mosul's College of Medicine provided ethical approval. Participants gave their consent in order to be included in the study.

Sample selection

This study comprised 50 patients (42 females and 8 males) who were categorized as having rheumatoid arthritis (RA) based on the ACR/EULAR (2010) diagnostic criteria.

Exclusion criteria

1. Patients not meet ACR /EULAR criteria.
2. Patients with hypertension, diabetes mellitus and ischemic heart diseases.

Data Collecting Tool

Questionnaires covering clinical and demographic characteristics (age, gender, length of disease, and current medicines) and echo results were used to gather data. All patients with proven RA underwent echocardiography at the Ibn-Sena Teaching Hospital's Echo Department Unit. An PHILIPS 2006 ultrasonic imaging system with a 3.5 MHz transducer was used for the investigation. Every patient had M-mode, two-dimensional, color Doppler, and continuous and pulsed wave Doppler echocardiography. The dimensions of the cardiac chamber and the thickness of its wall were acquired by M-mode echocardiography. Using Simpson's formula, fractional shortening (FS) and ejection fraction (EF) were computed, and the diastolic function was assessed.

Statistical analysis

Data were presented using the SPSS software package (version 25) in appropriate tables and figures. For analysis, the chi-square test, percentage, and independent (t) test were employed. If the p value is less than (< 0.05), it was deemed significant.

RESULTS

This study comprised 50 patients with proven rheumatoid arthritis between October 2020 and May 2021. The mean age was 49.92±12.55. Among the sample, 8(16%) were males while 42(84%) were females, as indicated in figure (1).

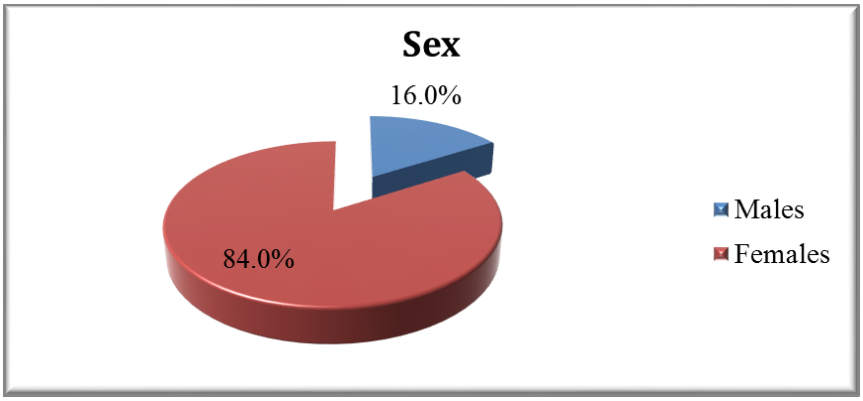

Figure 1: Gender distribution.

The personal traits of the research sampling population are displayed in Table (1). RF factor was positive in 50 patients while 43(86%) individuals had a positive ACCP.

Table 1: Studied parameters among the sampled population.

Parameters	Rheumatoid arthritis (n = 50)
Age/ years (Mean±SD)	49.53± 11.55
Duration of RA/ years (Mean±SD)	11.18 ± 8.73
Sex	**No. (%)**
Male	8 (16%)
Female	42 (84%)
Hematological and serology	**No. (%)**
Rheumatoid factor	50(100%)
ACCP	43(86%)

Most of the individuals under study were receiving medical treatment. As seen in figure (2), of them, 42 (84%) were receiving Methotrexate (MTX), then after by azathioprine (AZA) two (4%), leflunomide one (2%), and MTX+AZA one (2%). Four (8%) patients were not receiving any medication.

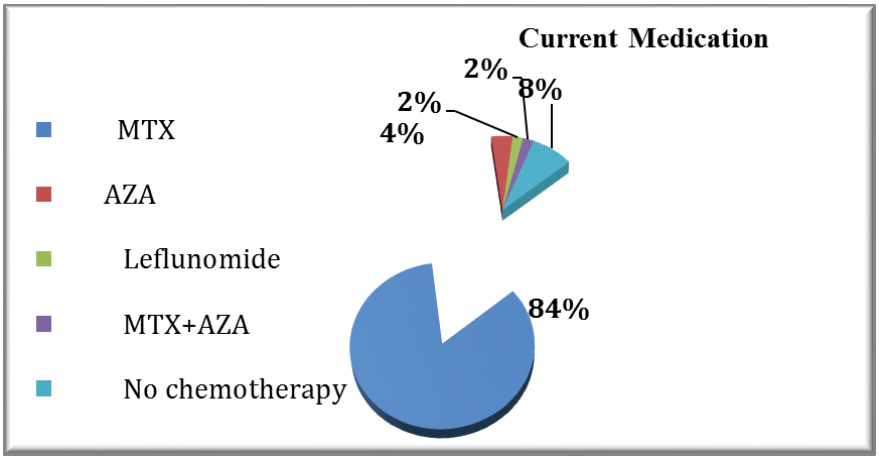

Figure 2: Percentages of chemotherapy.

Table (2) displays the features and prevalence of echocardiographic abnormalities, in both sides. 26 (52%) of the 50 participants in the study exhibited cardiac involvement. The DD or abnormalities of the left ventricular filling characterized by a reduced E/A ratio, was the main abnormality in the echocardiography, occurring in 26 cases (52%). This was followed by pulmonary hypertension in 18 cases (26.18±5.86), tricuspid valve abnormality in 7 patients (14%), mitral valve abnormality in 5 cases (10%), and the aortic valve in 3 cases (6%). Just 2 individuals (4%), however, had pericardial effusions.

Upon gender comparison of RA patients, females outnumbered men by a ratio of 5.1:1, which is typical of autoimmune disorders. Of the 50 patients, 8(16%) were male and 42(84%) were female. The results of the abnormal echocardiogram in RA patients did not significantly correlate with the patients' gender ($p > 0.05$).

The distribution of the patients under the current study according to the age with respect to echo results, 4 out of 10 patients who were 40 years of age or younger had abnormal findings on echocardiography, whereas 22 out of 40 patients, or 55% of the patients, were over 40 years of age. These findings demonstrated a strong correlation ($p<0.05$) between RA patients' abnormal echocardiogram findings and age.

With a mean RA illness duration of 11.18±8.73 years, the patients under research fall into two categories: those with early RA (18%), which is defined as disease duration less than four years, and those with late RA (82%), which is defined as disease duration longer than four years. Just 4 patients from the 1st group (those <4 years old) exhibited LVDD on echo testing, whereas 22 patients (84.61%) from the 2nd group (those with >4 years of RA) had echo abnormalities. This suggests that there is a substantial correlation ($p<0.05$) between the length of RA illness and abnormal echocardiogram results.

Table 2: The outcomes of Echo.

Parameters	Rheumatoid arthritis (n = 50)	Abn
	Mean±SD	No. (%)
LVESD (39.42±3.7) mm/m^2	31.16±3.40	9(18%)
LVEDD (<56mm)(47.2±4.3)mm	43.64±6.13	16(32%)
Septal Thıckness (8.3-11mm)	0.96 ± 0.16	6(12%)
LVPW thıckness (7.5-9.8)Mm	0.80 ± 0.14	3(6%)
EF (55-70)%	58.98 ± 8.32	6(12%)
FS (25-45)	0.34 ± 0.05	3(6%)
E/A Ratio (1-2)	1.05 ± 0.19	26(52%)
DD		26(52%) Grade1 22pt Grade2 2pt Grade3 1pt Grade4 1pt
LA (2.0-4.0cm)	3.21 ± 0.43	4(8%)
Aortic root	31.0 ±4.77	Six (12%)

(<40 mm men, <34mm female)		
MV (>3cm^2)		five (10%) two Stenosis(4%) two Regurg.(4%) one Prolaps (2%)
AV (2cm^2)		three (6%) one stenosis(2%) one regurg.(2%) one As+AR(2%)
TV (5cm^2)		TR 7 (14%)
RVSP (PHTN) (12.2-25mmHg)	26.18 ± 5.86	seven (14%) six mild(12%) one moderate (2%)
Pericardium (mild effusion)		two (4%)

DİSCUSSİON

In the current study, among the 50 patients, 26 (52%) had cardiac contribution. It was in line with a study by Amer *et al.*, (2012)[7], which found that 53% of patients had heart involvement on echocardiography. A one-dimensional examination of 44 patients with classical or definite RA revealed that 34 patients had pericardial effusion, 22 of them experienced palpable nodules meanwhile 22 patients had no such experience. According to the preponderance of research on patients with RA, cardiac involvement is the most common cause of the illness, which shortens patients' lives by 4 years in men and 10 years in women.[8]

In this study, from 50 examined patients, twenty six (52%) had cardiac involvement. The main echocardiographic anomaly was DD with one patient experiencing severe LVDD, 3 patients with moderate LVDD, and 22 patients with mild DD. This is similar to a investigation done by Selçuk[9] and Di Franco[10] that was done independently on RA patients, without assessing the course of the disease, a substantial proportion of patients having ventricular dysfunction in echocardiography.

Moreover, no significant difference was noticed in the development of DD concerning sex; anyway, this result is not dependeble due to small male sample size.

The DD patients in this study were much older than the non-DD patients. This is steady with the Iranian work carried on by Saadati.[15] In a different research conducted in the UK, Aamer Sandoo assessed the clinical results of 201 RA patients in order to identify the risk factors of CVD, CAD, and cerebrovascular disorders, in addition to hypertension. His research revealed a link between aging and cardiovascular problems.[13]

The individuals enrolled in the research have had RA diseases for an average of 11.18±8.73 years. Eighty-one of them which represented (18%) were classified as having late RA (RA lasting >4 years), whereas nine (18%) were classified as having early RA (<4 years). In the first group (those <4 years), only 4 patients had an echo examination showing LVDD; in the second group (those with >4 years of RA), 22 out of 26 patients exhibited echo abnormalities (84.61%). This suggests a strong correlation between the duration of RA illness and aberrant ECG results. According to a related study conducted in Iran by Masooleha[14] there was a significant relationship between the duration of illness as, well as, cardiac abnormalities.

Concerning valvular disorder (VD), it was noticed in percentages of; seven individuals (14%), five had aberrant mitral valves (10%), and three had defective aortic valves (6%). Consistent with the present investigation, Saadati discovered that there was a significant risk of valve diseases, including tricuspid, mitral, and aortic insufficiency, in his research conducted on 40 patients in Iran.[13] Similarly, aortic and tricuspid insufficiency have a higher risk than other VD, according to Lili Pan et al. (2016).[14,16] Patients with RA have a significantly higher risk of VD compared to those without the disease.[17] Only 2 patients (4%) had pericardial effusion. In contrast to this investigation, other research discovered a greater prevalence.[18]

We should note some of the limitations that this study has. These include the limited sample size, which means that this study may not be typical of all RA patients; bigger patient numbers were necessary for a more accurate conclusion; and the loss of patient follow-up to show progress after successful RA therapy. The investigation was conducted out in a single site, scarcity and constraints in the time span of the study is another drawback. The final and most crucial point is that the majority of patients with RA and cardiac involvement are treated as outpatients in private clinics rather than being registered in hospitals.

CONCLUSION

The structure and function of the heart are significantly impacted by rheumatoid arthritis. The severity of the condition and the overall death rate would be lessened with early detection and treatment of cardiac symptoms. Echocardiography is a useful technique to assess and maintain follow-up for the patients with RA.

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