



ORIGINAL RESEARCH PAPER

Internal Medicine

STUDY OF CARDIOVASCULAR MANIFESTATIONS IN PATIENTS OF RHEUMATOID ARTHRITIS

KEY WORDS: ARA(American Rheumatology Association),CRP (C-reactive protein, DAS (disease activity score) & RA (Rheumatoid Arthritis)

Dr Binay Kumar Singh*

MD, Associate professor, Department of Medicine, ESI PGIMSR, Basaidarapur, New Delhi. *Corresponding Author

Dr Anup Kumar

Postgraduate Resident

ABSTRACT

INTRODUCTION: Rheumatoid arthritis is a chronic inflammatory disease of unknown etiology affecting approximately 1% of the adult population worldwide. The primary target of this disease is synovium. Although Rheumatoid arthritis commonly involves joints, several extra-articular manifestations has also been observed involving cardiac, hematological, pulmonary, ocular and neurological systems and it's one of the most common cause of death in these patients.

AIM: To study different types of cardio-muscular manifestations and their early recognitions in patients of rheumatoid arthritis patients.

MATERIAL & METHODS: This study was prospective observational study done on the patients of rheumatoid arthritis which were recruited from rheumatology clinic of ESI- PGIMSR as per ARA criteria & their details clinical work up along with CBC, RA factor, ECG, ECHO were done.

RESULT: In our case, out of 140 patients, cardiac involvement was observed in 32 cases (22.8%). The mean disease duration of rheumatoid arthritis was found 5.1 year in entire study group however it was 6.67 years in patients with cardiac abnormalities.

CONCLUSION: In our study there was higher incidence of cardiac involvement in patients with increased duration of disease with mean being 5.1 years. The maximum incidence of cardiac abnormalities was between 24-50 years with female preponderance (F :M 3.5:1)

INTRODUCTION:

Rheumatoid arthritis is a chronic inflammatory disease of unknown aetiology affecting approximately 1% of the adult population worldwide¹. The primary target of this disease is synovium where it causes uncontrolled proliferation of the synovial tissue. This results in excessive production of fluid which in turn leads to the erosion of surrounding bone, tendons and ligaments. Although Rheumatoid arthritis commonly involves joints, several extra-articular manifestations has also been observed involving cardiac, hematological, pulmonary, ocular and neurological system²

The prevalence of rheumatoid arthritis worldwide is approximately 1%. As per the studies by Malaviya et al, the prevalence of rheumatoid arthritis in Indian population is 0.75%³ Identification of cardiac lesions in the patients of Rheumatoid arthritis were made by Jean Martin Charcot⁵

Present study has been conducted to evaluate rheumatoid arthritis patients in terms of clinical examination, electrocardiography and echocardiography and to determine prevalence of specific types of cardiac manifestations in these patients so as to better understand and treat them as early as possible.

AIMS AND OBJECTIVES

AIM:

To study different types of cardiovascular manifestation in the patients of Rheumatoid arthritis.

OBJECTIVES:

To recognize early, the subclinical cardiovascular manifestations in the patients of Rheumatoid arthritis.

MATERIAL AND METHOD:

This study was conducted at ESI-PGIMSR basaidarapur New Delhi.

Study Type:

Observational study.

Method Of Selection:

140 patients were selected consecutively from Rheumatology clinic of ESI PGIMSR Basaidarapur Delhi.

Inclusion Criteria:

Age- 18 years and above, up to 60 years of age who fulfilled the

revised American College of Rheumatology/European League Against Rheumatism Criteria 2010 for Rheumatoid arthritis.

Exclusion Criteria:

- a) patients with less than 18 year of age,
- b) patients suffering from congenital heart disease, valvular heart disease, ischemic heart disease, hypertension, smokers, pregnant females, chronic alcoholics,
- c) chronic kidney disease.

METHODOLOGY:

This study was under taken on the patients who visited rheumatology clinic (Department of Medicine at ESI-PGIMSR basaidarapur New Delhi, during the period of study from October 2019 to April 2021. A total number of 140 patients who had approached the rheumatology clinic in the hospital, and having satisfied the modified ACR (2010) criteria were selected for the study. Detailed history & Rheumatological examination as well as systemic examination were done to evaluate these patients. Tender joint count and swollen joint count was done and a simplified 28 joint articular index has been used to assess disease activity. 28 joints included 10 proximal interphalangeal joints of fingers, 10 metacarpophalangeal joints, and the wrist, elbow, shoulder and knee joints bilaterally.

Cardiovascular examination was done in detail, respiratory, abdominal and neurological examination was done in detail. Extra-articular manifestations were carefully noted and documented.

Investigations:

Following investigations were done with special emphasis on: **ESR, RA factor, Anti-CCP, CRP.**

Routine investigations:

CBC with Hemoglobin estimation, Blood sugar estimation Liver function test Kidney function test Serum electrolytes test Radiographic assessment: Routine chest x-ray PA view

Electrocardiography:

Echo Cardiography:

With patient lying supine and left lateral position both in M mode and two dimensional and doppler Echocardiography

was done. Cardiac position, Cardiac chambers, atrial and ventricular septae, pericardium, valves, great vessels, ejection fraction, peak velocities across valves and grading of regurgitation if any, were documented.

OBSERVATION AND RESULTS:

The study was undertaken in the rheumatology clinic at ESIPGIMS and Hospital basaidarapur, New Delhi – (Table-1) In this study female were higher in number as compared to male in various age groups. This study clearly indicated the female preponderance of this disease – (Figure-1). When patients with cardiac abnormalities were compared to those patients without cardiac abnormalities, it was found that the mean age for the patients with cardiac abnormalities was higher (45.56 years) when compared to the patients without cardiac abnormalities (40.52 years) and the association was statistically significant, P value (0.015).

Cardiac abnormalities were seen in 32 patients by echocardiography, out of which 25 were female (78.12%) and 7 were male (21.88%). The most common cardiac involvement were left ventricular diastolic dysfunction which were observed in 20 (14.28%) subjects. Out of 20 subjects 17(12.14%) were female and 3(2.14%) were male. The second most common cardiac involvement was pericardial effusion which was observed in 8(5.71%) subjects, Out of which 3 were male (2.14%) and 5(3.57%) were female. Other cardiac involvements were mitral regurgitation which were observed in 2 male subjects (1.4%), aortic regurgitation was observed in 1 female subject (0.7%), pulmonary hypertension with tricuspid regurgitation were observed in 1 female subjects (0.7%). The mean duration of disease was 6.04 years with standard deviation of 2.06 years. The duration of disease ranged from 6 month to 10 years. Cardiac abnormalities with echocardiography were more common among patients with longer duration of the disease. The mean duration of disease among patients with cardiac abnormalities was 6.63 years and patients without cardiac abnormalities were was years. P value 0.001 (statistically significant). The mean duration of disease was 6.04 years with standard deviation of 2.06 years. The duration of disease ranged from 6 month to 10 years.

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ELECTROGRAPHY In the study group 3 patients (2.1%) were having left ventricular hypertrophy, 10 patients (7.1%) were having left anterior fascicular block, 1 patient (0.7%) were having incomplete right bundle branch block (1.4 %) and 1 patient (0.7%) were having incomplete right bundle branch block. This study revealed that ECG changes are nonspecific among subjects with cardiovascular abnormalities observed by echocardiography when compared with subjects without cardiovascular abnormalities by echocardiography. Echocardiography: Structural and functional abnormalities were observed by echocardiography in 32 subjects out of 140 (22.8%). Out of 32 patients, 20 (14.28%) were having left ventricular diastolic dysfunction, 8 (5.71%) had pericardial effusion, 2 had mitral regurgitation (1.4%), 1 (0.7%) had aortic regurgitation and 1 (0.7%) had pulmonary hypertension with tricuspid regurgitation. All the subjects were clinically asymptomatic.

DISCUSSION:

Cardiac involvements are well documented as extra-articular manifestations in autopsy studies of those suffered from Rheumatoid arthritis. These abnormalities have also been observed by echocardiography and Doppler analysis in various studies.

Abnormalities were 6.63 years. The mean age group of patients without cardiac abnormalities was 4.69 years. There were Age and sex distribution. The mean age of the patients with RA in this study was 41.67 years with range between 20 to 60 years. The maximum incidence of cardiac abnormalities was between 24 to 50 years of age. The female to male ratio in this study was 2.5:1.

In a study by maoine et al⁹ the mean age of the study group was 46.4 years with a range of 18 to 76 years, and the male to female ratio was 1:2.2. The maximum incidence of cardiac abnormalities 66% was seen in 30-60 years age group.

The mean age of patients in this study group is slightly higher as compared to present study.

Echocardiographic finding:

In this study, cardiac manifestations were seen in 32 subjects with rheumatoid arthritis out of 140 subjects included in the study (22.8%) The most common cardiac abnormalities were left ventricular diastolic dysfunction (LVDD) which were seen among 20 patients out of 140 RA subjects (14.28%), the second most common manifestation was pericardial effusion which were seen among 8 out of 140 (5.71%) Patients with RA. Other findings were mitral regurgitation (MR) which were seen among 2 patients (1.4%) with RA patients, Pulmonary hypertension with regurgitation was seen in 1 patient (0.7%). Aortic regurgitation was seen in 1 patient with RA (0.7%). Maione et al studied 39 RA subjects and found the incidence of cardiac involvement to be 43 % in their study and the most common abnormality was left ventricular diastolic dysfunction (26%). Pericardial involvement was seen in 9% and valvular lesion in 8% Corrao et al¹⁰ in 1995 patients with cardiac abnormalities with duration of the disease, p value 0.001. Evaluated 35 RA patients for cardiac function using echocardiography and found the incidence of cardiac abnormalities to be 57.1%. in their series of patients. Pericardial involvement was found to be the most common abnormality and left ventricular function was not evaluated.

This is in contrast to our study in which the most common cardiac abnormalities were LVDD. Another study conducted in 1996 evaluated 40 patients for ventricular function in RA and found that ventricular filling abnormalities were significantly higher in RA as compare to controls¹⁰.

Levendoglu et al in 2002 evaluated 40 patients with rheumatoid arthritis for Ventricular function using doppler echocardiography and compared with them with 44 control subjects. They found a significantly increased incidence of left ventricular diastolic dysfunction as compare to controls¹⁰.

Dowson et al in their study of 146 RA patients have described a high incidence (21%) of pulmonary hypertension in their series of patients 41, In contrast to our study in which pulmonary hypertension were observed in only one patient (0.7%)¹⁰.

In an Indian study by Kaushal et al in 35 North Indian RA patients, the incidence of cardiac abnormalities was 20% and the major manifestation was pericardial involvement (16%).

Their study did not reveal any left ventricular functional abnormalities¹¹, this is in contrast to finding in our study where LVDD was the predominant abnormality.

Echocardiographic findings according to duration of disease:

In this study there was significantly higher incidence of cardiac

involvements in patients with increased disease duration. The mean duration of disease was 6.04 years and the mean duration of disease in patients with cardiac abnormalities was 6.63 years. There were statistically significant association found between disease duration with cardiac abnormalities with pvalue of 0.001. Kaushal et al found that mean duration of disease in their series of patients to be 3.65 years¹¹. Franco et al evaluated 32 patients of RA to assess LV diastolic abnormalities by Doppler echocardiography. They found a direct relationship with a linear increase in incidence of left ventricular diastolic dysfunction with increasing duration of disease. The present study also had similar findings with an increasing duration of disease in patients with left ventricular filling abnormalities²⁰.

Electrocardiographic findings:

In the present study 3 patients were found to have left ventricular hypertrophy as per the Romhilt Estes criteria. Other ECG changes were left anterior fascicular block which were seen in 4 patients with RA, incomplete right bundle branch block was seen in 1 patients with RA. However, there were no significant differences with regard to the above mentioned ECG abnormalities in patients with echocardiographic abnormalities as compared to those with no echocardiographic abnormalities. Tlustochowicz et al evaluated 70 RA patients with baseline electrocardiogram. They did not find any significant difference in information obtained from baseline studies²¹.

SUMMARY:

Cardiac involvement in Rheumatoid arthritis patients were observed in 32 cases (22.8%) out of 140 cases studied.

The maximum incidence of the disease was seen in the age group of 24-50 years and female to male ratio was 2.5:1. The mean disease duration of Rheumatoid arthritis was found to be 5.1 years in the entire study groups; however it was 6.67 years in patients with cardiac abnormalities and 4.69 years in patients without cardiac abnormalities. There was statistically The most common cardiac abnormality seen in this study group was left ventricular diastolic dysfunction which was 14.28%. Other abnormalities seen in our study were pericardial effusion in 5.71%, Mitral regurgitation in 1.4%, Aortic regurgitation and pulmonary hypertension with tricuspid regurgitation in 1 subject each (0.7%) respectively. The electrocardiogram revealed minor conduction abnormalities which were insignificant on comparison with subjects without cardiac involvement. Thus, it can be concluded that there are sub-clinical cardiac abnormalities which may be present in patients of rheumatoid arthritis and may go undetected especially in those patients who have no signs and symptoms of cardiac involvement. These abnormalities can be detected at early stage by screening modalities such as echocardiography.

The overall incidence of cardiac abnormalities was lesser in the present study compared to the other studies. This could be attributed to following reasons: The incidence of extra articular manifestations is much lower in Indian patients as evidenced by Kaushal et al study & the duration of disease was lesser in our study as compared to other studies.

CONCLUSION-

Our study was as observational study in which 140 patients with rheumatoid arthritis were selected according to A CR / EULAR diagnostic criteria. Cardiac abnormalities were one of the most important extra-articular manifestations in rheumatoid arthritis. Most of these abnormalities were sub-clinical. Significant association found between when subject with Rheumatoid arthritis were evaluated with echocardiography, out of 140 patients, 32 subjects (22.8%) were found to have cardiac abnormalities. Out of these 32 subjects, 20 subjects (14.28%) had LV diastolic dysfunction, 5 subjects had pericardial effusion (5.71%), 2 subjects had mitral regurgitation (1.4%), 1 subject each were having aortic regurgitation pulmonary hypertension with tricuspid

regurgitation (0.7%). The maximum incidence of cardiac abnormalities were seen between 24-50 years with a female preponderance (female to male ratio 9:). There was a higher incidence of cardiac involvement in patients with increased duration of disease with a mean duration of disease being 5.1 years. Since cardiovascular diseases are one of the most common cause of mortality in the patients of Rheumatoid arthritis hence these cardiac abnormalities should be detected early which will aid in correct assessment and management of patients with Rheumatoid arthritis. Therefore, echocardiography should be made integral part of initial evaluation for every patient diagnosed to have rheumatoid arthritis which will help in early detection and treatment of cardiac disease.

Table -1 Age & Sex Distribution in patients of RA

Age groups (in years)	Number of cases	Female	Male
21-30	18 (12.8%)	13 (9.2%)	5 (3.5%)
31-40	52 (37.1%)	36 (25.7%)	16 (11.4%)
41-50	37 (26.4%)	25 (17.8%)	12 (8.5%)
51-60	33 (23.5%)	27 (19.28%)	6 (4.28%)

Table-2 Duration of disease in RA patients with cardiac abnormalities

Durati on of Disease	Number of RA patients	Number of patients with Echo- cardiograph ic abnormalities	Specifics
1-2 years	4	NIL	-
3-4 years	20	NIL	-
5-10 years	46	32	<ul style="list-style-type: none"> • LVDD-20 • Pericardial effusion – 8 • M.R.-2 • A.R.-1 • P.HTN with TR-1

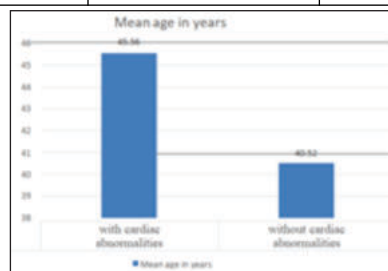


Fig.1: Association of Age with Cardiac abnormalities in RA patients

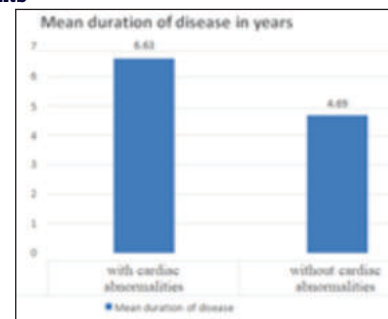


Fig.2: Mean duration of disease with cardiac abnormalities



Figure-3: Echo cardiography finding in RA patients

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