Cardiac Involvement in Rheumatoid Arthritis

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Abstract:

Objective: To determine cardiac involvement in patients with rheumatoid arthritis (RA) and its clinical and echocardiographic findings.

Methods: Fifty five RA patients who fulfilled the revised criteria of American College of Rheumatology enrolled in the study. The patients subjected to clinical assessment and electrocardiography (ECG), chest x-ray and echocardiographic study were done for them.

Results: Cardiac abnormalities were detected in 18(32.72% p value 0.0051) patients. Pericardial effusion was found in 4(7.27%) patients while left ventricular and right ventricular diastolic dysfunction detected in 8(14.54%) patients. Abnormal electrocardiographic findings were identified in 10(18.18%) patients including partial bundle brunch block, low voltage graph and non specific T wave changes. Chest x ray with increased cardiothoracic ratio found in 5 (9.09%) patients.

Conclusions: Cardiac involvement is a recognized sequel of RA. Pericardial effusion and diastolic dysfunction is not unknown. Non specific ECG changes were recorded. Frequent follow up regarding cardiac status in RA is recommended.

Key words: Rheumatoid arthritis, heart, trans-thoracic echocardiography (TTE).

Introduction

Rheumatoid arthritis is a chronic inflammatory disorder that usually involves the joints, tendons, and bursae but the disease may involve the brain, peripheral nerves, lungs, kidneys, heart and blood vessels [(1)]. RA is a disorder of unknown origin but it is thought that the autoimmune component of the disease can have significant multisystemic effects[(2)].The onset is most frequent during the 4th and 5th decades of life, with 80% of all patients developing the disease between the ages of 35-50[(3)] and the female outnumbers males almost 3:1[(4)].

The most common extra-articular manifestations of RA include nodules, vasculitis, neuromuscular involvements and keratoconjuctivitis sicca with dry mouth characteristic of Sjogren disease, however there is a high percentage of pericarditis and involvement of lung, liver and pancreas [(5)]. Clinically apparent pericarditis and myocarditis are uncommon disorder in patients with RA [(6)].Cardiac manifestations were observed in RA patients and echocardiography is the method of choice to detect pathologies in the morphology and function of heart[(7)].Current knowledge of cardiac manifestations of RA stems only from clinical and TTE studies [(8)]. Pericarditis occurs in one third of RA patients however clinically apparent RA is infrequent [(9)].There is growing evidence that patients with RA have higher risk of cardiovascular disease (CVD) and recent analysis indicates that CVD is the most common cause of death [(10)]. Heart lesions were found at autopsy in 55-60% of RA patients, with pericardial effusion in 26 %[(11)].Subcutaneous rheumatoid nodules were present in 2.8% cases [(12)] but rheumatoid nodule in the heart is unusual specific manifestation [(13)].

A series of studies showed 73% overall cardiac involvement with only 32% pericardial effusion and 11% pericardial thickening without effusion [14], 37% echocardiographic abnormalities and 6% had pericardial effusion [15]. Baltimore etal [16] looked for etiologies of pericardial effusion in 204 patients and only 7(3.43%) case were diagnosed.

The risk of sudden death and myocardial infarction appears to be increased in patients with RA [17] but this increase is independent of traditional CV risk factors [18]. Cigarette smoking, DM, hypertension, dyslipedemia, obesity and physical inactivity are important risk factors for CVD which could if more prevalent in RA patients; explain the excess CV burden in the patient [18].Traditional treatment of RA has been directed against joint damage not against increased CV morbidity [19]. Interstitial lung disease is the most common manifestation of lung disease [20] and noted in 34 %[21].

Patients & Methods:

The study enrolled fifty five patients who are fulfilled the revised criteria of American College of Rheumatology. Seropositive (positive latex fixation test) RA patients admitted to rheumatologic department at the Sulaimany general hospital from june/2006 to january/2007. Full history regarding age, duration of illness, family history, socioeconomic status, drug history use and medical illness. Full clinical examination was done.

Laboratory tests including complete blood picture, ESR, fasting total serum cholesterol and triglyceride were estimated. Chest x-ray with posterioanterior view was advised. Standard 12 lead ECG investigations and TTE were performed for all patients. Adequate 2-dimensional, M-mode and Doppler assessments were obtained.

Results:

Out of 55 patients, 48 (87.27%) patients were females and 7(12.72) males. The age ranged from 18 - 84 years with their mean age of 53.31 ±2.14. The age of 25(45.54%) patients were from 40-59 years while 18(32.72%) patients were more than 60 years and 10(18.18%) patients between 20-39 years (table 2) to 39 years (table 1). 10(18.18%) patients had family history of 1st degree relatives of RA .Smoking observed in 6(10.90%).The duration of disease ranged from 6 month to 40 years and majority; 35(63.63%) of patients were between 2-10 years (table 2).

Seven (12.72%) and 11 (20%) patients had diabetes mellitus and hypertension respectively. Three patients had both hypertension and diabetes. Increase in fasting total cholesterol level found in 12(12.81%) patients. 39(70.90%) patients were on one or more disease modifying anti-rheumatoid drugs.

Chest x-ray was abnormal in 25(45.54% P value 0.00037) patients. Cardiothoracic ratio was increased in 5(9.09%) patients. Abnormal respiratory imaging was identified in 20 (36.36%) patients.

Echocardiography (p value 0.0051) was abnormal in 18(32.72%) patients. Pericardial effusion was elicited in 4(7.27%) patients. Abnormal pericardium (thick or calcified) without effusion was found in 6 (10.90%) patients. Cardiac valve abnormality detected in 6 patients. Diastolic ventricular dysfunction elicited in 8(14.45%) patients.

Table-1: Age and gender distribution of the sample

Gender	Age (year-old)	No.	Total %
Female	>16<20	2	3.63
	20-39	9	16.63
	40-59	23	41.81
	≥ 60	14	25.45
Male	>16<20	0	0
	20-39	1	1.81
	40-59	2	3.63
	≥ 60	4	7.72
Total		**55**	**100%**

Table-2: Duration of RA

Duration (year)	No.	%
< 2	4	7.27
2-10	35	63.63
11-20	10	18.18
21-30	5	9.09
> 30	1	1.18
Total	**55**	**100%**

Table-3: Historical and clinical data

History	No.	%
Family history of RA	10	18.18
Smoking	6	10.9
Hypertension	11	20
Diabetes mellitus	7	12.72
Hypercholestrolemia	12	21.18
hypertriglyceridemia	18	32.72

Table-4: Chest x-ray findings

The abnormality	No.	%
Increase cardiothoracic ratio	5	9.09
Hyperinflation	2	3.63
Fibro-reticular changes	6	10.9
Pulmonary fibrosis	5	9.09
Pneumonic changes	2	3.63
Oblitrtative changes	2	3.63
Total abnormal	**25**	**32.72**

Table-5: Echocardiographic findings

The finding	No.	%
Pericardial effusion	4	7.27
Thick and/or calcified pericardium	6	10.9
Isolated valve abnormality	4	7.27
Multiple valve abnormality	2	3.63
Mitral valve abnormality	2	3.63
Aortic valve abnormality	4	7.27
Tricuspid valve abnormality	1	1.18
Diastolic ventricular dysfunction	8	14.54
Systolic ventricular dysfunction	1	1.18
Ischemic heart disease	2	3.63

Discussion:

Cardiac manifestations were observed in RA patients and echocardiography is the method of choice to detect pathologies in the morphology and function of heart [7].Cardiac abnormality in our rheumatoid arthritic patients was present in 32.72% patients (p value 0.0051).7.27% of them had Pericardial effusion. Left ventricular diastolic and right ventricular diastolic function was reduced in 14.54%patients. Aortic and mitral valve abnormality were found in7.27% and 30.63% respectively. Two patients had evidence of ischemia on TTE.

Cardiac involvement in RA was looked by a number of authors. Tlustachowicz W et al [11] declared 26% pericardial effusion, 10% chronic pericarditis and 3% cardiac valve abnormalities with mitral more than aortic valve involvement. Schorn D et al [14] showed 73% overall cardiac involvement with only 32% pericardial effusion and 11% pericardial thickening without effusion .37% echcardiographic abnormalities and with only 6% pericardial effusion had been described by Mody GM et al[15]. Baltimore et al [16] looked for etiologies of pericardial effusion in 204 patients and 3.43% of his cases were due to RA. Dutschman L, etal [33] showed 41%cardiac involvement and 11.2%pericardial effusion.

We found less overall cardiac involvement than Schorn D, Mody GM, and Dutschman L studies[14,15,33].The figure is much more less when it is compared with Schorn D et al results[14] but the range extensively narrows with Mody GM, and Dutschman L studies[15,33]. We detected lower frequency of pericardial effusion than some studies[11,14,33]. However, our results were slightly higher than what had been observed in some other studies[15,16]. Our result of abnormal pericardium (thick with or without calcification) was nearly similar to the results of Tlustachowicz W and Schorn D studies[11,14]. No any evidence of pericarditis, unstable angina or acute myocardial infarction recorded from the ECG.

The classical risk factors do not fully explain the risk of CVD in patients with RA and the risks are more likely to be additive[18]. The prevalence of hypertension depends on both racial composition and criteria used to define hypertension and one-fifth of individuals or more have hypertension (3).We found that one fifth of the patients had hypertension and 12.72% were diabetic. Studies investigating risk factor in RA are scarce. We detected two patients with increased BMI. Obesity especially abdominal obesity is a risk factor for CVD in the general population [18]. More than 20% in UK and 30% in USA are obese [34]. However in RA the relationship between BMI and CV mortality

appears to be reversed [18] as with our results less prevalence rate of obesity was observed. This issue might need to be more investigated in our community in order to find out the relation between BMI, CVD and RA. Two patients had frequent premature ventricular beats. These two patients should be investigated thoroughly because CVD may present differently in the patients with RA, with an increased frequency of unrecognized myocardial infarction and a lower likelihood of angina symptoms [18].

9.09%of our patients (P value 0.0046) had subcutaneous rheumatoid nodules but none of them had nodule in the heart or in the pericardium. Subcutaneous rheumatoid nodules were present in 2.8% of cases [12] but rheumatoid nodule in the heart is unusual specific manifestation [13]. 20% of patients have subcutaneous nodule [4]. Calguneri M, etal [32] declared 18.1% rheumatoid nodules in their study in a teaching hospital in Turkey. Our result implied controversy in the presence of rheumatoid nodule; higher percentage than some studies[12] and lower than some other studies[4,32] had been observed, but the absence of cardiac nodule declared similarity with the finding of Ojeda YJ et al study[13].

Interstitial lung disease is the most common manifestation of lung disease [30] and noted in 34 %[31]. The RA manifestations in the chest are varied as the pleura, lung parenchyma, airways and pulmonary vasculature can be all involved. Conventional x-ray is not a sensitive to find out RA – lung disorders. Pulmonary function tests and high resolution CT scan provide better results [30,31].We found 45.54%patients (P value 0.00037) with evidence of abnormal chest x-ray reports.1n 32.72%lung field abnormality elicited. Our result of respiratory abnormality is nearly consistent with Larsen A Cohick CB et al studies[30,31]. In RA female outnumbers male almost 3:1 [4,27]. In our results the female gender was more affected. RA is most frequent during the 4th and 5th decades of life, with 80% of all patients developing the disease between the ages 33-50[3]. We found 86%of patients presented the onset of RA from the age of 40 and more and this is consistent relatively with the finding of other studies [4,27]. Family history of 1st degree relatives for RA was elicited in18.18% .The prevalence rate of family history was higher than what had been described by Peter E[3].

1n patients with RA, the prevalence of anemia ranges from 30-70% in various studies [22,23]. We found, 50.90%patients with anemia. The degree of anemia was mild in 34.54% patients. Our finding is consistent with the finding obtained from other studies[22,23]. The WBC count is usually normal but a mild leucocytosis may be present [3,4]. We found normal WBC count in 80% of patients 14.54% of patients had leucocytosis. The upper limit of increase was 19.5X1000³. Our result is consistent with other studies findings[3,4]. Raised ESR implies activity of a disease(s).In 89.09% of patients; it was elevated. This indicates that most RA patients were in active stage. Whether cardiac involvements have any relation to WBC count and ESR elevation need to be further explored.

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