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Cardio-Respiratory Manifestations and Its Correlation with Clinical Disease Activity Index in Rheumatoid Arthritis

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Abstract **Original Research Article**

Background: In Rheumatoid arthritis (RA), disease activity helps to achieve remission with appropriate treatment, also known as treat-to-target strategy. This strategy is controversial as composite indexes assessing disease activity clinically may be affected by comorbidities or other patient-related factors. Thus they may not truly be a representation of disease activity. The study aimed to assess the cardio-respiratory manifestation and its correlation with clinical disease activity index (CDAI) in RA patients. ***Methodology*:** The cross-sectional study was performed on 100 RA patients. Severity of RA was assessed using CDAI. Cardiovascular manifestations were investigated using Electrocardiogram (ECG), 2D Echocardiography (M-mode). Chest X-ray, high resolution computed tomography of the chest, and pulmonary function tests were performed to assess respiratory manifestations. Data were analysed using R-Studio V1.2.5001 software. Chi-square test was used to find the association between variables. ***Results:*** Abnormal ECG findings were observed in 17 patients whereas, cardiovascular and respiratory abnormality was observed in 78 and 44 patients respectively. High and moderate diseases activity was found in 42 and 58 patients respectively. A significant association was observed between duration of disease and, cardiac and respiratory manifestation (P=0.0009, P=0.0004). A significant difference was observed in CDAI of patients with or without respiratory abnormalities (P=0.044). No significant association was found between CDAI and cardiorespiratory abnormality. ***Conclusion*:** Most RA patients had cardiorespiratory manifestations with high and moderate CDAI. For early identification and treatment, screening of cardiorespiratory manifestation is required.

Keywords: Electrocardiography, Echocardiography, Respiratory function test, Rheumatoid arthritis, Tomography.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by synovial and systemic inflammation and presence of auto-antibodies [1]. RA is heterogeneous and may be described as a syndrome with different causes including genetic and environment related factors resulting in clinical manifestations [2]. Although joint pain is the main feature, RA has a plethora of extraarticular manifestations which causes substantial morbidity and mortality [3]. Traditional risk factors of cardiovascular disease (CVD) namely hyperlipidemia, diabetes mellitus and positive CVD family history along with BMI are considered risk factors for CVD in RA patients. However, these traditional risk factors fail to explain the higher likelihood of CVD in RA patients [4]. Also, RA patients with high rheumatoid factor titres are more likely to have extra articular manifestations [5]. Respiratory involvement in seen in 30-40% of RA patients [6].

However, there is paucity of data regarding cardio-respiratory manifestation in RA patients and its association with clinical disease activity index (CDAI). Therefore, the study was conducted to assess cardio-respiratory manifestations and its correlation with CDAI in RA patients.

MATERIAL AND METHODS

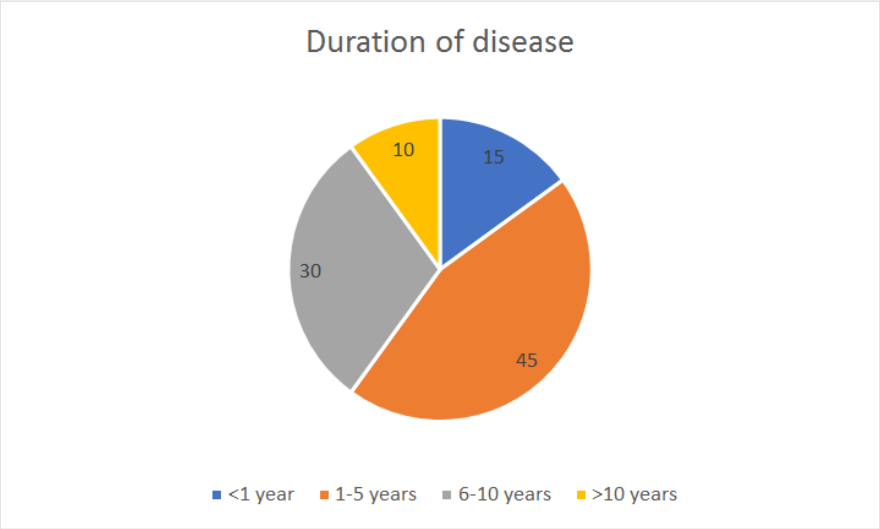
The cross-sectional study was performed on 100 RA patients attending the medicine outpatient department of tertiary care centre. 100 patients included were based on active disease, age >18 years and diagnosed based on 2010 ACR/EULAR classification criteria [7]. Patient with malignancy, pregnancy were excluded from the study. Severity of RA was assessed using CDAI. Cardiovascular manifestations were investigated using Electrocardiogram (ECG), 2D

Echocardiography (M-mode). Chest X-ray, high resolution computed tomography of the chest, and pulmonary function tests were performed to assess respiratory manifestations. Data were analysed using R-Studio V1.2.5001 software. Chi-square test was used to find the association between variables.

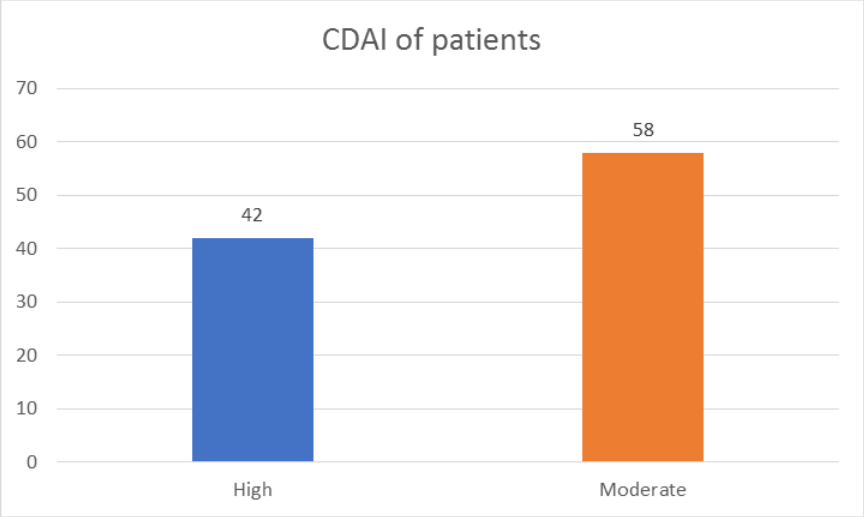
RESULTS

The average age was 51.93±14.2 years, of which 52% were females. According to Kuppuswamy classification most of the patients were of the upper lower class (n=34). The average duration of disease and CDAI was 4.78±3.60 years and 25.94±9.28 respectively. Duration of disease and CDAI of patients are summarized in table 1. ECG, cardiac and respiratory findings of patients are shown in table 2. Duration of RA was significantly associated with cardiovascular manifestations and respiratory manifestations (P=0.0009 and P=0.0004). PASP (n=6), ejection fraction <60% (n=10), left ventricular hypertrophy (n=20), and regional wall motion abnormality (n=17) was observed in patients.

The pulmonary function test showed mean FVC 80±11.31L, FEV1/FVC ratio 76.62±10.81%, PFER 87.31±9.40L/s, and CIMT 0.92±0.27. No significant difference was observed in FEV1, FEV1/FVC, and PEFR of patients with or without respiratory abnormalities however, a significant difference was observed in CDAI value in patient with respiratory abnormality (23.66±6.47) and patients without respiratory abnormality (27.74±10.72) (P=0.044). No significant difference was observed in CDAI values of patients with the presence of cardiovascular abnormality when compared with CDAI values of patients without abnormalities. No significant association was between CDAI and cardiorespiratory abnormality.



Graph-1: Duration of disease and CDAI of patients



Graph-2: CDAI of patients

Table-1: ECG, cardiac and respiratory findings

ECG findings	**Number of patients**
RBBB	4
ST-T Changes	5
Left ventricular hypertrophy	6
Premature Ventricular Contraction	2
Cardiac Finding	**Number of patients**
LV diastolic dysfunction	6
Myocardial infarction	14
Heart failure	7
Hypertension	16
Pericardial effusion	9
Pulmonary hypertension	16
Valvular abnormalities	3
Pericarditis	7
Respiratory finding	**Number of patients**
Pulmonary nodule	3
Pleural effusion	10
Pulmonary Fibrosis	19
Bronchiectasis	8
Interstitial lung disease	4

DISCUSSION

The proportion of females was higher than males and the average age of the patients was 51.93±14.2, with a mean 4.78±3.60 years of disease duration. These findings was comparative to previous studies [8-10]. Prabhakaran AP *et al*., had a high CDAI score in 60% of their cases. However, their mean CDAI score was similar to ours [11].

ECG findings showed similar results as by the study of Singh R *et al*., In contrast with the results the study of Singh R *et al.*, showed LV diastolic dysfunction, and pericardial effusion as common cardiovascular findings. Whereas, pulmonary hypertension was observed in 1.67% patients [9]. The study of Dawson JK showed PASP in 31% patients, abnormal ejection fraction in 9% patients [12]. Al-Assadi *et al.*, reported a mean FVC of 78.55±30.43 [13] and Madhavan *et al.*, reported a mean FVC of 86.3±9.88L and FEV1/FVC was 96.54±13.29% [14]. Banik *et al*., also found pulmonary findings in Ra to be associated with duration of the disease [15]. The study of Kroot E *et al.*, showed about 27% of patients with at least one chronic coexisting disease [16].

CONCLUSION

In this study significant difference was observed in CDAI of patients with or without pulmonary manifestations. Duration of RA was significantly associated with cardiorespiratory manifestation. No significant association was observed between CDAI and cardiorespiratory manifestation. Hence, screening of cardiorespiratory manifestation in patients with RA is required for early identification and treatment.

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