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Original Research Article.

A Cross-Sectional Study to Evaluate Pleuropulmonary Manifestations of Rheumatoid Arthritis: An Institutional Based Study

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ABSTRACT

Background: Rheumatoid arthritis (RA) is a systemic inflammatory disorder that most commonly affects the joints, causing progressive, symmetric, erosive destruction of cartilage and bone, which is usually associated with autoantibody production. The present study was conducted to assess prevalence of pleuropulmonary manifestations of rheumatoid arthritis.

Materials and Methods: The present study was conducted among 140 RA patients over a period of 6 months. A standard form was used to record the data from all the patients. All relevant parameters in the history and clinical examination were noted. The laboratory investigations were done. Chest, cervical spine, and bilateral hand X-rays were obtained from all patients. Pulmonary function tests (PFT) were done in all patients, and a chest CT was done in those with an abnormal PFT or clinical/x-ray suspicion of ILD. The recorded data was compiled, and data analysis was done using SPSS (SPSS Inc., Chicago, Illinois, USA).

Results: In the present study a total of 140 RA patients which consisted of 64.28% females and 35.71% males. The mean age of onset of RA was 44.3 yrs. Spirometry was normal in 67.14%. Mild restriction was seen in 16.42%. Moderate restriction seen in 10.71% and severe restriction seen in 5.71%. Pulmonary manifestations were present in 32 patients (18.7%). The predominant pulmonary manifestation was ILD (13.57%). There were 5 cases of bronchiectasis (3.57%) and 1.42% cases of pleural effusion, pulmonary nodule each and 2.85% cases of pulmonary hypertension.

Conclusion: The present study concluded that pulmonary manifestations were present in 18.7% RA patients. The predominant pulmonary manifestation was ILD.

Keywords: Spirometry, Pulmonary Manifestation, ILD, Rheumatoid Arthritis.

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INTRODUCTION

Rheumatoid arthritis (RA) is an inflammatory systemic disease with unknown etiology that is characterized with peripheral symmetric polyarthritis. The prevalence of this disease is about 1% in general population.[1-3] RA is associated with pain, fatigue, functional disability and deterioration of emotional state and if not treated early, can lead to irreversible structural and functional damage.[4] Although rheumatoid arthritis (RA) develops its central pathology within the synovium of joints, many non-articular organs become involved, particularly in patients with severe joint disease. The predominant extra-articular manifestations include subcutaneous nodules, pleuro-pulmonary, cardiac and neurological involvement, vasculitis and Felty's syndrome.[5] Pleuro-pulmonary involvement is an important cause of morbidity and mortality in the patients of RA.[6] Following its first description by Ellmann and Ball in 1948 in 3 patients with RA, ILD quickly appeared as the predominant pulmonary manifestation of Rheumatoid Arthritis (RA).[7] Respiratory symptoms in rheumatoid arthritis can be due to a variety of conditions that affect the parenchyma, pleura, airways or vasculature. Complications may arise directly from rheumatoid arthritis involvement or may occur secondary to immune-modulating medications used to treat rheumatoid arthritis. The majority of respiratory manifestations occur within the first 5 years of disease.[8] Respiratory symptoms may precede onset of articular symptoms in 10–20% of cases.[9] The risk factors for PP involvement in RA are currently unknown. Several studies have been performed to identify possible risk factors, with older age, male gender, long-standing disease, high levels of serum rheumatoid factor (RF), increased inflammatory markers, high erythrocyte sedimentation rate (ESR), positive genetic markers (e.g., human leukocyte antigen DR4 [HLA-DR4]),

therapeutic factors, cigarette smoking, and/or the presence of extra-articular manifestation of RA (ExRA) all showing some associations though results were variable.[10-12] Pulmonary involvement in RA patients can be assessed as interstitial pneumonitis and fibrosis, pleural involvement, pulmonary nodule, bronchiolitis obliterans organizing pneumonia, arthritis associated with pulmonary hypertension, and involvements of small and large airways.[1,2] Interstitial lung disease (ILD) is another type of pulmonary manifestation in patients with RA that usually has a poor prognosis. Mostly RA-ILD has no symptoms and is only diagnosed by clinical examination, pulmonary function test (PFT), and high-resolution computed tomography (HRCT); so it seems that diagnosis of pulmonary involvement in early stages of RA is of great importance.[3,13-16] The present study was conducted to assess prevalence of pleuropulmonary manifestations of rheumatoid arthritis.

MATERIALS AND METHODS

The present study was conducted among 140 RA patients in Department of General Medicine,

Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh (India) over a period of 6 months. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written consent was taken from the patient after explaining the study. Patients who satisfied the revised ARA criteria, irrespective of whether respiratory signs or symptoms were present or not were included in study. Patients having pulmonary TB, Bronchial asthma, Occupational lung diseases were excluded from study group. A standard form was used to record the data from all the patients. All relevant parameters in the history and clinical examination were noted. The laboratory investigations done were hemoglobin, total and differential leukocyte counts, platelet count, ESR, RF (latex agglutination), liver and renal function tests. Chest, cervical spine and bilateral hand X-rays were obtained from all patients. Pulmonary function tests (PFT) were done in all patients, and a chest CT was done in those with an abnormal PFT or clinical/x-ray suspicion of ILD. The recorded data was compiled, and data analysis was done using SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA).

RESULTS

In the present study a total of 140 RA patients which consisted of 64.28% females and 35.71% males. The mean age of onset of RA was 44.3 yrs. Spirometry was normal in 67.14%. Mild restriction was seen in 16.42%. Moderate restriction seen in 10.71% and severe restriction seen in 5.71%. Pulmonary manifestations were present in 32 patients (18.7%). The predominant pulmonary manifestation was ILD (13.57%). There were 5 cases of bronchiectasis (3.57%) and 1.42% cases of pleural effusion, pulmonary nodule each and 2.85% cases of pulmonary hypertension.

Table 1: Demographic detail

Variable	N (%)
Male	50(35.71%)
Female	90(64.28%)
Mean Age(yrs)	44.3±1.4

Table 2: Spirometry in rheumatoid patients

Spirometry	Frequency N (%)
Normal	94(67.14%)
Mild restriction	23(16.42%)
Moderate restriction	15(10.71%)
Severe restriction	8(5.71%)

Table 3: Types of pulmonary involvement

Types of pulmonary involvement	N (%)
Pleural effusion	2(1.42%)
Pulmonary nodule	2(1.42%)
ILD	19(13.57%)
Pulmonary hypertension	4(2.85%)
Bronchiectasis	5(3.57%)

DISCUSSION

The most striking feature of RA lung involvement is that almost all components of the lung structure are potential targets of injury.[17] Parenchymal diseases include ILD or nodules while airway diseases include but are not limited to bronchiectasis (BE), bronchiolitis (associated with air trapping), and bronchial wall thickening.[15,18,19] Pleural and vascular structures can also be affected. The prevalence of a specific form of lung disease varies depending on the population studied and the modalities used. When examined by HRCT, lung abnormalities have been found in 50–70% of unselected RA patients[15,18,19], among which ILD and BE are most common. However, these abnormalities are, very often, not associated with any symptoms.[18,19]

In the present study a total of 140 RA patients which consisted of 64.28% females and 35.71% males. The mean age of onset of RA was 44.3 yrs. Spirometry was normal in 67.14%. Mild restriction was seen in 16.42%. Moderate restriction seen in 10.71% and severe restriction seen in 5.71%. Pulmonary manifestations were present in 32 patients (18.7%). The predominant pulmonary manifestation was ILD (13.57%). There were 5 cases of bronchiectasis (3.57%) and 1.42% cases of pleural effusion, pulmonary nodule each and 2.85% cases of pulmonary hypertension.

The ratio of women to men participants in the study was about 2-3 to 1.[20]

Nevertheless, investigations analyzing lung diseases in RA have reported rates ranging from 16.1% in Korea[21] to 23.4% in the US.[22]

Diagnosis of RA-ILD is based on clinical examination, PFT, and HRCT. Bronchoscopy and broncho-alveolar lavage were used in some past studies for the diagnosis of RA-ILD, but these instruments are usually used to rule out other diffuse pulmonary diseases and are not necessary in the diagnosis of RA-ILD.[23]

Japanese study by Sakaida et al,[24] had identified increased rheumatoid factor positivity in patients with pulmonary manifestations.

PP manifestations in RA are often associated with high morbidity and mortality due to infection and side effects of therapies. When compared to controls, it has been reported that the standard

mortality ratio with PP ranged from 2.5 to 5.0. In this analysis, we have confirmed that RA patients with PP were more likely to die during the study compared to those without.[25]

Notably, ILD was the most commonly occurring cause of death (25%), which is consistent with published data.[26,27]

CONCLUSION

The present study concluded that pulmonary manifestations were present in 18.7% RA patients. The predominant pulmonary manifestation was ILD.

REFERENCES

1. Shah A, St Clair EW. Rheumatoid arthritis. In: Dan LL, Anthony FS, Dennis KL, Stephen HL, Larry JJ, Joseph L, editors. Harrison's Principles of Internal Medicine. 18th ed., Vol. 2. New Delhi: McGraw Hill Medical; 2012. p. 2745.
2. Dale DC. Neutropenia and neutrophilia. In: Kaushansky K, Lichtman M, Beutler E, Kipps T, Prchal J, Seligsohn U, editors. Williams Hematology. 8th ed. New York, NY: McGraw Hill; 2010. p. 939 50.
3. O'Dell JR. Rheumatoid arthritis. In: Arend WP, Armitage JO, Clemmons DR, editors. Goldman's CECIL Medicine. 24th ed. Philadelphia, PA: Elsevier Saunders; 2012. p. 1681 9.
4. Lee DM, Weinblatt ME. Rheumatoid arthritis. Lancet. 2001; 358:903–11.
5. Wilder, RL. Rheumatoid arthritis. A. Epidemiology, Pathology, and pathogenesis. In: Primer on the rheumatic diseases. Schumacher, HR (Ed), 10th ed, Arthritis Foundation, Atlanta, 1993.
6. Byrd SL, Case BA, Boulware DW. Pulmonary manifestations of rheumatic disease. Postgrad Med 1993; 93:149–51, 154–6.
7. Ellman, P. And Ball, R. E. Rheumatoid disease with joint and pulmonary manifestations. Br Med J 1948 Nov 6;2(4583):816-20. doi: 10.1136/bmj.2.4583.816.
8. Marigliano B, Soriano A, Margiotta D, et al. Lung involvement in connective tissue diseases: a comprehensive review and a focus on rheumatoid arthritis. Autoimmun Rev 2013; 12: 1076–84.
9. O'Dwyer DN, Armstrong ME, Cooke G, et al. Rheumatoid arthritis (RA) associated interstitial lung disease (ILD). Eur J Intern Med 2013; 24: 597–603.
10. Bilgici A, Ulusoy H, Kuru O, Celenk C, Unsal M, Danaci M. Pulmonary involvement in rheumatoid arthritis. Rheumatol Int 2005; 25:429 35.
11. Gauhar UA, Gaffo AL, Alarcón GS. Pulmonary manifestations of rheumatoid arthritis.SeminRespir Crit Care Med2007;28:430 40.
12. Kelly CA, Saravanan V, Nisar M, Arthanari S, Woodhead FA, Price Forbes AN, et al. Rheumatoid arthritis related interstitial lung disease: Associations, prognostic factors and physiological and radiological characteristics – A large multicentre UK study. Rheumatology (Oxford) 2014;53:1676 82.
13. Fishman AP, EliasJA, Fishman JA, Grippi MA, Senior RM, Pack AI, editors. Pulmonary Manifestation of the Collagen Vascular Diseases. Fishman's Pulmonary Diseases and Disorders. 4thed. New York, NY: McGraw Hill Medical; 2008. p. 1193 212.
14. Gochuico BR, Avila NA, Chow CK, Novero LJ, Wu HP, Ren P, et al. Progressive preclinical interstitial lung disease in rheumatoid arthritis. Arch Intern Med 2008;168:159 66.
15. Bradley B, Branley HM, Egan JJ, Greaves MS, Hansell DM, Harrison NK, et al. Interstitial lung disease guideline: The British Thoracic Society in collaboration with the Thoracic Society of Australia and New Zealand and the Irish Thoracic Society. Thorax 2008;63 Suppl 5:v1 58.
16. Kim EJ, Collard HR, King TE. Rheumatoid arthritis associated interstitial lung disease: The relevance of histopathologic and radiographic pattern. Chest 2009; 136: 1397 405.
17. Young A, Koduri G, Batley M, Kulinskaya E, Gough A, Norton S, et al. Mortality in rheumatoid arthritis. Increased in the early course of disease, in ischaemic heart disease and in pulmonary fibrosis. Rheumatology (Oxford) 2007;46:350 7
18. Jearn LH, Kim TY. Level of anticitrullinated peptide/protein antibody is not associated with lung diseases in rheumatoid arthritis. J Rheumatol 2012;39:1493 4.
19. Aubart F, Crestani B, Nicaise Roland P, Tubach F, Bollet C, Dawidowicz K, et al. High levels of anti cyclic citrullinated peptide autoantibodies are associated with co occurrence of pulmonary diseases with rheumatoid arthritis. J Rheumatol 2011;38:979 82.
20. Sakaida H. IgG rheumatoid factor in rheumatoid arthritis with interstitial lung disease [Japanese]. Ryumachi 1995;35:671– 677.
21. A. Fischer and R. du Bois. Interstitial lung disease in connective tissue disorders. The Lancet 2012; 380(9842): 689–98.
22. A. Bilgici, H. Ulusoy, O. Kuru, Ç. Çelenk, M. Ünsal, and M. Danaci. Pulmonary involvement in rheumatoid arthritis. Rheumatology International 2005; 25(6): 429–35.
23. B. Cortet, R.-M. Flipo, M. Remy-Jardin et al. Use of high-resolution computed tomography of the lungs in patients with rheumatoid arthritis. Annals of the Rheumatic Diseases 1995; 54(10): 815–9.
24. S. Hassen Zrour, M. Touzi, I. Bejia et al. Correlations between high-resolution computed tomography of the chest and clinical function in patients with rheumatoid arthritis: Prospective study in 75 patients. Joint Bone Spine 2005; 72(1): 41–7.
25. Brown KK. Rheumatoid lung disease. Proc Am Thorac Soc 2007;4:443 8.
26. Habib HM, Eisa AA, Arafat WR, Marie MA. Pulmonary involvement in early rheumatoid arthritis patients. Clin Rheumatol 2011;30:217 21.
27. Saag KG, Teng GG, Patkar NM, Anuntiyo J, Finney C, Curtis JR, et al. American College of Rheumatology 2008 recommendations for the use of nonbiologic and biologic disease modifying antirheumatic drugs in rheumatoid arthritis. Arthritis Rheum 2008;59:762 84.

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