

A STUDY OF SPIROMETRIC LUNG FUNCTION TESTS AND ITS CORRELATION WITH HIGH RESOLUTION COMPUTED TOMOGRAPHY IN PATIENTS OF RHEUMATOID ARTHRITIS

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ABSTRACT: Rheumatoid arthritis is disease which usually starts as an insidious symmetrical polyarthritis often with non specific systemic symptoms. Pleuropulmonary involvement is a important cause of morbidity and mortality in patients of rheumatoid arthritis. The extra articular manifestations like bronchiectasis, interstitial lung disease, caplan syndrome are well known complications of rheumatoid arthritis¹. To make these things more clear, the present study has been conducted enrolling 50 patients of rheumatoid arthritis coming to Medicine Department of Sri Guru Ram Das Institute of Medical Sciences and Research, Vallah, Sri Amritsar.

RESULTS: In this study it was found that bronchiectasis and reticulonodular pattern were the most common findings on High resolution computed tomography accounting for 18 %. On spirometry restrictive pattern dominated over obstructive pattern in this study. On HRCT also the restrictive pattern was the most common finding. The results of both were correlated using spearman formula and the results were statistically significant with p value of <0.05. Even the finding of both spirometry and HRCT were correlated with duration of disease and it was found that restrictive pattern dominates over obstructive with increasing duration of disease (from <5 years to > 10 years) and the correlation was statistically significant with p value of <0.05.

INTRODUCTION: Rheumatoid arthritis is a chronic inflammatory systemic disease that produces most of its manifestations in diarthrodial joints. The most common form of disease is demonstrated by symmetrical, destructive and deforming polyarthritis affecting small and large synovial joints with associated systemic disturbances in addition to variety of extra-articular features and presence of circulating antiglobulin antibodies. The prevalence of RA worldwide is 0.3 to 1.5%. It is more common in females with ratio of 2:1²

AIMS AND OBJECTIVES: To correlate spirometric lung function tests with HRCT findings in patients of rheumatoid arthritis and to correlate these findings with duration of disease.

MATERIAL AND METHODS: 50 patients of rheumatoid arthritis in SGRDIMSRI, Sri Amritsar. Patients divided into three groups < 5 years, 5 to 10 years and >10 years based on duration of disease.

Spirometric function tests: By Spiro Excel Equipment

HRCT findings: By SEIMENS SOMATOM EMOTION Equipment.

Anti-CCP and RA factor were done to confirm diagnosis of rheumatoid arthritis. EULAR criteria was used to diagnose rheumatoid arthritis and patients with EULAR score of > 6 were

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considered to have rheumatoid arthritis. Serum ACE levels were done to exclude possibility of sarcoidosis and absence of hilar lymphadenopathy on HRCT also exclude diagnosis of sarcoidosis. ANA levels and anti-dsDNA were also done to exclude other causes of interstitial lung disease like Systemic lupus erythematosus (SLE). Anti topoisomerase antibodies were done to exclude diseases like scleroderma. The complete history and clinical examination was done to exclude other connective tissue diseases causing interstitial lung disease.

INCLUSION CRITERIA: Patients satisfying clinical examination and ACR-EULAR criteria of rheumatoid arthritis.

EXCLUSION CRITERIA: 1. Patients with any history of chest radiation, injury.

2. Smokers will be excluded from the present study.

3. Patients with history of occupational lung disease and other connective tissue diseases were excluded from the study.

RESULTS: The present study included 50 patients of rheumatoid arthritis out of which 39 were females and 11 were males. The minimum age in this present study was found to be 24 years and maximum study was found to be 70 years. Most of the patients showed restrictive pattern by both spirometry and HRCT. Most common pattern found on HRCT- Reticulonodular pattern (18%) and Bronchiectasis (18%). Other various lung pattern found on HRCT were; ground glass opacification was found in 6 (12%) patients, ground glass opacification along with pulmonary nodules were found in 2 (4%) patients, mosaic interstitial pattern was found in 2 (4%) patients. 21 patients were having normal findings. Ground glass opacification, pulmonary nodules, reticulonodular pattern and mosaic interstitial pattern were taken as restrictive pattern and bronchiectasis was taken as obstructive pattern in this study. Restrictive pattern dominates in most of patients with increasing duration of disease from 5 years to 10 years. The results of both HRCT and spirometry was correlated and were found to be statistically significant with p value of <0.001. HRCT and spirometric findings were also correlated with duration of disease. These results were found stastically significant with p value of 0.001 and 0.011 respectively.

DISCUSSION: Restrictive pattern was the most common pattern in our study and similar results were found in other studies. In our study as duration of disease goes on increasing restrictive pattern becomes dominant over obstructive pattern with percentage of 57.1% and even Gowdhaman³ study observed similar results. . In present study out of 50 patients, 38 were females (76%) and 12 were males (24%). Out of 50 patients with rheumatoid arthritis, on spirometric tests 26 patients showed normal pattern (52%), 22 patients were having restrictive pattern (44%) and 2 patients (4%) were having obstructive pattern. On high resolution computed tomography normal pattern was found in 21 patients (42%), restrictive pattern was found in 20 patients (40%) and obstructive pattern was found in 9 patients (18%). Rajasekran⁴ performed a study on 18 patients of rheumatoid arthritis. Both spirometric test and high resolution computed tomography were also performed on the patients. About 60% of patients showed restrictive pattern in this study on spirometric tests. High resolution computed tomography showed ground glass shadowing in majority of patients. Honey combing was found in 4 patients in this study. Reticular shadowing was found in 2 patients in this study. A significant correlation was found between various investigations

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done in the study. Our study agrees with this study. Youssef⁵ performed a study to investigate the prevalence and types of pulmonary involvement using high-resolution computed tomography scan (HRCT) and pulmonary function tests (PFT) and to evaluate the association between respiratory symptoms and rheumatoid lung disease in a group of Egyptian rheumatoid arthritis patients. He found that nearly 64% of RA patients demonstrated abnormalities on spirometry and 47% on high resolution computed tomography. Mixed restrictive and obstructive pattern was the commonest findings in all patients by both spirometric tests and HRCT methods with predominance of restrictive pattern in most of patients and both of these methods were significantly correlated with each other with p value($p < 0.05$). Our study agrees with this study. Schrenthner⁶ conducted a study on 62 patients of rheumatoid arthritis. The patients were subjected to spirometric function test analysis. The patients were divided into three groups based on duration of disease-0 to 3 years, 4 to 10 years and >10 years duration. It was found that lung dysfunctioning goes on increasing as duration of disease goes on increasing with predominance of restrictive pattern. Our study agrees with this study.

CONCLUSION: Pulmonary involvement is present in majority of patients with rheumatoid arthritis. An exhaustive clinical examination and some cost effective screening tests are sufficient to detect this problem in earlier stages which can be instrumental in better care of patients. Finally considering adverse prognostic implications of pulmonary involvement reported in rheumatoid arthritis, further studies involving a large number of patients are warranted to delineate factors responsible for derangement and find remedial measures if possible.

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HRCT FINDINGS	NO OF CASES	PERCENTAG
BRONCHIECTASIS	9	18.0
GROUND GLASS OPACIFICATION	6	12.0
GROUND GLASS OPACIFICATION,PULMONARY NODULES	2	4.0
MOSIAC INTERSTITIAL PATTERN	2	4.0
NORMAL	21	42.0
PULMONARY NODULES	1	2.0
RETICULONODULAR PATTERN	9	18.0
TOTAL	50	100.0

TABLE 1: HRCT FINDINGS

PFT Pattern	HRCT Pattern			Total
	Normal	Restrictive	Obstructive	
Normal	18	6	2	26
Restrictive	2	14	6	22
Obstructive	1	0	1	2
Total	21	20	9	50

TABLE 2: HRCT AND SPIROMETRIC PATTERN CROSS TABULATION

(Spearman rho: r value = 0.529; p < 0.001; Highly significant)

DURATION OF DISEASE	HRCT PATTERN			TOTAL
	NORMAL	RESTRICTIVE	OBSTRUCTIVE	
<5 years	12 (80%)	0 (0%)	3 (20%)	15 (100%)
5 – 10 years	2(14.3%)	8(57.1%)	4(28.6%)	14 (100%)
> 10 years	7 (33.3%)	12(57.1%)	2 (9.5%)	21 (100%)
Total	21(42%)	20 (40%)	9(18%)	50 (100%)

TABLE 3: DURATION OF DISEASE * HRCT PATTERN OBSERVED

$\chi^2 = 18.405$ df = 4; p = 0.001; Significant

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