



A Study on Pulmonary Function Test in Patients with Rheumatoid Arthritis

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Abstract

Rheumatoid arthritis is a chronic inflammatory disease with various pulmonary manifestations.

Materials and Methods: *A cross sectional observational study including 50 patients of rheumatoid arthritis was conducted in Darbhanga Medical College from September 2016 to August 2017. Clinical data and PFT measurements were recorded and analysed using appropriate statistical test.*

Results: *46% patients had abnormal PFT pattern. Respiratory symptoms were more evident with abnormality of PFT. More PFT changes were noted with older age and progressive duration of disease.*

Conclusion: *Clinical respiratory manifestations as well as PFT abnormalities are quite evident in rheumatoid arthritis.*

Introduction

Rheumatoid arthritis (RA) is a chronic inflammatory disease of unknown etiology marked by a symmetric, peripheral polyarthritis. It is the most common form of chronic inflammatory arthritis. Because it is a systemic disease, RA may result in a variety of extra articular manifestations, including fatigue, subcutaneous nodules, lung involvement, pericarditis, peripheral neuropathy, vasculitis, and hematologic abnormalities.

There are at least six forms of lung disease in RA, as follows:

- Pleural disease-
- Interstitial fibrosis
- Nodular lung disease
- Bronchiolitis obliterans with organizing pneumonia
- Arteritis, with pulmonary hypertension

- Small airways disease

A significant proportion of Rheumatoid arthritis patients show various kinds of respiratory manifestations. Even before appearance of any frank respiratory manifestations there is change in the Pulmonary Functions Test (PFT) study in most of the RA patients, which may be useful for early diagnosis as well as prediction of future pulmonary outcomes in this patient.

Materials and Methods

Study Area: General Medicine department of Darbhanga Medical College & Hospital, Laheriasarai, Bihar.

Study Population: The patients attending our medical college and hospital at OPD and inpatients wards who fulfill the inclusion criteria.

Inclusion Criteria

		Score
Joint involvement	1 large joint (shoulder, elbow, hip, knee, ankle)	0
	2-10 large joints	1
	1-3 small joints (MCP, PIP, Thumb IP, MTP, wrists)	2
	4-10 small joints	3
Serology	>10 joints (at least 1 small joint)	5
	Negative RF and negative ACPA	0
Acute-phase reactants	Low-positive RF or low-positive anti-CCP antibodies (≤ 3 times ULN)	2
	High-positive RF or high-positive anti-CCP antibodies (>3 times ULN)	3
Duration of symptoms	Normal CRP and normal ESR	0
	Abnormal CRP or abnormal ESR	1
Duration of symptoms	<6 weeks	0
	≥ 6 weeks	1

A score of 6 or more fulfilling the requirements for definite RA and thus fulfilling the inclusion criteria of our study.

Exclusion Criteria

- Patient not giving consent
- Not fulfilling inclusion criteria of definite Rheumatoid arthritis.
- Coexisting respiratory illness as found by clinical evaluation.

Study Period: From September 2016 to August 2017.

Sample Size: 50.

Study Design: Cross sectional, Observational study.

Study Tools and Techniques: History taking and clinical examination of the patient were done with a preformed questionnaire and a standard Proforma and necessary blood reports were obtained. Patients were evaluated clinically and with necessary imaging and other tests (chest x ray, Echocardiography and HRCT). Pulmonary Function Test was done according to British Thoracic Society recommendations.

An obstructive pattern was defined as FEV1/FVC < 0.7 and/or significantly reduced mid-expiratory flow (FEF₂₅₋₇₅ <50% predicted).

A restrictive pattern was defined as FVC < 80% predicted.

Analysis of Data: All collected data were analyzed by appropriate statistical methods using SPSS software version 20.

Results

Total 50 patients were included in our study. 30(60%) patients were male and 20(40%) patients were females. 18(36%) patients were of age below 35, 18(36%) patients were of age between 35-50, 14(28%) patients were of age older than 50. mean age was 44.42 +/- 7.8 years.

20(40%) patients were with disease duration of less than 5 years, 12(24%) were with 5-10 years duration, 18(36%) patients were with greater than 10 years duration.

Table1: Pattern of PFT in study population

Normal PFT	PFT With Abnormality		
	Obstructive	Restrictive	Mixed
27(54%)	9(18%)	10(20%)	4(8%)
	23(46%)		

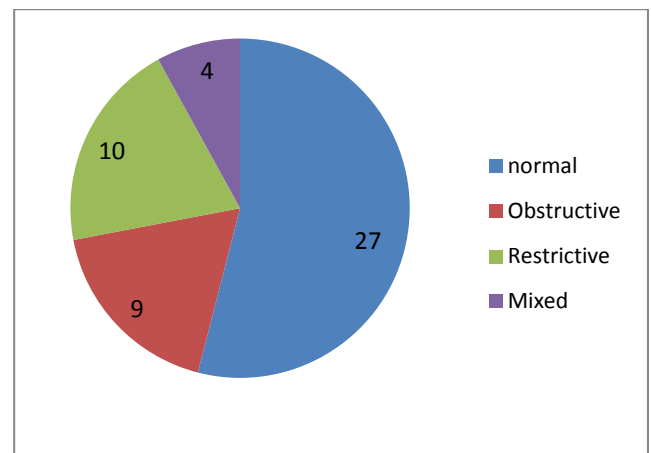


Figure 1: PFT pattern in study population

Table 2: Respiratory symptoms in association of PFT

	With Respiratory Symptoms	Without Respiratory Symptoms	Total
With PFT Change	20	3	23
Without PFT Change	2	25	27
Total	22	28	50

(P value=<0.01,significant)

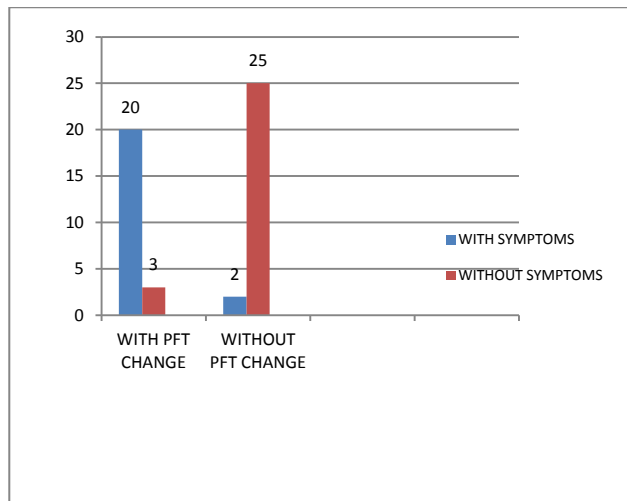


Figure 2: Respiratory symptoms in relation to PFT changes

Table 3: PFT change in relation to smoking

	Non Smoker	Smoker	Total
With PFT Change	5	18	23
Without PFT Change	22	5	27
Total	27	23	50

(p value = <0.001, significant)

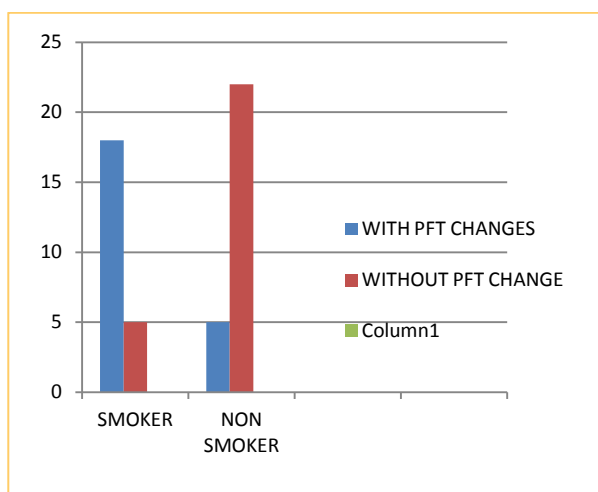


Figure 3: PFT change in relation to smoking

Table 4: PFT change in relation to Age

Age	With PFT Change	Without PFT Change	Total
<35	5	13	18
35-50	8	10	18
>50	10	4	14

(P value = <0.01, significant)

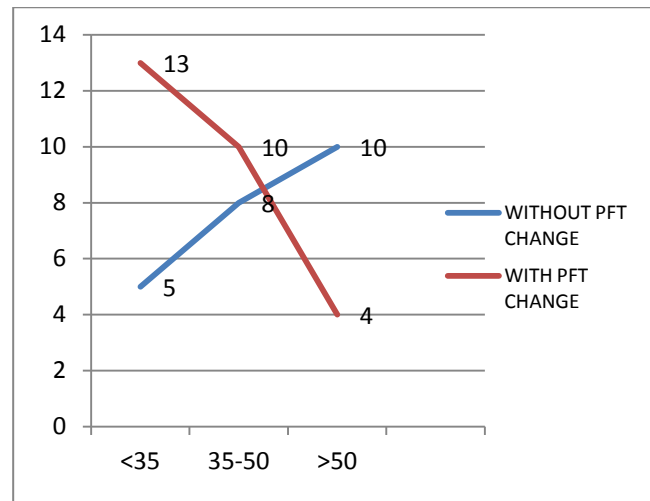


Figure 4: PFT change in relation to age

Changes in PFT with Duration of Disease

Duration	With PFT Changes	Without PFT Change	Total
<5	3	17	20
5-10	5	7	12
>10	15	3	18

(P value = <0.05, significant)

Discussion

Lung disease, as an extra articular manifestation of the disease, related to the drug therapy for RA, or related to co morbid conditions, is the second commonest cause of mortality. All areas of the lung including the pleura, airways, parenchyma, and vasculature may be involved, with interstitial and pleural disease and infection being the most common problems.

The present study was carried out on all eligible cases of Rheumatoid Arthritis meeting the strict inclusion and exclusion criteria attending the OPD of General Medicine and also at in patient department over a period of about one year at Darbhanga Medical College and Hospital, Laheriasarai, Bihar.

A similar study carried out by Avnon LS et al. from Israel showed an obstructive pattern of in about 20% and a restrictive ventilatory defect in about 25% with a normal PFT found in about 54% (excluding DLCO changes). Another study from Germany by Scherthaner et al. reported on 62 patients show that, 21 % of patients had low FEV1/FVC ratios, and 18% had a high airways resistance. A similar high prevalence (38%) of

obstructive changes were also found in another study in UK by Collin et al. Results from another study from Malaysia by Mohd Nur et al. revealed a low forced expiratory flow (FEF)(25-75%) in 16% and Restrictive pattern in 26.7% by PFT.

Two possible explanations for this high prevalence of airways obstruction are there. An association between RA and alpha1 antitrypsin phenotypes has been reported, and this could in theory predispose some patients with RA to emphysema. However, in a separate study no significant association was found between the incidence of antitrypsin phenotypes in patients with RA. A more attractive explanation is that the obstruction is due to frequent respiratory tract infections. Walker et al has shown that patients with RA are more prone to respiratory tract infections than patients with osteoarthritis.

In our study there was a significant correlation between disease duration and obstructive, as well as restrictive changes in PFT. These findings were corroborated by the Japanese study as well as other studies including those by Collins et al , Geddes et al.

A significant correlation was found in our study with smoking and obstructive PFT changes (P=.048) corroborating with most other studies.

Limitation

- 1) Our study had a relatively small number of study population from a relatively small geographic area.
- 2) Our study was conducted in a tertiary care centre i.e. a referral centre so the possibility of referral bias could not be ruled out.
- 3) Effect of various DMARDs including methotrexate in changing PFT pattern was not evaluated in our study.

Conclusion

From the study it is evident that the prevalence of lung involvement was quite high as evidenced clinically as well as by PFT. The prevalence of the obstructive as well as restrictive changes on PFT

was significantly associated with smoking, age of the patient and duration of the disease. Therefore; while public health education should stress the need for early reporting of any respiratory symptoms in RA patients to the healthcare provider, there is need to explore a potential role for screening with a PFT and lung imaging in patients of RA. Further prospective studies in this regard is necessary.

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