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Original Research Article

A hospital based cross sectional study of clinical picture and spirometry pattern on interstitial lung diseases at a tertiary care centre

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ABSTRACT

Background: Many of the ILDs are difficult to differentiate on clinical examination and history as they have similar clinical features. Symptom complex is not beyond that of respiratory symptoms. The objective was to study the clinical picture and spirometry pattern of the patients having interstitial lung disease.
Methods: Hospital based cross sectional study was carried out among 73 cases of ILDs. Data related to history, clinical examination was recorded. Six minute walk test and spirometry was carried out. The data was analysed using proportions.
Results: Incidence of Idiopathic pulmonary fibrosis (IPF) increased with age. Exertional dyspnea (100%) and cough (95.9%) were the commonest presenting symptoms amongst ILD patients. End inspiratory fine crackles (95.1%) and clubbing (67.1%) are the predominant clinical signs. Mean BMI of various ILDs patients were 24.86±8.2 Kg/m² in NSIP followed by 22.9±4.6 in sarcoidosis 21.9±6.4 and 20.8±3.94 in IPF and in Cryptogenic Organizing Pneumonias 19.34±1.8 Kg/M². Serum ACE level was raised in 69.2% patients of sarcoidosis. 81 % of patients could successfully perform 6 Minute Walk Test. Among those who could perform, average desaturation was 8.11% in sarcoidosis, 7.52% in IPF, 6.0% In Hypersensitivity Pneumonitis, 5.75% in NSIP and 4.75% in CTD associated ILDs patients. Raised C Reactive Protein label was consistent (45.2%) in ILDs, maximum in HP (63%) and 2 out of 3 patients with COP and 3 out of 5 patients of CTD associated ILDs. 17.8% cases had positive serum ANA, maximum in IPF.
Conclusions: Idiopathic pulmonary fibrosis (IPF) was the commonest Interstitial Lung disease present in 39.7% of 73 cases followed by sarcoidosis in 17.9%, cases.

Keywords: Clinical picture, Clubbing, Dyspnoea, Serum ACE level, Spirometry pattern

INTRODUCTION

The diseases which affect the interstitium of the lungs are known as Interstitial lung disease (ILD). Another term used for this group of diseases is diffuse parenchymal lung disease (DPLD).[1]

The prominent feature in interstitial lung diseases is fibrosis in the interstitium, which produces derangement of alveolar architecture and loss of functional alveolar capillary units.[2] Many of the ILDs have similar clinical features and are not easily distinguished on examination. Symptoms are generally limited to the respiratory tract.

Dyspnea on exertion and dry cough are very prominent in the affected patients to make them go to the hospital for relief. However, sputum production, hemoptysis, or wheezing is also rare symptoms of the disease.[3]

Hence, it is very important that the chest physician takes the detailed history, does thorough clinical examination and ask for radiography the most suitable investigation and then correlates all the features together i.e. history, clinical and radiological and then confirms the diagnosis.

This should also include tests of the pulmonary as well as confirmation by histopathological findings and then the final diagnosis should be made. Initially ILD was consider as a rare disease however, in the last few decades scattered case reports have emerged including various etiological factors responsible for ILDs from India.[4]

Present study was done to study the clinical picture and spirometry pattern of the patients having interstitial lung disease.

METHODS

This was hospital based cross sectional study conducted in GSVM Medical College, Kanpur, Uttar Pradesh, India within study period of July 2013 to August 2014 with 73 patients during the study period.

Inclusion criteria

- Age more than 18 years of age
- Symptoms suggestive of interstitial lung disease.

Exclusion criteria

- Age less than 18 years of age
- Not willing to participate in the present study.

Methodology

Institutional Ethics Committee permission was taken. All patients coming to the outpatient department aged more than 18 years of age and symptoms suggestive of interstitial lung disease and willing to participate in the present study were included and detailed history, thorough clinical examination was carried out.

The data was recorded in the predesigned, working proforma for the present study.

Symptoms like Weight loss, Difficulty in swallowing, Dry eyes or dry mouth, Rash or changes in skin, Edema on legs, Blood in Urine, Bruising Skin, Hand ulcers, Mouth ulcers, Chest pain were asked.

Symptoms related to gastro esophageal reflux disease like Indigestion, Heart burn, Acid-sour taste, Belching, Bloating sensation cough at, Cough after meals, Night times/sleeping were asked. Past and environmental history was taken. Exposure to Dusts (visible), Molds (visible), Air conditioner, Cooler, Birds in home (caged) (include pigeons, parrot, hen, crow, mourning), any changes in house/housing conditions in recent past, was asked. Six minute walk test was performed. Serological investigations were carried out.

Statistical analysis

The data was recorded in the predesigned, pretested, semi structured study questionnaire. Then the data was entered in the Microsoft excel worksheet and analyzed using proportions. Appropriate statistical test was applied. P value less than 0.05 was taken as statistically significant.

RESULTS

Table 1 shows distribution of study subjects as per signs and symptoms. Cough with expectorant was common in NSIP in 85.7% of the cases among all other types. Chest Pain was common in NSIP in 85.7% of the cases among all other types. Breathlessness was common in COP in all cases. Joint pains was common in CTD in 60% of the cases. Weight Loss was common in COP in 66.7% of the cases.

Difficulty in Swallowing was common in CTD in 20% of the cases. Skin changes was common in CTD in 60% of the cases. Pallor was common in NSIP in 85.7% of the cases. Clubbing was common in HP in 81.9% of the cases. Cyanosis was common in other types in 40% of the cases. Bibasilar crepts was common in all cases in most of the types of interstitial lung diseases.

Table 2 shows distribution of study subjects as per the frequency of antibiotic usage and BMI. Most of the ILD patients visiting hospital had taken at least one course of antibiotic (for more than 7 days). Only 32.9% of patients had not taken a complete course of antibiotic.

Frequent antibiotic usage (≥3 courses a year) was observed in 30.8% of patients with Sarcoidosis. Mean BMI of ILD patients was 21.58±5.0 kg/m^2. BMI observed was higher in patients with NSIP (24.86±8.2) and Sarcoidosis (22.9±4.6), whereas those patients with COP (19.34±1.8) and CTD associated ILDs (19.71±4.8) had lower BMI. Table 3 shows distribution according to ability to perform 6 min walk test and saturation drop in 6 MWT in various interstitial lung diseases. 80.8% of patients with ILD were able to perform 6 minute walk test.

All patients with hypersensitivity pneumonitis could perform 6 MWT; while only 57.2% of patients with NSIP and 60% of CTD associated ILD patients were able to perform the 6MWT. Average SPO2 drop after 6MWT was 7.39%, maximum saturation drop was observed in Sarcoidosis (8.11%) followed by IPF (7.52%) and minimum in ILD patients associated with connective tissue disorder (4.75%).

Maximum (40.7%) cases had less than 5% saturation drop after 6MWT, 28.8% cases had saturation drop between 5%-10% and 30.5% cases had more than 10%

saturation drop. Table 4 shows spirometry patterns in various types of interstitial lung diseases. Most common abnormality among ILD patients in Spirometry was restrictive pattern (78.2%), obstructive pattern was observed in single case of IPF while mixed pattern was observed in 9.1% cases.

Table 1: Distribution of study subjects as per signs and symptoms.

Symptoms/ signs	IPF (n= 29)	Sarcoidosis (n=13)	HP (n=11)	NSIP (n=7)	COP (n=3)	CTD associated ILDs (n=5)	Others (n=5)	Total (n=73)
Cough with expectorant	8 (27.6)	1 (7.7)	6 (54.6)	6 (85.7)	2 (66.7)	2 (40.0)	4 (80)	29 (39.7)
Chest Pain	8 (27.5%)	5 (38.4%)	3 (27.3%)	6 (85.7%)	0	1 (20.0%)	3 (60%)	26 (35.6%)
Breathlessness	21 (72.5%)	8 (61.6%)	8 (72.7%)	1 (14.3%)	3 (100%)	4 (80%)	2 (40%)	47 (64.4%)
Joint pains	7 (24.1%)	3 (23.0%)	4 (36.4%)	3(42.8%)	1 (33.3%)	3 (60.0%)	0	21 (28.7%)
Weight loss	10 (34.4)	3 (23.1)	6 (54.5)	1 (14.2)	2 (66.7)	1 (20)	2 (40)	25 (34.2)
Difficulty in swallowing	1 (3.4)	1 (7.7)	0	0	0	1 (20)	0	3 (4.1)
Skin changes	0	0	0	1(14.2)	0	3 (60)	0	4 (5.4)
Pedal oedema	2 (6.8)	6 (46.1)	0	0	1 (33.3)	2 (40)	2 (40)	11 (17.9)
Mouth ulcers	0	0	0	1 (14.2)	0	0	0	1 (1.4)
Skin changes	00	00	00	2 (28.6)	00	2 (40)	00	4 (05.3)
Pallor	14 (48.7)	8 (61.6)	8 (72.8)	6 (85.7)	00	4 (80)	1 (20)	43 (58.9)
Clubbing	23 (79.3)	8 (61.6)	9 (81.9)	3 (42.8)	1 (33.3)	3 (60)	2 (40)	49 (67.1)
Cyanosis	5 (17.2)	2 (15.3)	1 (09.1)	1 (14.3)	1 (33.3)	1 (20)	2 (40)	13 (17.8)
Bibasilar crepts	29 (100)	11 (84.6)	11 (100)	7 (100)	3 (100)	5 (100)	4 (80)	70 (95.9)
Wheeze	3 (10.3)	1 (07.7)	00	1 (14.3)	00	00	00	6 (08.3)

Table 2: Distribution of study subjects as per the frequency of antibiotic usage and BMI.

No. of antibiotic course in last 1 year	IPF (n= 29)	Sarcoidosis (n=13)	HP (n=11)	NSIP (n=7)	COP (n=3)	CTD associated ILDs(n=5)	Others (n=5)	Total (n=73)
0	11 (37.9%)	4 (30.7%)	4 (36.4%)	1 (14.3%)	2 (66.7%)	1 (20%)	1 (20%)	24 (32.9%)
1	9 (31.0%)	3 (23.1%)	3 (27.2%)	6 (85.7%)	1 (33.3%)	3 (60%)	2 (40%)	27 (38.3%)
2	4 (13.9%)	2 (15.4%)	2 (18.2%)	00	0	00	1 (20%)	9 (12.3%)
≥3	5 (17.2%)	4 (30.8%)	2 (18.2%)	0	0	1(20%)	00	12 (16.5%)
BMI (Kg/m^2)	**IPF (n= 29)**	**Sarcoidosis (n=13)**	**HP (n=11)**	**NSIP (n=7)**	**COP (n=3)**	**CTD associated ILDs (n=5)**	**Others (n=5)**	**Total**
<17.49	20.7	15.3	27.3	14.3	00	40	40	22.0
17.5-22.49	48.3	38.5	27.3	42.7	100	40	40	43.8
22.5-27.49	31.0	38.5	18.1	14.3	00	20	20	26.0
>27.5	00	07.7	27.3	28.7	00	00	00	08.2
Mean	20.86 ±3.94	22.9±4.6	21.96±6.4	24.86±8.2	19.34±1.8	19.71±4.8	20.06 ±3.7	21.58±5.0

Spirometry was normal in 10.9% cases (p. 0618). Most of the patients with normal Spirometry were of Sarcoidosis. All patients of COP and CTD associated ILDs had restrictive pattern on Spirometry.

Table 5 shows prevalence of serum immuno antigen positivity in various types of interstitial lung diseases. Raised C Reactive Protein label was consistent (45.2%) in ILDs, maximum in HP (63%) and 2 out of 3 patients

with COP and 3 out of 5 patients of CTD associated ILDs. 17.8% cases had positive serum ANA, maximum in IPF.

Table 3: Distribution according to ability to perform 6 min walk test and saturation drop in 6 MWT in various interstitial lung diseases.

Able to perform 6 min. walk test	IPF (n= 29)	Sarcoidosis (n=13)	HP (n=11)	NSIP (n=7)	COP (n=3)	CTD associated ILDs(n=5)	Others (n=5)	Total (n=73)
Yes	23(79.3%)	12 (92.3%)	11(100%)	4 (57.2%)	2 (66.7%)	3 (60.0%)	4 (80%)	59(80.8%)
No	6 (20.7%)	1 (7.7%)	00	3 (42.8%)	1 (33.3%)	2 (40%)	1 (20%)	14(19.2%)
Saturation Drop	**IPF (n= 29)**	**Sarcoidosis (n=13)**	**HP (n=11)**	**NSIP (n=7)**	**COP (n=3)**	**CTD associated ILDs (n=5)**	**Others (n=5)**	**total (n=59)**
<5%	9(39.1%)	7(58.3%)	4(36.4%)	2(50.0%)	1(50.0%)	1(25.0%)	00	24(40.7%)
5% - 10%	6(26.0%)	2(16.7%)	3(27.2%)	1(25.0%)	00	2(50.0%)	3(100%)	17(28.8%)
>10%	8(34.9%)	3(25.0%)	4(36.4%)	1(25.0%)	1(50.0%)	1(25.0%)	00	18(30.5%)
Mean percent-age Drop	7.52%	8.11%	6.0%	5.75%	6.0%	4.75%	7.6%	7.39%

Table 4: Spirometry patterns in various types of interstitial lung diseases.

Patterns	IPF (n= 22)	Sarcoidosis (n=12)	HP (n=8)	NSIP (n=5)	COP (n=2)	CTD associated ILDs (n=4)	Others (n=2)	ILD (n=55)
Normal	1 (4.5%)	4 (33.3%)	0	1 (20%)	0	0	0	6 (10.9%)
Obstructive	1 (4.5%)	0	0	0	0	0	0	1 (1.8%)
Restrictive	18 (82.0%)	7 (58.3%)	7 (87.5%)	4 (80%)	2 (100%)	3 (75%)	2 (100%)	43 (78.2%)
Mixed	2 (9.0%)	1 (8.4%)	1 (12.5%)	0	0	1 (25%)	0	5 (9.1%)

Table 5: Prevalence of serum immuno antigen positivity in various types of interstitial lung diseases.

Immuno antigens	IPF (n=29)	Sarcoidosis (n=13)	HP (n=11)	Nsip (n=7)	Cop (n=3)	Ctd (n=5)	Others (n=5)	Total
CRP	40.7%	23.0%	63.7%	42.8%	66.6%	60%	60%	45.2%
ANA	27.6%	0	18.2%	14.3%	0	40%	0	17.8%
DsDNA	6.9%	0	0	0	0	20%	0	04.1%

DISCUSSION

In this study, breathlessness was the most frequent symptom and was present in 100% of cases. Similar observation was made in a study done by Gagiya AK et al, and Sen T et al.[5,6] Breathlessness was present in 71.9%, 79.2%, 97.2% and 98.6% patients in Verma SK et al, Muhammed SK et al, and Maheshwari U et al, studies respectively.[7,8,9]

Cough was the second most common symptom in our study after breathlessness, seen in 95.9% cases. Cough was usually dry in nature. In various other studies cough was found in 90% by Muhammed SK et al, 43.29% by Gagiya AK et al, 70% by Sen T et al, 92.1% by Maheshwari U et al.[5,6,8,9] Chest pain was present in 35.6% cases in this study. Verma SK et al, find 34.7% cases in their study.[7] We found that 27.8% of the cases had joint pains. In various other studies joint pain was found in 15.7% by Muhammed SK et al, 16.0% by Gagiya AK et al, 13.2% by Maheshwari U et al.[5,8,9] Anorexia and weight loss was reported in 10% in Sen T et al, study and 50% in Gagiya AK et al, study. In this study Anorexia and weight loss was observe in 34.2% cases.[5,6]

Dysphagia and skin changes were infrequent, seen in only 4.1% and 5.4% respectively in our study. Study done by Kumar R et al, showed them to be present in 3.8% and 1.7% cases respectively. Another important observation was that, tuberculosis treatment more commonly sought in sarcoidosis group (53.8%) compared

to ILD group (30.1%). Kumar R et al, made similar observation with ATT history present in 15% cases and most commonly in sarcoidosis (22%).[10] We noted that 32% had anemia. Muhammed SK et al, found anemia in 33% cases.[8] We observed that 45.2% showed increased levels of C-reactive proteins. Similar findings were given by Abeles AM et al.[11] We also noted that positivity of serum DsDNA was 6.9% in IPF group and the positivity was 20% in CTD group. Weinberg I et al, gave similar reports.[12] Serum Rheumatoid Factor was done in patients complaining of joint pain and shows positive result in 32% cases, Anti Jo1 and Scl 70 was tested in patients suspected for scleroderma. Anti Jo1 was positive in 3 out of 8 patient and Scl 70 was positive in 2 out 6 patients in our study. Antinuclear antibodies & rheumatoid factor are clear markers of collagen vascular disease but are also often positive in IPF. Muhammed SK et al, studied serology of 70 cases of DPLD and find ANA was positive in 11 patients, RA factor in 8, Anti dsDNA in 2, Anti Scl 70 in 3 patients. Kumar R et al, studied cases of rheumatoid disease-associated ILDs, rheumatoid factor was positive in all 7 patients. Systemic sclerosis was diagnosed on the basis of positive Anti Scl-70 antibody in all 5 cases. SLE was diagnosed in one patient with positive anti ds-DNA antibody.[8,10]

CONCLUSION

Idiopathic pulmonary fibrosis (IPF) was the commonest Interstitial Lung disease present in 39.7% of 73 cases followed by sarcoidosis in 17.9%, hypersensitivity pneumonitis in 15.1%, nonspecific interstitial pneumonia in 9.6%, connective tissue associated ILD in 6.8%, cryptogenic organizing pneumonia in 4.1% cases.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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