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STUDY OF CLINICO-RADIOLOGICAL PROFILE OF INTERSTITIAL LUNG DISEASE PATIENTS ATTENDING CRGH UJJAIN

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Abstract:

Introduction: Interstitial lung diseases are heterogeneous group of disorders of the lower respiratory tract that are characterized by both acute and chronic inflammation and a generally irreversible and relentless process of fibrosis in the interstitium and the alveolar walls. This study was undertaken with the aim to study the clinical and radiological spectrum of ILDs presenting to a tertiary care centre.

Methodology: The present study was conducted in Department of Pulmonary Medicine, tertiary care centre, Ujjain on 25 patients over a period of one year. All those patients who were suspected as case of ILD on clinical and radiological ground were included. A detailed history along with occupational history was obtained and entered in a questionnaire. All patients were examined clinically and underwent basic investigations along with PFT, ChestXray and HRCT thorax.

Result: The mean age of patients was 53.68 years and majority (68%) patients belonged to 41 to 60 years of age. Shortness of breath was present in all 100% patients. Velcro crepts was present in 24 (96%) patients while rhonchi was seen only in 3(12%) patients. Among most of the ILD patients i.e 20 (80%) septal thickening was seen. Honey combing was seen in 14(56%) patients. It was more in male as compare to female and there was significant difference only for this pattern (P=0.010).

Conclusion: Interstitial lung disease must be suspected with the presence of specific symptoms, signs and further investigations like haematological parameters, PFT, chest X-ray and HRCT chest. In large number of cases, accurate diagnosis of Interstitial pulmonary fibrosis can be made without a surgical lung biopsy and with a high specificity (>90%) following detailed clinical and radiological assessment with the help of HRCT.

Keywords: PFT, ILD, CXR. CT thorax.

Introduction

Interstitial lung diseases are heterogeneous group of disorders of the lower respiratory tract that are characterized by both acute and chronic inflammation and a generally irreversible and relentless process of fibrosis in the interstitium and the alveolar walls.[1] The term “interstitial” can be misleading as most of these conditions also affect the airway spaces and even the blood vessels, but it is the predominant and primary involvement of the interstitium that characterizes them.[2] The natural history of several interstitial lung diseases is characterized by slow and progressive destruction of alveolar-capillary functional units, often with respiratory failure and death. For their smoldering evolution and non-specificity of symptoms (exertional dyspnea and cough), they may remain undiagnosed and not treated for a long time.[3,4]

Although interstitial lung diseases are more common in adults, certain forms such as hypersensitivity pneumonitis and idiopathic interstitial pneumonias are seen in children as well.[5] In children, common diseases associated with interstitial lung diseases include viral respiratory tract infections (RSV, parainfluenza, etc.), gastroesophageal reflux, idiopathic pulmonary fibrosis, pulmonary hemosiderosis, eosinophilic pneumonia, pneumonitis associated with AIDS, etc.[5,6,7,8] Though there are several interstitial lung diseases, only a few handful of about 10-12 account for more than 90% of them. Among the well over 200 distinct entities of ILDs, a limited number of disorders, including idiopathic pulmonary fibrosis, sarcoidosis, and connective tissue disease-related ILDs, account for most ILDs encountered clinically.[9] Hence, proper knowledge and understanding of these common entities is pertinent in diagnosing them and also in including

them in the differential diagnosis. For the physician, the distinctive sign of interstitial lung disease is the evidence of diffuse pulmonary opacities on chest X rays or a suggestive pattern on pulmonary function tests. The diagnosis of chronic ILD depends on epidemiologic data, clinical and radiological findings which make it possible to consider a diagnosis of high probability in at least 60% of cases and reduce the gamut of hypothesis in the remaining.[10]

Moreover, there have been numerous studies comparing conventional radiography and HRCT in the diagnosis of specific interstitial diseases, very few studies have incorporated the whole gamut of interstitial lung diseases in a single study. This prospective observational study was, therefore, undertaken with the aim to study the clinical and radiological spectrum of ILDs presenting to a tertiary care centre.

Objective-

1. To study clinical profile of Interstitial Lung Disease patients for early and correct diagnosis

2. To study radiological profile of Interstitial Lung Disease in patients of ILD

Methodology:

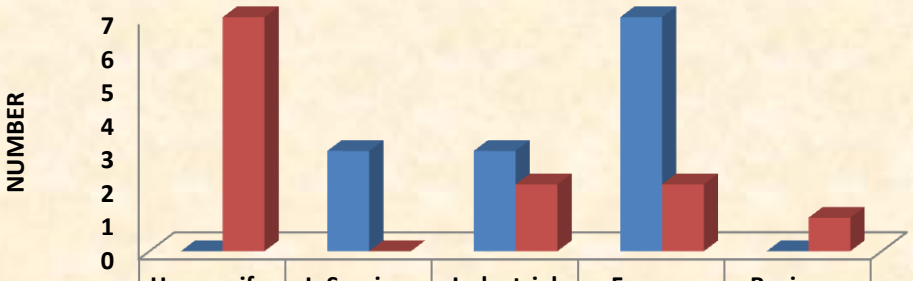
The present study was conducted in Department of Pulmonary Medicine, tertiary care centre, Ujjain on 25 patients over a period of one year. All those patients who were suspected as case of ILD on clinical and radiological ground as per ATS (American Thoracic Society) definition and ERS (European respiratory society) definition of ILD; and patient with symptoms and signs of ILD with significant occupational history were included in the study. Patients not giving consent, pregnant females, known cases of obstructive lung disease, lung cancer and pleural disease were excluded from the study. A detailed history along with occupational history was obtained from all the patients fulfilling inclusion criteria and entered in a questionnaire. All patients were examined clinically and underwent basic investigations like complete blood count, sputum examination for acid fast bacilli (RNTCP), sputum examination for culture and sensitivity, chest X-ray, ECG, liver function test, renal function test, blood sugar, serum electrolytes, HIV, HbsAg testing. Also assessment of pulmonary functions were done by spirometry. Apart from these investigations, HRCT thorax for confirmation of initial findings were done.

Statistical analysis: Data was compiled using Ms Excel and analysed using Statistical Package of Social Science (SPSS Version 20; Chicago Inc., USA). Data comparison was done by applying specific statistical tests to find out the statistical significance of the comparisons. Quantitative variables were compared using mean values and qualitative variables using proportions. Significance level was fixed at $P \leq 0.05$.

RESULT:

The study included 25 patients fulfilling inclusion criteria with mean age 53.68 years. Majority i.e. 17 (68%) patients belonged to 41 to 60 years of age followed by 5 (20%) and 3 (12%) patients belonging to >60 and <40 years of age group. About 14 (56%) patients were males and only 1 (44%) patients were females.

Figure 1:Demographic distribution of ILD patients according to Occupation & gender



	Housewife	InService	Industrial Exposure	Farmer	Business
MALE	0	3	3	7	0
FEMALE	7	0	2	2	1

Graph 1:

Among male, most of the subjects were farmer i.e 7 (28%) while among females most of the subjects were housewives. 5(20%) were working in industry. There was statistically significant difference in the distribution of patients according to occupation & gender (P=0.003). Out of 14 males, 10 (71.4%) males were smokers whereas 100% females were non smokers in present study whereas exposure to biomass was positive in 3 (27.3%) females only.

Table 1: Presenting Complaints among Interstitial Lung Disease (ILD) patients

Presenting Complaints	Male N(%)	Female N(%)	Total N(%)	Chi Square Value	Significance 'P Value
Cough	14(56%)	10(40%)	24(96%)	1.326	0.250(NS)
Expectoration	6(24%)	3(12%)	9(36%)	0.649	0.420(NS)
Shortness of Breath	14(56%)	11(44%)	25(100%)	NA	NA
Fever	3(12%)	1(4%)	4(16%)	0.698	0.404(NS)
Chest pain	3(12%)	0(0.0%)	3(12%)	2.679	0.102(NS)
Joint pain	0(0.0%)	2(8%)	2(8%)	2.767	0.096(NS)
Skin lesion	0(0.0%)	3(12%)	3(12%)	4.339	0.04*(S)
Others	3(12%)	0(0.0%)	3(12%)	2.679	0.102(NS)

Most of subjects were having cough and shortness of breath. Out of 25 patients, cough was present in 24(96%) and shortness of breath was present in all 100% patients. mMRC grading was used to classify shortness of breathing. Most of the subjects i.e 17(68%) were having Mmrc grade 3. Skin lesion was present only in 3(12%) females. Statistically significant difference was found between male & females only for skin lesion (P=0.04) and for all other complaints there was no Statistically significant difference between male & female. (P>0.05)

Table 2: Co-Morbidity among Interstitial Lung Disease (ILD) patients.

Co-Morbidity	Male N(%)	Female N(%)	Total N(%)	Chi Square Value	Significance 'P Value
COPD	1(4%)	0(0.0%)	1(4%)	0.818	0.366(NS)
RVF	1(4%)	0(0.0%)	1(4%)	0.818	0.366(NS)
DM	3(12)%	0(0.0%)	3(12%)	2.679	0.102(NS)
Hypertension	4(16%)	3(12%)	7(28%)	0.005	0.943(NS)
Bronchial Asthma	0(0.0%)	3(12%)	3(12%)	4.339	0.04(S)
Rheumatoid Arthritis	2(8%)	0(0.0%)	2(8%)	1.708	0.191(NS)
Tuberculosis	1(4%)	0(0.0%)	1(4%)	0.818	0.366(NS)
Drug History	5(20%)	0(0.0%)	5(20%)	4.911	0.03*(S)

Hypertension was observed in 7 (28%) patients. Tuberculosis, RVF, COPD was present only in 1(4%) patients. Bronchial asthma was seen in 3(12%) and drug history was present in 5(20%). Statistically significant difference was seen between male and female only for bronchial asthma and for drug history. ATT was given to 10(40%) patients.

Table 3: Velcro crepts & Ronchi presents during Auscultation among Interstitial Lung Disease (ILD) patients.

Auscultation	Male N(%)	Female N(%)	Total N(%)	Chi Square Value	Significance 'P Value
Velcro crepts	13 (52.0%)	11 (44.0%)	24 (96.0%)	0.818	0.366 (NS)
Rhonchi	1 (4.0%)	2 (8.0%)	3 (12.0%)	0.711	0.399 (NS)

Out of 25, Velcro crepts was present in 24(96%) patients while rhonchi was seen only in 3(12%) patients. There was no statistically significant difference in the presence of Velcro crepts & Rhonchi according to gender (P> 0.05).

Table 4: Pulmonary Function Test (PFT) among Interstitial Lung Disease (ILD) patients.

PFT	Male	Female	Total	't' Test Value	'P' Value
	Mean ±SD	Mean ±SD	Mean ±SD		
FEV1/FVC	65.86±19.4	72.6±10.71	68.8±16.25	1.037	0.311 (NS)
FEV1	55.7±11.06	51.5±11.73	53.8±11.32	0.931	0.362 (NS)
FVC	57.9±11.13	54.5±12.51	56.4±11.63	0.718	0.48 (NS)

Mean FEV1/FVC was more in female i.e 72.64±10.71 as compared to male i.e 65.86±19.43. Mean FEV1 & Mean FVC was 53.84±11.32 & 56.36±11.63 respectively. There was no statistically significant difference in the PFT parameter according to gender. (P> 0.05). Most of the subjects had restriction PFT Pattern i.e 10(40%). Mixed pattern was seen in 8(32%) and obstruction pattern was seen in 7(28%) patients. There was no statistically significant difference in the PFT parameter according to gender.(P= 0.396)

Table 5: Chest X-ray Pattern among Interstitial Lung Disease (ILD) patients.

Chest X-ray Pattern	**Male N(%)**	**Female N(%)**	**Total N(%)**	**Chi Square Value**	**Significance 'P Value**
Reticular	9(36%)	9(36%)	18(72%)	0.939	0.332(NS)
Nodular	6(24%)	6(24%)	12(48%)	0.337	0.561(NS)
Reticulonodular	3(12%)	6(24%)	9(36%)	2.932	0.087(NS)
Linear	4(16%)	2(8%)	6(24%)	0.365	0.546(NS)
Cystic lesions	3(12%)	1(4%)	4(16%)	0.698	0.404(NS)
Consolidation	1(4%)	3(12%)	4(16%)	1.857	0.173(NS)
Volume loss	10(40%)	8(32%)	18(72%)	0.005	0.943(NS)
Cardiomegaly	4(16%)	0(0.0%)	4(16%)	3.741	0.05*(S)

Among most of the subjects, reticular, volume loss & nodular pattern was seen. Reticular & volume loss pattern was seen in 18(72%) patients. Nodular pattern was seen in 12(48% patients and cardiomegaly was seen only in 4 male. Statistically significant difference was seen only in the presence of Cardiomegaly pattern (P=0.05).

Table 6: High Resolution CT Scan Pattern among Interstitial Lung Disease (ILD) patients.

HRCT Pattern	Male N(%)	Female N(%)	Total N(%)	Chi Square Value	P Value
Septal thickening	11 (44%)	9 (36%)	20 (80%)	0.041	0.840 (NS)
Ground glass opacity	4 (16%)	6 (24%)	10 (40%)	1.732	0.188 (NS)
Honeycombing	11 (44%)	3 (12%)	14 (56%)	6.579	0.010* (S)
Mediastinal Lymphadenopathy	0 (0.0%)	1 (4%)	1 (4%)	1.326	0.250 (NS)
Traction Bronchiectasis	6 (24%)	7 (28%)	13 (52%)	1.066	0.320 (NS)

Among most of the ILD patients i.e 20(80%) septal thickening was seen. Honey combing was seen in 14(56%) patients. It was more in male as compare to female and there was significant difference only for this pattern (P=0.010). Traction Bronchiectasis was present in 13(52%) patients. Usual interstitial pneumonia Pattern was seen in 14(56%) ILD patients while non specific interstitial pneumonia Pattern was present in 9 (36%) patients. UIP was seen more in male(40%) as compare to female(12%). Statistically significant difference was found between male & female in the distribution of UIP Pattern (P=0.03).

DISCUSSION:

In present study, twenty five patients were included and were diagnosed as ILD based on clinical, radiological and PFT findings from the OPD and from those admitted in medical college Ujjain. They were studied according to their demographic features, clinical characteristics and radiological findings. In a developing country like India, with a high prevalence of tuberculosis (TB), ILDs are often initially misdiagnosed as TB. Data on ILDs has been limited to just a few dispersed studies.[11,12] The largest ILD series published from India comprised just 274 patients.[11] Also, most of the previous studies on ILD from India lacked any computed tomography (CT) evaluation. This prospective study was, therefore, undertaken with the aim to study the spectrum of ILDs presenting to a tertiary care centre.

In our study of 25 patients the demographic distribution showed that 14(56%) were male & 11(44%) were female. Most of the subjects were 41-60 year old i.e 68%. Mean age of all patients were 53.68 year. Jindal et al study also correlate with this study with peak incidence between 30 to 59 years. Male and female incidence was 42.4% and 57.4%.[12] Higher incidence of ILD amongst females in the reference study could be explained due to associated collagen vascular disease group which was more (50.8%) compared to present study (8%).[12] In another study by Mahashur et al study, out of 161 cases 86 were male and 75 were female. 10% were below 25 years of age and 46% were at least 45 years of age.[13]

In present study, smoking history was observed in 40% patients; all the 11 female were Non Smoker and out of 14 male, 10 were smoker. The literature shows more men being diagnosed with IPF than women and the majority being smokers.[14] Chronic exposure to biomass was present only in 3 (12%) patients and all were females. Dyspnoea was present in 100% cases in present study which is similar to Jindal et al,[12] Mahashur et al,[13] and Crystal et al[15]. Bilateral crepts were present in 96% which is consistent with the findings of study by et al[16] and in other studies by Jindal et al[12], Mahashur et al[13] which had a high incidence of crepts. Another important observation is that almost 40% of cases of ILDs had a history of anti-tubercular treatment. This might be due to radiological similarities between ILD and pulmonary tuberculosis and a lack of awareness and paucity of diagnostic facilities in remote areas. In our study mean FEV1/FVC was more in female i.e 72.64±10.71 as compared to male i.e 65.86±19.43. Mean FEV1 & Mean FVC was 53.84±11.32 & 56.36±11.63 which closely resemble to Jindal et al (60.90%) Study respectively.[12] Most of the subjects had restriction PFT Pattern i.e 10(40%). Mixed pattern was seen in 8(32%) and obstruction pattern was seen in 7(28%) patients. Majority of patients have FVC% of predicted between 30-59% in present study and in Mahashur et al studies.[13] In Mahashur et al study, FVC% of predicted below 30% was found in 27% as compared to 53% in present study, which may be related to early refers or early diagnoses of interstitial lung diseases due to more advance in non-invasive investigation of interstitial lung diseases.[13] FEV1/FVC ratio was more than 60% in most cases in present study and also in Mahashur et al studies (94%). FEV1/FVC % was normal or increased in both studies.

Honey combing appearance on CT in present study was 56% in which males were 44% and females were 12%. These findings were similar to the findings of Johnston et al in which honeycomb appearance was observed more in male as compare to female and there was significant difference only for this pattern (P=0.010), however honeycombing was observed in only 15.10% patients.[16]This observed discrepancy between present study and reference study may be because of that in present study selection of patient selection was done mainly on typical X ray chest finding and clinical findings while Johnston et al study patient study had patients with normal chest X ray too.

CONCLUSION:

Our study suggests that interstitial lung diseases are not uncommon in India. Interstitial lung disease must be suspected with the presence of specific symptoms, signs and further investigations like haematological parameters , PFT ,chest X-ray and HRCT chest. In a developing country like India, with high prevalence of pulmonary tuberculosis where still most of the ILDs are misdiagnosed as tuberculosis and many cases still remain undiagnosed, the education and awareness of general practitioners and physicians about ILDs deserves special attention. In large number of cases , accurate diagnosis of Interstitial pulmonary fibrosis can be made without a surgical lung biopsy and with a high specificity (>90%) 137 following detailed clinical and radiological assessment with the help of HRCT.

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