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Demogrphic, Clinico-Radiological and Etiological Profile of Diffuse Parenchymal Lung Disease in Hilly Area of Western India.

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Abstract

Introduction: The interstitial lung diseases are a clinically challenging and diverse group of over 150 disorders characterized by varying degrees of fibrosis and inflammation of the lung interstitium. Interstitial lung disease broadly classified into 4 groups. Group I consist of disorders of known causes, group II include idiopathic interstitial pneumonias (IIPs) which further divided in major and minor IIP, Group III include granulomatous lung disorders and group IV included rare interstitial lung disease. A detail history is the key to diagnose Interstitial lung disease. Common presenting pulmonary symptoms are progressive cough (mainly dry), persistent progressive shortness of breath or dyspnoea.

Materials and Methods: Our study is tertiary care hospital based prospective study. Study period was from July 2015 to June 2016. All patients were taken randomly who attended the department of respiratory medicine. 50 confirmed cases of interstitial lung diseases were evaluated for study.

Result: In our study, Majority (82%) of the patients belonged to 21-60 years of age group. The mean age of study population was found to be 46.1 years. Male to female ratio was 3.5:1. 56% (23 male, 5 female) of the study population were belonged to stone mine and related works (drilling & construction) followed by household works (16%), farmers (14%). In our study dyspnoea (90%) & cough (80%) were the commonest symptom. Majority of the patients 33/50 (66%) had duration of illness more than 1 years. In our study, 26 (52%) cases had diffuse involvement on chest skiagram followed by 26% cases had predominantly lower zone involvement. Among all, 44% cases had nodular infilterates, 26% cases with reticular or reticulo-nodular pattern with 22% cases showed progressive massive fibrosis. final diagnosis were made as silicosis 25 patient, miliary tuberculosis 9,

interstitial parenchymal fibrosis 6, systemic sclerosis 5, asbestosis 3 and hypersensitivity pneumonitis 2 patients respectively.

Conclusion: Interstitial lung disease is a group of diverse disorder of lung parenchyma. Demography of area and occupation are major risk factor for various type of ILD.

Keywords: Interstitial lung disease, reticulo nodular, silicosis.

Introduction

The interstitial lung diseases are a clinically challenging and diverse group of over 150 disorders characterized by varying degrees of fibrosis and inflammation of the lung interstitium. The interstitium of the lung spans the region between alveolar epithelium and pulmonary vascular endothelium. This region includes a variety of cell types (fibroblasts, myofibroblasts, and macrophages) and matrix components (collagens, elastin and proteoglycans). The interstitium extends from the alveolar space proximal to the terminal and respiratory bronchioles.[1] However, "interstitial lung disease" is a misnomer, because this condition affects not only the interstitium but also the alveolar space and sometimes the airways. So that the term diffuse parenchymal lung disease (DPLD) is more appropriate[2] and defined as- A diverse group of pulmonary disorders with variable degrees of pulmonary inflammation and fibrosis that are classified together because of similar clinical, roentgenographic, physiologic or pathologic manifestations. DPLDs broadly classified[3] into 4 groups. First group consist of disorders of known causes (collagen vascular disease, environmental or drug related) as well as disorders of unknown cause. The latter include idiopathic interstitial pneumonias (IIPs), Granulomatous lung disorders (e.g. sarcoidosis, military TB) and other forms of rare interstitial lung disease (ILD) including lymphangioleiomyomatosis (LAM), pulmonary Langerhans' cell histiocytosis/ histiocytosis X (HX), and eosinophilic pneumonia.[4] Environmental dust exposure–related disease, involving either inorganic dust (e.g. asbestosis and silicosis) or organic dust (e.g., hypersensitivity pneumonitis [HSP].[5]

Common presenting pulmonary symptoms of such patients are progressive cough mostly dry, persistent progressive shortness of breath or dyspnea.[6] It is now widely accepted that all clinical, radiological, and when available, histopathological data should be integrated into the final diagnosis[7]. Diagnosis can be made by the combination of clinical and roentgenographic features. Histopathological confirmation of the diagnosis is not required in most of the cases.

There are very few studies are done on interstitial lung diseases in such hilly area where occupation and exposure are totally different from rest of India. The present study was therefore planned to analyze the clinicoradiological menifestations and spectrum of interstitial lung diseases. Our aim of the study was to find out demography, clinic-radiological profile and etiological spectrum of interstitial lung diseases.

Materials and Methods

Present study was tertiary care hospital based prospective study, carried out in 50 confirmed cases of interstitial lung diseases. All patients were taken randomly who attended the department of respiratory medicine of Institute which is located in the western part of India. Study period was from January 2015 to July 2016. All the cases who came with complains of unexplained dyspnoea, cough, chest pain & showing bilateral diffuse shadows on chest skiagram were selected for study and further evaluated.

Aims & Objective of study was as follow: (1) demographic (age, sex, occupation) profile; (2) Clinicoradiological profile; (3) etiological profile.

Exclusion Criteria

1. Who not given written consent for study.

2. Patients of pulmonary tuberculosis and other infectious pulmonary diseases.

3. Patient suffering from systemic disease like Diabetes, Thyroid disease, Hypertension, COPD, HIV, and other co-morbidities.

All selected cases were interviewed, examined and evaluated for their clinical profile; occupational exposure (like silica dust, mining, cotton dust, bird droppings). All patients were undergone routine CBC, RFT, LFT, Monteux test, Chest Xray, PFT, HRCT thorax (if needed) and in some patient autoimmune profile for connective tissue disorders etc. Patients were grouped according to their final etiological diagnosis.

Result

In our study, Majority (82%) of the patients belonged to 21-60 years of age group. Though 40% cases occurred in the age group of 21-40 years, 42% were in the age group of 40- 60 years and 8 patients (16%) more than 60 years of age. The mean age of study population was 46.1 years. Male to female ratio was 3.5:1(Table 1). Majority of study subjects 56% (23 male, 5 female) were engaged in stone mine and related works (drilling & construction) followed by household works 16%, farmers 14% and others 14% (Table 2). 70% cases were non smoker (Table 3). Dyspnoea (90%) & cough (80%) were the commonest presenting symptoms with constitutional symptoms like fever, malaise, generalised weakness in 70%. Chest pain also complained by 44% of subjects which was more in occupational DPLD (Table 4). Majority of the patients 33/50 (66%) had duration of illness (TDI) more than 1 years at the time of presentation (Table-5). On general physical examination, 66% cases (33/50) were tachypanic (>18 breath per minute). Late signs of disease progression hypoxia was in 28% (SpO2<90%) confirmed by pulse oxymetry at the time of presentation & 20% cases had elevated JVP & 10% had pedal oedema. 22%(11/50) cases had clubbing (Table 6).

Chest skiagrams predominantly had diffuse involvement in 52% (26/50) cases followed by lower zone involvement in 26% (13/50) cases. Among all, 44% cases had nodular infilterates, 26% cases with reticular or reticulo-nodular pattern with 22% cases showed progressive massive fibrosis (Table 7). Only 3 cases had normal chest skiagram. In our study majority of cases (26/50) were diagnosed by symptomatology, occupational exposure history and chest skiagram. Rest of 24 cases were confimed by HRCT thorax and autoimmune serology profile. Among 24 cases, 54% cases had basal and subpleural infilterate involvement followed by 41.6% with diffuse involvement on HRCT. 45.8% cases had reticular infilterates, 41.6% had GGO, 37.5% had honey combing & 45.8% with mediastinal lymphadenopathy. Confident Usual interstitial pneumonias (UIP) pattern in HRCT was present in 6 cases to made confident IPF diagnosis(Table 8). In our study final diagnosis were made as silicosis 25 patient, miliary tuberculosis-9, interstitial parenchymal fibrosis (IPF) 6, systemic sclerosis (SSc)- 5, asbestosis 3 and hypersensitivity pneumonitis (HP) in 2 patients respectively.

Discussion

Various interstitial lung diseases (ILD) were confirmed by multidisciplinary approach in 50 patients and taken for study. High Resolution CT Scan (HRCT) thorax was played important role to confirm confident diagnosis of various ILD in 24 cases and also important to exclude some without lung biopsy. In present study, majority of the patients 42/50 (82%) were belonged to middle age group (21-60 years). Mean age of study population was 46.1 years. Similar findings was also observed in study done by Kassim Mohammad Sultan et al[8] (2012) in which mean age was (43.1 ± 1.5) years. Other study done by Yadav et al[9] observed similar result (mean age 45.24

years) at presentation. Male to female ratio was 3.5:1 in present study. Male and female incidence was 42.4% and 57.4% in Jindal et al[10] study. As there were more female patients of collagen vascular disease (50.8%) compared to present study. Male predominance in present study was observed because study population predominantly involved in stone mine related occupation (sand blasting, drilling, and construction) and male were involved more in occupational related exposure. In present study 56% study population (23 male, 5 female) were belonged to stone mine and related works. So majority of subjects suffered from occupational ILD (silicosis) and male were involved more. Other study done by Jindal et al[10], observed similar dominance of occupational ILD in half of patients (46.62%) and history of dust exposure. Majority of patients (70%) were not current smoker in study population. These findings were consistent with Kassim Mohammad Sultan et al[8] (2012) study which showed non smoker 71.4% patients.

Commonest presenting symptoms were dyspnea (90%) & dry cough (80%). Similar observations also reported by U.Maheshwari et al[11] (2004) in which breathlessness (98.6%) and dry cough (92.1%) were the most common presenting symptoms. Constitutional symptoms like fever, malaise, generalised weakness in 70% and chest pain (44%) respectively which was more in occupational ILD (Silicosis). Other study done by Kassim et al[8] (2012) also showed similar observation. H S Subhash et al[12] (2004) also observed similar clinical features. Digital clubbing was in 11/50 (22%), which is less than other study done by Yadav et al[9] noted digital clubbing in a total of 41% patients. Radiologically, Majority of cases (52%) had diffuse involvement on chest X rays followed by lower zone involvement in 26% cases. Among all, 70% cases had reticular/or nodular infiltrates & 22% cases showed progressive massive fibrosis (PMF). In our study majority of cases were diagnosed as occupational ILD like silicosis, so majority of cases under study radiologically presented with diffuse involvement (52%) with nodular infiltrates (44%) and PMF (22%). Chest X rays were diagnostic for most of occupational diseases and military tuberculosis. Radiological findings observed by U. Maheshwari et al[10] (2004) were cosistant with present study which included reticular 26(32.8%) & reticulonodular shadows in 45(59.2%) and hilar enlargement in four (5.3%) patients. Other study[8] observed that chest-X rays findings in 24(85.7%) patients had mainly lower zone involvement and 18 (64.3%) patients had reticular infiltrate because more IIP cases and findings are not consistent with present study.

Unconfirmed 24 cases were further evaluated with HRCT thorax for confirmation of diagnosis. 54% cases had basal and subpleural involvement and 41.6% with diffuse involvement on HRCT. Among 24 cases, 45.8% cases had reticular infiltrates, 41.6% had GGO, 37.5% had honey combing & 11/24 (45.8%) with mediastinal lymphadenopathy. Usual interstitial pneumonias (UIP) pattern were present in 6 cases. These findings were inconsistent with study done by Kassim Mohammad Sultan et al[7] (2012) and observed basal infiltrate in 20 (71.4%), subpleural involvement in 11(39.3%) & mediastinal lymphnode in 10.7%. It is possibly due to different etiological pattern of ILD in present study. Final etiological spectrum of study population were grouped as silicosis- 25, idiopathic interstitial pneumonia (IPF) 6, miliary tuberculosis 9, systemic sclerosis (SSc) 5, asbestosis 3 and hypersensitivity pneumonitis (HP) 2 cases respectively. Our hospital is situated in hilly area of the Aravali mountain ranges in the west of India. Most common occupation of the people from there were stone mine and related works, so occupational ILD was more prevalent in present study.

Conclusion

The interstitial lung diseases are a clinically challenging and diverse group of over 150 disorders characterized by varying degrees of fibrosis and inflammation of the lung interstitium. It is now widely accepted that all clinical, radiological, and when available, histopathological data should be integrated into the final diagnosis. Spectrum of interstitial lung disease is depends on demographic profile and leading occupational exposure of defined area. Definite occupational exposure related ILDs diagnosis can be made easily on the basis of strong history of exposure and chest skiagram with symptomatology. Only few patients need further level of investigations like HRCT, Serology and lung biopsy.

Table No.1 -Age and Sex distribution

Age Groups	**Male**	**Female**	**Total**	
Up to 20	1	0	1	2%
21-40	13	7	20	40%
41-60	18	3	21	42%
>60	7	1	8	16%
Total	**39**	**11**	**50**	**100%**

Table No. 2: Occupations of Study Population

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Stone Mines	15	30%	3	6%	18	36%
Labourer	8	16%	2	4%	10	20%
Farmer	7	14%	0	00	7	14%
Household work	4	8%	4	8%	8	16%
Others	5	10%	2	4%	7	14%
Total	39		11		50	

Table No.3: Smoking status

Smoking status	No. Of cases	%
Smoker	15	30%
Non-smoker	8	16%
Ex smoker	27	54%
Total	50	100%

Table No. 4: Symptomatology

Clinical features	No.	%
Dyspnoea	45	90%
Cough	40	80%
Chest pain	22	44%
Constitutional	35	70%

Table No. 5: Duration of Illness

Duration	No. of patient	Percentage
1 year	17	34%
1 – 3 years	15	30%
>3 years	18	36%
Total	50	100%

Table No. 7: General physical examination (GPE)

Feature	No.	Percentage
Tachypnea (>18 bpm)	33	66%
Hypoxia (SpO2 <90%)	14	28%
Clubbing	11	22%
JVP elevated	10	20%
Pedal oedema	5	10%

Table No 8: Radiological (chest X-Ray) involvement

Chest X ray findings	No of cases	Percentage
Normal	3	6%
Lower zone infiltrates	13	26%
Diffuse infiltrate	26	52%
Reticular/ Nodular infiltrate	35	70%

PMF infiltrate	10	20%
GGO	4	8%

Table No 9: HRCT findings

CT finding	No of cases	Percentage
Basal infilterate	13/24	54%
Sub pleural involvement	13/24	54%
Diffuse lung involvement	10/24	41.6%
Honey combing	9/24	37.5%
Reticular infilterate	11/24	45.8%
Ground glass appearance	10/24	41.6%
Mediastinal LN	11/24	45.8%
UIP Pattern	3	12%
NSIP	3	

TABLE NO 10: Spectrum of ILD of the study population

Diagnosis	No. Of patient	Percentage
Silicosis	25	50%
Asbestosis	3	6%
IIP	6	12%
HSP	2	4%
Miliary TB	9	18%
SSc	5	10%
Total	50	100%

SSc = systemic sclerosis, IIP = Idiopathic interstitial pneumonia, HSP = Hypersensitivity pneumonia

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