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Clinicoradiological Profile of Patients with Diffuse Parenchymal Lung Disease.

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ABSTRACT

Background: The profile of diffuse parenchymal lung disease (DPLD) has mainly been reported from the developed countries; the prevalence and outcome of DPLD is not studied well across India. The aim of this study is to describe the clinical radiological spectrum of various DPLDs from a tertiary care centre of a developing country. **Methods:** An observational cross-sectional study was carried out in a single tertiary care center in northern India which included 50 consecutive subjects (age >12 years) who had diffuse parenchymal lung diseases. In this study, the clinical, radiological and histological data subjects was collected. **Results:** Out of the total 50 subjects, mean age was 49.04 years with females constituting 58% of the total. Most common symptoms were gradually progressing dyspnoea (100%) followed by dry cough (76%). The commonest finding on chest radiograph in our series was reticular pattern (78%).The commonest pattern on high-resolution computed tomography was traction bronchiectasis (56%), followed by honeycombing (50%), septal thickening (46%).The commonest cause of DPLD in study was Idiopathic Pulmonary Fibrosis (38) %, followed by connective tissue – interstitial lung disease (CTD-ILD)(26%) and NSIP(12%). Smoking was one of the major risk factor associated with IPF, and 52.6% of patients with IPF were smokers (P<0.001). **Conclusion:** IPF (38%) was the commonest DPLD seen followed by CTD- ILD and NSIP at a tertiary center in northern India similar to the spectrum reported from developed countries. More studies are required from developing countries to ascertain the spectrum of DPLDs in different geographic

Keywords: Diffuse Parenchymal Lung Disease, Idiopathic Pulmonary Fibrosis, connective tissue – interstitial lung disease (CTD-ILD).

INTRODUCTION

Diffuse parenchymal lung disease (DPLD) refers to a large group of acute and chronic pulmonary diseases characterized by damage to the lung parenchyma, with varying patterns of fibrosis and/or inflammation.[1,2] These diseases also frequently affect the airspaces, peripheral airways, vasculature, and corresponding epithelial and endothelial surfaces even though the pulmonary interstitium (i.e. The space between the epithelial and basement membranes) is the primary site of the parenchymal damage establishing an accurate diagnosis of DPLD can be challenging for clinicians as these comprises of a heterogeneous group of more than one hundred distinct lung disorders that tend to be grouped together because they share clinical, radiographic, and pathologic features.[3,4] The presenting complaints of patients with DPLD includes progressive dypnoea, exercise intolerance and a pervasive dry cough. Fine crepitations may be appreciated on chest auscultation. Signs of pulmonary hypertension and right heart failure may also be present, mainly in the advanced cases. Oxygen desaturation commonly occurs during exertion and is associated with worse prognosis.[5,6] The process of sachieving a multidisciplinary diagnosis in a patient with idiopathic interstitial pneumonia (IIP) is dynamic and requires a close communication between clinician, radiologist, and when appropriate, pathologist.[7] The prerequisites for multidisciplinary diagnosis includes clinical data (presentation, exposures, smoking status, associated diseases, lung function, laboratory findings) and radiologic findings. Surgical lung biopsy carries an inherent risk of morbidity and mortality; hence only a fraction of patients are deemed suitable.[8]. Over the past decade, DPLDs have been reclassified in comprehensive international consensus

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statements.[1,9-11] According to latest guidelines, these can be broadly classified into major Idiopathic Interstitial Pneumonias (Idiopathic Pulmonary Fibrosis, Idiopathic Nonspecific Interstitial Pneumonia, Respiratory Bronchiolitis–Interstitial Lung Disease, Desquamative Interstitial Pneumonia., Cryptogenic Organizing Pneumonia, Acute Interstitial Pneumonia); Rare Idiopathic Interstitial Pneumonias (Idiopathic Lymphoid Interstitial Pneumonia, Idiopathic Pleuroparenchymal Fibroelastosis); Unclassifiable Idiopathic Interstitial Pneumonias.[9]

Because limited set of history and physical clues are seen, chest imaging studies especially HRCT are used for the initial clinical evaluation of the patient with DPLD. Radiological investigations are important for further management of the patient.

Since DPLD consists of heterogenous group of disorders with different etiology and treatment, the following study was conducted to make clinicoradiological profile of the DPLD patients in a tertiary care hospital of northern India.

MATERIALS AND METHODS

This study was carried out in the department of chest and tuberculosis, Government Medical College, Amritsar. This was an observational cross-sectional study which included 50 patients who had diffuse parenchymal lung diseases and came to outpatient department or were admitted in wards.

This study was conducted after approval from the institutional ethics committee, Govt. Medical College, Amritsar. Each patient was considered for the study after taking an informed consent.

Inclusion criteria

1. Patients with age 12 years and above, either sex having chief complaints of dyspnea & cough and bilateral diffuse shadows on chest radiography.

Exclusion criteria

1. Patients not consenting for the study.
2. Diffuse parenchymal lung diseases cases diagnosed to have tuberculosis.
3. Patients with cardiac disorders.
4. Patients with very severe hypoxemia.

A pre-structured proforma was filled in those cases which were included in the study. Their personal data including age, sex, occupation, address, a detailed occupational history were sought out. Their symptoms, past and personal history with special focus on smoking were noted down. This was followed by their physical examination, investigations including Chest x-rays, SpO2 with pulse oximetery.Spirometeric analysis,[6] min walk test were done. The data was documented, tabulated and analyzed by using unpaired t-test and Chi-square test wherever applicable.

RESULTS

Fifty patients diagnosed as DPLD based on clinical, radiological and PFT findings attending OPD and/or admitted in Chest and TB hospital, Amritsar were included in the study. They were studied according to their demographic features, clinical characteristics, and Radiological findings and the following observations were made which have been depicted in tabular form.

Table 1: Average age at Presentation in DPLD Patients

Parameter	Male (Mean ±SD) (n=21)	Female (Mean ±SD) (n=29)	P-value
Age	56.95±14.77	52.90±15.39	0.354

Average age of presentation in males came out to be 56.95±14.77 years and in females it was 52.90±15.39 years. The p value turned out to be 0.354 which is statistically insignificant.

In the present study, main complaints observed were breathlessness, cough, expectoration, fever, joint pains and thickening of skin. Breathlessness being the most common complaint was seen in all the 50 patients (100%), followed by cough in 38 patients (76%).

Table 2: Presenting Complaints of Patients with DPLD

	Breathlessness	Cough	Expectoration	Fever	Joint pains	Thickening of Skin
Metastasis	1	1	1	1	1	0
Pneumoconiosis	1	0	1	0	0	0
ABPA	1	1	1	0	0	0
HP	2	2	1	0	0	0
COP	3	2	1	0	0	0
Sarcoidosis	4	3	1	0	0	0
NSIP	6	5	1	0	0	0
CTD - ILD	13	7	1	0	7	6
IPF	19	17	3	2	1	0
Total	50	38	11	3	9	6

Table 3: Radiological Profile of DPLD Patients

Radiology	IPF	CTD 0 ILD	NSIP	Sarcoidosis	COP	HP	ABPA	Pneumoconiosis	Metastasis
Chest X-ray Findings									
Features									

Reticular Pattern	19	10	6	0	0	0	0	0	0
Reticulonodular	0	2	0	0	0	2	0	0	0
Nodular Pattern	0	1	0	3	0	0	1	1	1
Consolidation	0	0	0	2	3	0	0	0	0
Mediastinal Widening	0	0	0	3	0	0	0	0	0
HRCT Pattern									
Honeycombing	19	6	0	0	0	0	0	0	0
Ground Glass Opacity	0	5	6	0	3	2	0	0	0
Septal Thickening	19	8	0	0	0	0	0	0	0
Traction Bronchiectasis	19	9	2	0	0	0	0	0	0
Lymphadenopathy	0	0	0	4	0	0	0	0	0
Consolidation	0	0	0	1	3	0	0	0	0
Nodules	0	1	0	4	0	2	1	1	1

Most common chest X-ray feature in our study group was reticular pattern which was present in 39 patients (78%), followed by nodular pattern in 6 patients (12%) and consolidation in 5 patients (10%). Mediastinal widening and Reticulonodular pattern was seen in 4 patients (8%) each.

The most common HRCT pattern in our study group was Traction Bronchiectasis seen in 28 cases(56%), followed by Honeycombing seen in 25 cases(50%), Septal Thickening in 23 cases(46%) and GGO in 15 cases (30%). Other features seen were Lymphadenopathy in 4 cases (8%), Consolidation in 4 cases (8%), and Nodules in 11 cases (22%).

Table 4: Aetiological Distribution of Patients with DPLD

Aetiological Distribution	No of cases	Percentage
Metastasis	1	2
Pneumoconiosis	1	2
ABPA	1	2
COP	3	6
HP	2	4
Sarcoidosis	4	8
NSIP	6	12
CTD - ILD	13	26
IPF	19	38
Total	50	100

Of the study group of 50 patients with diffuse parenchymal lung disease, the most common cause of DPLD was IPF with 19 patients forming 38 % of the total. The second most common cause was connective tissue – interstitial lung disease (CTD-ILD) with 13 patients (26%) followed by NSIP with 6 patients (12%).

DISCUSSION

Diffuse parenchymal lung diseases are heterogeneous group of diseases involving lung interstitium. They have features in common like similarities of symptoms, comparable radiographic appearances, consistent alterations in the pulmonary physiology and typical histological features. Reports from western literature show an increase in the prevalence and incidence of DPLD in recent decades. The present study was conducted in fifty cases of DPLD attending OPD and/or admitted in chest and TB hospital, Amritsar so as to to evaluate the clinical spectrum and radiological findings of DPLD which can aid in their diagnosis and early management.

In the present study, the mean age was 49.04 years. The minimum age was 19 years and maximum age was 81 years. Majority of the patients (80%) were above the age of 40 years. Average age of presentation in males came out to be 56.95±14.77 years and in females it was 52.90±15.39 years (p =0 .354 ; statistically insignificant) i.e. there was no significant difference between male and female in term of age.

In our study, the male to female ratio is 1:1.38. Out of total 50 cases, 58% were females and 42% were males. Although, IPF was more common in males (58%), whereas CTD-ILD was more common in females (92.3%)

Out of total 50 patients in our study, the common symptoms at presentation observed were breathlessness which was seen in all the 50 patients (100%), followed by cough (76%), expectoration (22%), joint pains (18%). Fever and thickening of skin were complained by 6% and 12% respectively. One patient with IPF. 74% of our patients in the study were nonsmokers and 26% were smokers. All smokers were of male gender.

Of the study group of 50 patients with diffuse parenchymal lung disease, the most common cause of DPLD was IPF (38) % of the total. The second most common cause was connective tissue – interstitial lung disease (CTD-ILD) (26%) followed by NSIP (12%).

In conclusion, it was seen in our study that the clinical spectrum and radiological findings of diffuse parenchymal lung diseases (DPLD) at a tertiary centre in northern India was found to be comparable to the previously reported experience from India and even the developed countries of Europe and Northern America. Further studies are required from different regions of the world, more so from developing countries like India so that the global burden of DPLDs can be defined accurately so that diagnosis of diffuse parenchymal lung diseases can be done at an earlier stage so that effective treatment

can be done. Future studies should follow stringent criteria for diagnosis of DPLDs. Multidisciplinary discussion including clinical and radiological profiles should be done for diagnosis.

CONCLUSION

To conclude, the picture of diffuse parenchymal lung disease revealed in our study is similar to some of the retrospective studies from India as well as the world. IPF seems to be the most commonly diagnosed DPLD in our study also. Both the burden of tuberculosis and its role as a 'mimicker' of DPLD caused a significant delay in the diagnosis of the same. Early diagnosis of DPLD is of paramount importance to prevent/delay progression to irreversible damage especially in treatment responsive diseases like CTD-ILD, sarcoidosis, COP etc and most of these can be easily diagnosed on the basis of the clinical and the radiological features. Larger prospective epidemiological studies, increased education and awareness is required for a better understanding of the spectrum of diffuse parenchymal lung disorders and their therapeutic options.

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