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ORIGINAL RESEARCH

Clinico-radiological Profile of Patients with Diffuse Parenchymal Lung Disease (DPLD) attending a Tertiary Care Hospital of Eastern India – An Epidemiological Study

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ABSTRACT

Background: DPLD is a heterogeneous group of acute and chronic bilateral lung diseases of known and unknown causes. Studies on the epidemiology of DPLD are few in West Bengal, especially in areas outside Kolkata. This study was undertaken in a district Medical College in West Bengal. The aim of this study was to find out the distribution pattern of DPLD across socio-demographic and clinico-radiological variables.**-Methods:** This was across-sectional descriptive study of consecutive diagnosed DPLD patients (>18 years) in the Department of Pulmonary Medicine of Burdwan Medical College, conducted over one year. **Result:** Among a total of 58 patients, the majority of the patients were female (72%), non-smoker (all female) and 63% belong to the age group 40-60 years. Majority of patients were from rural area (82%), belonging to lower and lower middle class (65.5%) (Updated BG Prasad Scale). Cough (100%) was the most common symptom, followed by breathlessness (98%). Most common comorbidity was hypertension (26%) followed by diabetes mellitus (20%). Common CT patterns were UIP (67%), NSIP (21%), Nodular (12%). Fifty-four percent patients showed positive connective tissue disease markers.**-Conclusion:** Middle-aged, rural, non-smoker females were the predominant groups of DPLD patients in this study. The commonest pattern is UIP, probably due to CTD-DPLD.

Keywords: Diffuse Parenchymal Lung Diseases, Usual Interstitial Pneumonia, Sarcoidosis, Idiopathic Pulmonary Fibrosis

INTRODUCTION

Diffuse parenchymal lung disease (DPLD) is defined as a heterogeneous group of non-infectious and non-malignant progressive condition which involves pulmonary parenchyma diffusely distal to terminal bronchioles. It is usually bilateral and may be acute, sub-acute and chronic in onset. It may be caused by or associated with some known disease, but in most times its etiology is unknown. Its clinical diagnosis and etiological confirmation is challenging in India as our country is in endemic zone of tuberculosis. Another challenge in diagnosis is chronic heart failure which may be difficult to distinguish from DPLD with limited investigations. There are very few studies on the disease burden and the demography of the patients with DPLD, especially in India and results of these studies differ substantially.[1-4] Prevalence, clinico-radiological profiles, histopathology, etiology, progression and prognosis of DPLD are different in different studies due to difference in study design, study population, methodology including data collection and data analysis in these studies.[5-8]Demographic profiles of the patients included in these studies are different as per difference in the geographical location of the studies.[9,10]Some studies in India have found that idiopathic pulmonary fibrosis (IPF) is the most common. In contrast, others have concluded that connective tissue disease-associated DPLD (CTD-DPLD) is more common than

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IPF.[11,12] As per our knowledge, there is no study on the demography and clinico-radiological profiles of patients with DPLD residing in semi-urban and rural areas of Eastern India. Here we tried to show the demography as well as clinico-radiological profiles of the patients with DPLD in Eastern India attending a tertiary care hospital which is catering mainly the semi-urban and rural population.

METHODS

After taking ethical clearance from institutional ethics committee, a one-year, cross sectional, descriptive study was started at in-patient & out-patient department of Respiratory Medicine of Burdwan Medical College. The study included patients of equal to or more than 18 years of age of both sexes presenting with clinico-radiological symptoms and signs suggestive of diffuse parenchymal lung disease (DPLD) who gave the required written consents for participation in the study. Inclusion criteria are: 1.) = or > 18 years of age, 2.) Presence of respiratory symptoms and signs suggestive of DPLD (such as shortness of breath on exertion, dry cough or bibasal crackles), 3.) Presence of radiological abnormalities in Chest X-ray (CXR) or High-Resolution Computed Tomography (HRCT) of Thorax (such as bilateral involvement, loss of lung volumes, interstitial opacities – reticular, cystic or nodular and their combinations, fuzzy cardiac or diaphragmatic borders etc.). Exclusion criteria are: 1.) Extremely ill or breathless patients, 2.) < 18 years of age, 3.) Pregnancy & Lactation, 4.) Recent thoracic or upper abdominal surgery or occurrence of Acute Myocardial Infarction (AMI) or unstable angina, 5.) Presence of any infectious or malignant diseases. Detailed history was taken and relevant clinical examination was done in every patient. Among the history, occupation, socioeconomic status (by modified Updated B.G.Prasad scale), residence, smoking status and symptoms suggestive of connective tissue diseases (CTDs) were particularly enquired. Spirometry test, CXR – P.A. view, HRCT thorax and blood test for CTD profile such as Rheumatoid (RA) factor, Anti-CCP antibody, Anti-nuclear antibody (ANA) (Hep 2), Anti-scl-70 antibody, Anti-ds-DNA antibody & Anti-U1RNP antibody were done in every patient. Few other tests were done to establish the etiology in selected patients as per requirements. After considering the inclusion & exclusion criteria, all total 58 patients were selected for this observational study. All data were collected in a single visitand were analysed by appropriate descriptive statistical methods.

RESULTS

Out of total 58 patients, most of the patients (63%) belonged to the age group of 40 – 60 years, followed by 27% in the age group of less than 40 years and 10% in the age group of above 60 years. Hence, in this series, DPLD mainly affected older adults. Majority of the patients in this study were female (42 patients out of 58, 72%), rest were male (28%). So, in this study, females were more commonly affected by DPLD. 82% patients were from rural Bengal and rest 18% from urban population. In our study, most of the patients were housewives (50%), followed by farmers (24%), skilled labours (14%) and unskilled labours (12%). Majority (65.5%) of the patients belonged to lower socioeconomic class as per updated B.G. Prasad Scale. 13 (22.4%) patients belonged to middle class, while 7 (12.1%) patients belonged to lower middle class. Among the 58 patients enrolled in the study, 42 (72%) were non-smokers and rest 16 (18%) were smokers. 10 (17%) smokers consumed more than 10-pack years whereas 6 (10%) consumed less than 10-pack years. In our study, all (100%) patients had cough, predominantly dry cough, 57 patients (98%) had shortness of breath, 11 patients (18%) had chest pain, mostly pleuritic and only 7 patients (12%) had fever as presenting symptoms. Our study showed that 55% patients had comorbidities – 15 (26%) patients had hypertension which was the most common comorbidity, 12 (20%) patients had diabetes mellitus and in only 5 (8%) patients, obstructive airway diseases like asthma or chronic obstructive pulmonary disease (COPD) were detected. In our study, majority of the patients (51%) showed mixed pattern on spirometric evaluation with marked decrease in both FVC and FEV1/FVC ratio, 36% had restrictive defect and only 12% had obstructive defect in spirometry. Clinico-radiological analysis of our patients showed that 39(67%) patients had usual interstitial pneumonia (UIP), 12 (21%) patients had non-specific interstitial pneumonia (NSIP), 7 (12%) had nodular pattern in HRCT of thorax. (Table 1.) On investigating further, etiologically, it was found that 31 (54%) had CTD-DPLD, 19 (34%) had IPF, 3 (5%) had Chronic HP, 2 (4%) Sarcoidosis and 1 (3%) had LAM. (Table 2.)

Table 1: Clinico-Radiological Profile of DPLD patients

HRCT Patterns of DPLD	Number of Patients
UIP	39 (67%)
NSIP	12 (21%)
NODULAR	7 (12%)

Table 2: Etiological profile of DPLD patients

Etiological Basis of DPLD	Number of patients
IPF	19 (34%)
CTD DPLD	31 (54%)
Chronic HP	3 (5%)
Sarcoidosis	2 (4%)
LAM	1 (3%)

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DISCUSSION

In the study by Esam H. Alhamad et.al[13], the mean age was 55.4 ± 14.9 years which is similar in our study. In the study by S. Dhooria et.al[14], mean age is 50.6 years which is also similar to our study.

In the study by Esam H. Alhamad et.al[13], there was a slight predominance of females (202; 61.2%), and the male-to-female ratio was 1:1.37 which is similar to our study. However, in the study by Gagiya Ashok K et. Al[15], 66.5% male patients, while 33.5% were female patients in contrast to our study where predominantly female patients were diagnosed with DPLD.

In our study, most of the patients are non-smokers 33(57%), while 25 (43%) are smokers. In the study by Yadav H et.al[16], proportion of smokers ranged 12.5% in group I to 48.6% in group II, majority being non-smokers similar to our study.

Similar to our study, in the study by Esam H. Alhamad et.al[13], dyspnea and cough were the most common respiratory symptom in all groups. In the study by S. Dhooria et. Al[14], cough was the most common symptom (86.1%) followed by breathlessness (76.1%), weight loss (30.9%), anorexia (24.2%), joint pains (23.9%), and fatigue (17.9%) similar to our study. In the study by Gagiya Ashok K et.al[15], most of patients presented with breathlessness on exertion (100%) and cough was usually dry (43.29%) in nature. Dyspnoea in interstitial lung diseases is believed to be due to altered mechanics of breathing involving increased work of ventilation. Cough may be due to that cough receptors in the lung are sensitive not only to mucosal and pleural stimuli, but also changes in the mechanism of lung expansion. Anorexia and weight loss was found in 50% and 33.33% patients respectively. It may be due to chronic hypoxia and its effect on metabolism. Fever was present in a small number (13.32%) of patients. It may be due to associated infection.

In the study by Gagiya Ashok K et. Al[15], in most of patients FVC% of predicted was decreased and in 60% cases below 60% of predicted FVC. FEV1/ FVC ratio was normal and or increased in all cases except 1 case. This is slightly different from our study where both FVC and FEV1/FVC ratio decreased. Decrease in FVC was due to more stiffness of lungs due to fibrosis and resistance to inflation.

In the study by Esam H. Alhamad et.al[13], the most frequent disease was connective tissue disease (CTD)-associated DPLD (34.8%), followed by idiopathic pulmonary fibrosis (IPF) (23.3%), sarcoidosis (20%), and hypersensitivity pneumonitis (6.3%), similar to our study. In the study by S.Kundu et.al[17], IPF was the most common entity (38.04%) among DPLD cases followed by CTD–DPLD (31.5%), hypersensitivity pneumonitis (10.9%), sarcoidosis (5.4%), and silicosis (5.4%). However, in the study by S. Dhooria et.al[14], Sarcoidosis was the most common (42.2%) DPLD, followed by IPF (21.2%). CTD-DPLDs, HP, and non-IPF DPLDs were diagnosed in 12.7%, 10.7%, and 9.2% of the subjects, respectively. In the study by Yadav H et.al[16], Group I (Granulomatous) sarcoidosis contained 16 patients (21.3%). Group II (IIP) COP, IPF, NSIP contained 37 patients (49.3%). Group III (Known, BOOP, Drug induced, Silicosis, SLE etc) contained 15 patients, Group IV (others EP, HP, LAM, LCH) contains 7 patients (9.3%). Hence it can be seen there is quite a large variation in types of DPLDs in all studies, showing that larger sample is required and the disease has a variable distribution.

CONCLUSION

We can conclude from our present study that DPLD is not a very uncommon disease in India particularly the Eastern region of India. We have the following assertions from our study:

The present study summarizes the distribution pattern of DPLD across sociodemographic profiles where it can be seen predominantly among non-smokers, female gender, among age group 40-60, mostly from rural areas belonging to lower socioeconomic status.

Most common HRCT DPLD pattern in our study is Usual Interstitial Pneumonia (UIP), Non Specific Interstitial Pneumonia (NSIP). The most common cause of DPLD in our study is CTD-DPLD followed by IPF.

This goes to show that there are large geographic variations in DPLD across various parts of India when compared with similar literature. Hence, while ecountering a case of suspected DPLD it is important to keep in mind the regional epidemiology while suspecting a definite cause of DPLD for early detection and management.

We believe that a future prospective global multicenter epidemiological study is needed to establish the true incidence of various DPLDs among different regions of our country. This will improve our understanding of the natural history of the disease and will aid in identifying appropriate targets for therapeutic interventions.

REFERENCES

1. Castelino FV, Varga J. Interstitial lung disease in connective tissue diseases: evolving concepts of pathogenesis and management. Arthritis Res Ther. 2010;12(4):213.
2. Raghu G, Weycker D, Edelsberg J, Bradford WZ, Oster G. Incidence and prevalence of idiopathic pulmonary fibrosis. Am J Respir Crit Care Med 2006;174:810–816.
3. Raghu G, Chen SY, Yeh WS, Maroni B, Li Q, Lee YC, Collard HR. Idiopathic pulmonary fibrosis in US Medicare beneficiaries aged 65 and older: incidence, prevalence, and survival, 2001-11. Lancet Respir Med 2014;2:566–572.
4. Lopez-Campos JL, Rodriguez-Becerra E. Neumsor Task Group. Registry of Interstitial Lung Diseases. Incidence

DOI: 10.69605/ijlbpr_13.7.2024.68

of interstitial lung diseases in the south of Spain 1998-2000: the RENIA study. Eur J Epidemiol 2004;19:7.
5. Coultas DB, Zumwalt RE, Black WC, Sobonya RE. The epidemiology of interstitial lung diseases. Am J Respir Crit Care Med 1994;150:967–972.
6. Behr J, Hoeper MM, Kreuter M, Klotsche J, Wirtz H, Pittrow D. Investigating significant health trends in idiopathic pulmonary fibrosis (INSIGHTS-IPF): rationale, aims and design of a nationwide prospective registry. BMJ Open Respir Res 2014;1:e000010.
7. Samet JM, Coultas D, Raghu G. Idiopathic pulmonary fibrosis: tracking the true occurrence is challenging. Eur Respir J 2015;46:604–606.
8. Tzilas V, Bouros D. Inherent weaknesses of the current ICD coding system regarding idiopathic pulmonary fibrosis. Eur Respir J 2015;45:1194–1196.
9. American Thoracic Society/European Respiratory Society international multidisciplinary consensus classification of the idiopathic interstitial pneumonias. Am J Respir Crit Care Med 2002;165:28.
10. Travis WD, Costabel U, Hansell DM, King TE Jr, Lynch DA, Nicholson AG, Ryerson CJ, Ryu JH, Selman M, Wells AU, et al.; ATS/ERS Committee on Idiopathic Interstitial Pneumonias. An official American Thoracic Society/European Respiratory Society statement: update of the international multidisciplinary classification of the idiopathic interstitial pneumonias. Am J Respir Crit Care Med 2013;188:733–748.
11. Raghu G, Collard HR, Egan JJ, Martinez FJ, Behr J, Brown KK, Colby TV, Cordier JF, Flaherty KR, Lasky JA, et al.; ATS/ERS/JRS/ALAT Committee on Idiopathic Pulmonary Fibrosis. An official ATS/ERS/JRS/ALAT statement: idiopathic pulmonary fibrosis: evidence-based guidelines for diagnosis and management. Am J Respir Crit Care Med 2011;183:788–824.
12. Sahin H, Brown KK, Curran-Everett D, Hale V, Cool CD, Vourlekis JS, Lynch DA. Chronic hypersensitivity pneumonitis: CT features comparison with pathologic evidence of fibrosis and survival. Radiology 2007;244:591–598.
13. Alhamad EH. Interstitial lung diseases in Saudi Arabia: A single-center study. Ann Thorac Med 2013;8:33-7.
14. Dhooria S, Agarwal R, Sehgal IS, Prasad KT, Garg M, Bal A, et al. (2018) Spectrum of interstitial lung diseases at atertiary center in a developing country: A study of 803 subjects. PLoS ONE 13(2): e0191938.
15. GagiyaAK, Suthar HN, Bhagat GR. Clinical profile of interstitial lung diseases cases. Natl J Med Res. 2012; 2(1): 2-4.
16. Yadav H, Srivastava R. Clinicoradiological and demographic pattern in diffuse parenchymal lung diseases: An observational study. Int J Med Res Rev 2018;6(06):308-314.
17. Kundu S, Mitra S, Ganguly J, Mukherjee S, Ray S, Mitra R. Spectrum of diffuse parenchymal lung diseases with special reference to idiopathic pulmonary fibrosis and connective tissue disease: An eastern India experience. Lung India 2014;31:354-60.