Distribution and varied manifestations of Interstitial Lung Disease : An Observational Cross-sectional Study

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ABSTRACT

Introduction: Interstitial lung disease (ILD) is a group of heterogenous lung disease caused by inflammation and fibrosis of alveolar walls**.**Due to variety of clinical presentations, lack of awareness, misdiagnosis and under-reporting, it is difficult to estimate the true prevalence of ILD in our country. But as the complexity of lung disease is increasing after covid pandemic now it is important to detect true prevalence.

Patients & Method: This is cross-sectional study where the clinical history, lab findings data of the subjects were assessed retrospectively during period from 2019 to 2021. All data were collected from past medical records and the study was approved by Institutional ethics Committee, IMS & SUM Hospital,BBSR.

Result & Discussion: IPF was the most common ILD followed by RA-ILD and Dyspnea is the most common symptom.Female prevalence rate is more compared to male. In HRCT finding UIP pattern is common followed by NSIP pattern.

Conclusion :ILD is a progressive, irreversible and heterogenous disease, early detection and prevention holds utmost importancealso there were pre-existing or newly developed co-morbidities that hampered the course of the disease. Our study data may aid in early and prompt diagnosis based on the prevalence data.

Keywords: MCTD-ILD, pulmonary fibrosis, pneumonia, idiopathic PF, Dyspnea, ANCA

Introduction

Interstitial lung diseases (ILD) are a group of heterogeneous disorders that cause inflammation and subsequently, fibrosis of the alveolar walls(1).Interstitium refers to the space between the basement membrane of the alveolar lining epithelium and the vascular endothelium(2). Hence, an inflammation of the same results in profoundfibrosis of the alveolar wall as well as the capillaries. This kind of alveolar scarring is progressive in nature(3). ILD is an umbrella term that encompasses hundreds of lung parenchymal disorders grouped together owing to their similar clinical, radiological and pathological features(1).

The etiology of the ILDs may be known or unknown i.e. idiopathic. Some of the major idiopathic ILDs include Idiopathic Pulmonary Fibrosis (IPF), Idiopathic Non-Specific Interstitial pneumonia (INSIP), Acute Interstitial Pneumonia (AIP) and Cryptogenic Organising Pneumonia (COP)(4). When the cause is known, it may be either exposure related (occupational/ drug induced/ environmental) or auto-immune related(5). Occupational lung diseases causing ILDs include asbestosis, sarcoidosis, silicosis etc.Auto-immune causes may include rheumatoid arthritis (RA-ILD), systemic sclerosis (SSC-ILD), mixed connective tissue disease

(MCTD-ILD), polymyosistis/ dermatomyositis (PM/DM-ILD) among many others.

Due to the heterogeneity and diversity of the ILDs, diagnosis becomes a tedious job. And more often than not, they are misdiagnosed[6]. Most of the ILDs have no cause or cure in particular[7].The lung damage from ILDs is often irreversible[8] and with time worsens the patient's ability to breathe.Thus it is important to know the broader picture of the disease for prompt diagnosis and preventing the progression of the damage.

Owing to the wide spectrum of clinical presentations, lack of awareness, misdiagnosis and under-reporting, it is difficult to estimate the true prevalence of ILD in our country[7]. The present study was carried out to describe the demographic profile of patients with ILD attending a tertiary care teaching hospital in eastern Odisha and the associated risk factors, co-morbidities and clinical presentation for better understanding and apt diagnosis of the disease.

Material and Methods

The present study was a cross-sectional observational retrospective study conducted in the Department of Pulmonary Medicine, IMS and SUM Hospital, Bhubaneswar, Odisha. The study was conducted and the data was collected for a period of 2 years from 2019 to 2021.

The present study aimed to observe the patterns of ILD with the primary objective to assess the demographic profile and radiological patterns.The data included from past medical records were as follows clinical history examination.,history of smoking, exposure to industrial and organic dusts or any hypersensitivity ,Chest x-ray, high resolution computer tomography (HRCT)thorax. In HRCT, nodular pattern/ linear or reticular pattern/ cystic lesions, ground glass opacities and honey combing were looked for. Patients whose HRCT confirmed the diagnosis of ILD were included in the study.They were then classified into Usual Interstitial Pneumonia (UIP) pattern, Non-specific Interstitial Pneumonia (NSIP) pattern and others. Patients with age less than 18 yrs COPD, asthma, lower respiratory tract infections, active or history of tuberculosis or active COVID were excluded.

Routine blood tests included were CBC, serum electrolytes, LFT, RFT , blood glucose level,viral markers . Autoimmune work up included anti-nuclear antibodies (ANA titre), ANA profile,CRP,RAfactor,anti-ccp,Other tests were ANCA(Anti-Neutrophil Cytoplasmic Antibody),s.ACE,24 hr urinary calcium wherever feasible. Additionally,Spirometry, and bronchoscopy,cardiac evaluation was included wherever feasible. Diagnosis of interstititial lung disease was established on clinical history,exposure/occupation,serologicalprofile,hrct thorax pattern .

This cross-sectional study where the subjects were assessed retrospectively,was approved by Institutional Ethical Committee as Ref.no./IMS.SH/SOA/2022/406. Based on the above descriptive data, the present study aimed at obtaining the pattern and the most commonly encountered ILD at our centre.

Results

A total of 52 patients of ILD were included in the study.Idiopathic Pulmonary Fibrosis was the most common (36.5%) encountered followed by ILD associated with Rheumatoid Arthritis (21.2%) **[Table-1]**. Majorityof the patients were females (67.3%) and 32.7% were males. 28.8% of patients had a history of smoking or were current smokers.

Table-1. Baseline characteristics of the patients

	no. of patients	Age (mean±SD)	Gender M	F	h/o smoking	spo2 >95%
IPF	19 (36.5%)	67.74 ± 10.58	9	10	10	7
INSIP	5 (9.6%)	51.40 ± 9.86	0	5	0	3
HP	4 (7.7%)	50.25 ± 12.01	2	2	1	3
Vasculitis-ILD	2 (3.8%)	62.50 ± 3.54	0	2	1	0
RA-ILD	11 (21.2%)	55.27 ± 10.70	3	8	1	7
SSC-ILD	4 (7.7%)	48.00 ± 12.36	0	4	0	4
MCTD-ILD	2 (3.8%)	30.00 ± 0.00	0	2	0	0
PM/DM-ILD	1 (1.9%)	55.00 ± 0	0	1	0	0
Sarcoidosis	1 (1.9%)	38.00 ± 0	0	1	0	1
Silicosis	1 (1.9%)	40.00 ± 0	1	0	0	0
Other ILD	2 (3.8%)	58.00 ± 0	2	0	2	2
Total	52		17 (32.7%)	35 (67.3%)	15 (28.8%)	27 (52%)

Table-2. Clinical profile of the patients with ILD

	cough	dyspnea	joint pain	fever	muscle weakness	malignancy
IPF	18	19	6	5		
INSIP	5	5	1	1		1
HP	4	4	0			
Vasculitis	1	2	2	1		
RA-ILD	11	10	11	2		
SSC-ILD	4	4	2			
MCTD-ILD	2	2	2		1	
PM/DM-ILD	1	1			1	
Sarcoidosis			1		1	
Silicosis	1	1				
Other ILD	1	1		1		
Total	48 (92.3%)	49 (94.2%)	25 (48%)	10 (19.2%)	3 (5.8%)	1 (1.9%)

Cough (92.3%) and dyspnea (94.2%) were the most common clinical presentation in all types of ILDs.Among the non-pulmonary symptoms, joint pain (48%) involving both small and large joints was the most frequently encountered.Muscle weakness (5.8%) was mostly seen in ILDs associated with MCTD, Polymyositis and Dermatomyositis. **[Table-2]**

Table3. Co-morbidity profile of the patients					
	DM	HTN	cardiac disease	CKD	neurological disease
IPF	10	9	6	3	0
INSIP	1	1	1	0	1
HP	1	1	0	0	0
Vasculitis	0	1	0	2	0
RA-ILD	5	3	0	1	0
SSC-ILD	0	0	1	0	0
MCTD-ILD	0	0	0	0	0
PM/DM-ILD	0	0	0	0	0
Sarcoidosis	0	0	0	0	1
Silicosis	1	0	0	0	1
Other ILD	2	0	2	0	0
Total	19 (36.5%)	15 (28.8%)	9 (17.3%)	6 (11.5%)	3 (5.8%)

Table-3 shows all the associated co-morbidities with ILD, which contributed to hospitalisation and extension of hospital stay. Diabetes mellitus was associated in 19(36.5%),Hypertension 15(28.8%),cardiac involvement 9(17.3%),CKD in 6 (11.5%) of patients.

Table-4. Findings of Spirometry	
FVC	No. of patients (n=20)
mild restriction (60-80%)	7 (35%)
moderate restriction (40-59%)	9 (45%)
severe restriction (<40%)	4 (20%)

Table-5. HRCT patterns of the ILD patients			
	UIP	**NSIP**	**Others**
IPF	19		
INSIP		5	
HP	2		2
RA-ILD	9	2	
Vasculitis	1		1
SSC-ILD	1	3	
MCTD-ILD		2	
PM/DM-ILD			1
Sarcoidosis			1
Silicosis			1
Other ILD			2
Total	32 (61.5%)	12 (23%)	8 (15.3%)

Spirometry of 20 patients revealed moderate restriction in 45% cases and mild in 35%.
The most common HRCT pattern encountered was Usual Interstitial Pneumonia (61.5%) pattern followed by Non-specific Interstitial Pneumonia (23%) pattern. Others included progressive massivefibrosis,nodules with fibrosis.

Discussion

The present study was a cross-sectional retrospective descriptive study conducted in a tertiary care teaching hospital of eastern Odisha to find out the pattern and most common ILD in our centre. In the present study, female prevalence (67.3%) was more than the male counterpart (32.7%). Similar gender distribution was also found in a study by Vemuri et al[(1)] and Rai et al[(9)] where females were more commonly affected than males. However, male preponderance was seen in a study by Atienza-Mateo et al[(5)].

In the present study, IPF was the most common ILD followed by RA-ILD.Similar results were found in other studies like Rai et al[(9)], Traila et al[(10)].As per a study by Mahesh Babu et al titled “distribution of ILDs in a tertiary care centre of South India” the most common ILD (64.6%) was CTD ILD which is similar to our study[(1)]. As per study titled “spectrum of ILDs at a tertiary center in a developing country: a study of 803 subjects” sarcoidosis was the most common ILD (42.2%), CTD constituted 12.7%[(11)]. Results are in striking contrast to the ILD registry published by Sheetusingh et al which had HP as the most common ILD (47.3%) and CTD ILD being 13.9%[(12)].Another study “clinical profile of ILD at a tertiary care centre in India” by Deependra Kumar Rai et al found IPF as the most common ILD (24.4%) followed by CTD ILD (22.1%)[(9)].Another study titled “Retrospective Study of Interstitial Lung Disease in a Tertiary Care Centre in India” by Tiyas Sen and Zarir F. Udwadiahad IPF as most common ILD (43%) and CTD ILD being 18%[(13)].Another study titled “cardiovascular complications in patients with ILD and their correlation with 6 minute walk test and spirometry: a single centre study” put IPF and systemic sclerosis related ILD together and their combined prevalence was 23%[(14)].A study by Singh et al[(12)] had concluded that hypersensitivity pneumonitis (47.3%) was the most common new-onset ILD followed by CTD-ILD (13.9%) and IPF (13.7%).The most common CTD found in the present study was rheumatoid

arthritis (21.2%) followed by systemic sclerosis (7.7%). In a study by Catelino et al[15] systemic sclerosis was the most common CTD followed by rheumatoid arthritis.

The most frequently encountered symptom in our study was dyspnea (94.2%) followed by cough (92.3%). The study by Vemuri et al[1]had identical results.In most of the studies[16][17], shortness of breath and dry coughwere the most common symptoms. Non-pulmonary symptoms such as small and large joint pain, muscle weakness, fever were seen in ILD associated mostly with connective tissue disorders. Clinical features of CTD-ILD can range from asymptomatic to severe dyspnea. In addition to pulmonary involvement, other systems like musculoskeletal, mucocutaneous, gastrointestinal, cardiac and haematological may also be involved[18].

Co-morbidities like acute and chronic lung infections, gastro-oesophageal reflux, pulmonary hypertension, cardiovascular diseases can either pre-exist or develop any time during the course of the disease[19]. They impair of the quality of life of the patients and can lead to disease progression and death.In the present study, the co-morbidities like DM(36.5%),hypertension(28.8%),cardiac disease(17.3%),ckd(11.5%)

The most common HRCT pattern in the present study was UIP pattern (61.5%) followed by NSIP pattern (23%). These results corroborated with other studies by Rai et al[9]and Atienza-Mateo et al[5]where UIP was the predominant HRCT pattern.On the contrary, a study by Vemuri et al[1] found NSIP to be the most commonpattern observed (47.6%) followed by UIP pattern (38%).

Conclusion

IPF was the predominant ILD encountered at our centre with female preponderance. Among the CTD-ILD, RA-ILD took the lead. Most common symptom of presentation was shortness of breath and cough. There were pre-existing or newly developed co-morbidities that hampered the course of the disease. UIP pattern was the most seen pattern on HRCT.

For the reason that ILD is a progressive, irreversible and heterogenous disease, early detection and prevention holds utmost importance. This highlights the crucial role of proper history taking and clinical evaluation and confirming the diagnosis with appropriate radiological findings.

Further scope

If we analyse the results, all such studies have been done in individual centers in India, from various geographical areas. Their results are quite varied and not at par with the ILD registry of India which included 19 participating cities across India with 27 centers. Rural population and many other major cities were not included in the study. So, ILD registry might not be representative of the entire Indian population and thereby reflects the need for further research and awareness regarding the geographical and environmental differences rather than putting all ILDs in the framework of limited Indian studies that we have until now. Individual centers with scope of MDDs should be encouraged to analyse their own data to help in knowing the disease better and hence to approach ILD keeping geographical and environmental differences in mind.

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