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Prevalence of Interstitial Lung Disease presented to Pulmonology department at Lady Reading Hospital Peshawar; Unrevealing the Burden

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A B S T R A C T

Background: Interstitial lung disease is a disabling pulmonary morbidity that results in irreversible damage to the lung parenchyma leading to eventual dependence on long term oxygen therapy (LTOT). This condition has a wide variety of subtypes with their prevalence varying across different geographical regions of the world.

Objective: To determine prevalence of interstitial lung disease and its subtypes in patients presenting to pulmonology department at Lady Reading Hospital (LRH).

Methodology: This retrospective cross-sectional study was conducted at Pulmonology Department, LRH from January to December 2023, in which 303 patients with chronic cough and shortness of breath with restrictive pattern on spirometry were screened for presence of interstitial lung disease through High Resolution Computed Tomography (HRCT) scan of chest. Detailed history records and comprehensive HRCT report by radiologist were retrieved to determine subtypes. Data was analyzed by SPSS 20.00.

Results: In this study, a total of 303 patients were included with mean age of 50.08 ± 7.56 years. There were 128 (42.24%) male and 175 (57.76%) female patients. All patients had complaints of cough. The Prevalence of interstitial lung disease was 44.88% among suspected chronic lung disease patients. Idiopathic pulmonary fibrosis was the most common subtype with a prevalence of 37 (27.21%), followed by "cryptogenic organizing pneumonia(COP)" 21(15.44%), "hypersensitivity pneumonitis (HSP)" 20(14.71%), sarcoidosis 19 (13.97%), "non-specific interstitial pneumonia (NSIP)" 14(10.29%), "pulmonary alveolar proteinosis (PAP)" 13(9.56%) and "connective tissue disease related ILD" 12 (8.82%).

Conclusion: Prevalence of interstitial lung disease was 44.88% among chronic lung disease patients with idiopathic pulmonary fibrosis being most common subtype.

Keywords: Connective Tissue Disease; Idiopathic Pulmonary Fbrosis; Interstitial Lungdisease, Prevalence

Introduction

Interstitial lung disease (ILD) consists of a massive group of heterogeneous disorders that result in the pathological damage of the parenchyma of the lung ultimately leading to fibrosis of the lung.[1] In general, interstitial lung disease (ILD) is a progressive disease that follows a continuously worsening clinical course but can also present as a case of acute respiratory distress which can potentially threaten the life of the ailing patients.[2] When it comes to pathophysiological process that results in development of interstitial lung disease (ILD), not only it is poorly understood but also has demonstrated variation. It has been found that there is a strong association of pathogenesis of ILD and genetics.[3] In majority of the cases of interstitial lung disease etiology is idiopathic but other associated risk factors include systemic disorders, inhalational exposure to certain allergens, drugs, smoking, hepatitis C, tuberculosis and radiation therapy.[4,5] Another important pathophysiological association of interstitial lung disease that has surfaced in the recent times is with infection of the Sars-CoV-2 corona virus (COVID-19) which wreaked havoc across the globe in 2019/20 in the form of a pandemic.[6]

Globally, a rise has been observed in the burden of interstitial lung disease. According to previous literature it has increased by approximately 50% to as high as 207.2 per one hundred thousand cases.[7] Diagnosis of interstitial lung disease is a multi-step process in which patients who present with characteristic clinical features of 3Cs (crackles, cough and clubbing) undergo a series of tests. Amongst these most initial tests are pulmonary function test (PFT), chest x-ray, high resolution chest computed tomography (HRCT), autoimmune/rheumatology antibodies blood panel (in case of suspicion of presence of concurrent autoimmune or rheumatological disease) and, for definitive diagnosis, histopathological assessment of the diseased lung parenchyma. [8,9]

In Pakistan, availability and utilization of advanced diagnostic tests for effectively diagnosing interstitial lung disease is mainly concentrated in the teaching/tertiary health care hospitals due to which a vast majority of patients with this pulmonary morbidity remain undiagnosed in rural areas. This has the potential to significantly alter the real life estimates of prevalence of interstitial lung disease in a sector of Pakistani population. To address this and assess any change in trends documented in ILD PAK registry[10] after 2019 onwards, present study was conducted to determine the prevalence of interstitial lung disease and its subtypes in rural and urban areas draining to Lady Reading Hospital.

Methodology

This retrospective cross-sectional study was conducted at Pulmonology Department, LRH from January to December 2023" with patient data retrieved from the Hospital Management Information System granted exemption from ethics approval according to the principles of the Declaration of Helsinki.

The appropriate sample size for the study was calculated using the WHO sample size calculator for single population proportions with specified absolute precision. The parameters used included a confidence level of 95%, an absolute precision of 5%, and an anticipated prevalence of interstitial lung disease of 27%. Based on these parameters, the required sample size was determined to be 303 patients.

All adult patients at outdoor or those who were admitted to pulmonology department of Lady Reading hospital, Peshawar with chronic cough, shortness of breath and restrictive patterns on PFT's were included in this study. Patients with established diagnosis of interstitial lung disease (ILD) were also included in the study.

Patients with post infectious fibrosis (including post tuberculosis fibrosis), known history of Bronchial Asthma, COPD, pleural disease lung metastases, anthracosis and acutely reactive serology to COVID-19 virus and those with history of cystic fibrosis were excluded from the study.

Baseline characteristics of the patients including the age, gender, history of smoking, occupation, history of "connective tissue disorder (CTD)" and clinical symptoms (presence of crackles/cough/clubbing) were documented. The records of our unit had been keenly documented over the previous year, and no missing data were observed in the cases included in the study. Characteristic radiological HRCT chest findings of bilateral "ground glass opacification and/or honey-combing", is classified as a case of interstitial lung disease (ILD) were documented. In addition, based on specific HRCT chest findings, as described by Anjum et al.[11] and Sarwar Zubairi et al.[12], subtype of ILD was determined and documented as Idiopathic pulmonary fibrosis (IPF) as bilateral subpleural basal honeycombing with reticular opacities and traction bronchiectasis, Nonspecific interstitial pneumonitis (NSIP) as bilateral patchy ground glass attenuation with subpleural sparing, Hypersensitivity pneumonitis (HSP) as bilateral ill-defined micronodules, Sarcoidosis as lymphadenopathy and peri lymphatic micro nodularity, Cryptogenic organizing pneumonia (COP) as multifocal GGO/ consolidation with interlobular thickened septa and Pulmonary alveolar proteinosis (PAP) as peripheral ground glass opacification with crazy paving pattern and smooth thickening of interlobular and intralobular septal lines.

Statistical analysis of data collected was performed using Statistical package for Social Sciences version 20. Quantitative data was represented using mean ± standard deviation. Qualitative data was represented by using percentage and frequency. Prevalence of ILD was stratified by age, gender and history of smoking. Post-

Table 1. Baseline characteristics of study participants

Characteristic	Mean ± standard deviation / n (%)
Mean age ≤ 50 years > 50 years	50.08 ± 7.56 years 150 (49.51%) 153 (50.49%)
Gender Male Female	 128 (42.24%) 175 (57.76%)
History of smoking Yes No	 59 (19.47%) 244 (80.53%)
Occupation Unemployed/House wife Farmer Miscellaneous business Traffic police warden Bird/Poultry business	 118 (38.94%) 85 (28.05%) 43 (14.19%) 29 (9.57%) 28 (9.24%)
Clinical symptoms Cough Clubbing Crackles	 303 (100%) 148 (48.85%) 171 (56.43%)
Connective tissue disease Yes No	 88 (29.04%) 215 (70.96%)

stratification comparison was performed using Chi-square test. A p-value of ≤ 0.05 was considered statistically significant".

Results

In this study, 303 patients were included with mean age of 50.08 ± 7.56 years. There were 128 (42.24%) male and 175 (57.76%) female patients. Amongst all the patients, only 59 (19.47%) had positive smoking history while 244 (80.53%) had no history of smoking. Cough was present in all 303 (100%) of the patients. Dyspnea was present in 284 (94.8%). The oxygen measurement as a sign of a functional assessment of ILD was not considered in this study so was not mentioned. Measured. Clubbing was found in 148 (48.85%) of the patients. Crackles were present in 171 (56.43%) of the patients. Baseline demographics are given in detail below (Table 1).

Prevalence of interstitial lung disease (ILD) among patients who were part of this study based on HRCT chest findings was 44.88%. Amongst these patients who were found to have ILD (n = 136), most common subtype was idiopathic pulmonary fibrosis (IPF) with a prevalence of 37 (27.21%) followed by cryptogenic organizing pneumonia (COP) 21 (15.44%), hypersensitivity pneumonitis (HSP) 20 (14.71%), sarcoidosis 19 (13.97%), non-specific interstitial pneumonia (NSIP) 14 (10.29%), pulmonary alveolar proteinosis (PAP) 13 (9.56%) and connective tissue disease related ILD 12 (8.82%). Distribution of prevalence of ILD subtypes is given below in figure 1.

Prevalence of ILD in older age group was 73 (47.71%) while in younger age group it was 63 (42.00%), (p = 0.318). In male patients, prevalence of ILD was 69 (53.91%) while in female patients it was 67 (38.29%), (p = 0.007). Prevalence of ILD in patients with positive history of smoking was 21 (35.59%) while in those who had no history of smoking, its prevalence was 115 (47.13%), (p = 0.110) (Table 2).

Discussion

Interstitial lung disease has recently been a pulmonary morbidity of focus after the world has seen corona virus pandemic in which a large number of patients developed

Table 2. Stratification of prevalence of "interstitial lung disease (ILD) by age group, gender, and history of smoking (n = 303)

Interstitial lung disease	Age group		p-value
	≤ 50 years (n = 150)	> 50 years (n = 153)	
Yes	63 (42.00%)	73 (47.71%)	
No	87 (58.00%)	80 (52.29%)	0.318
Interstitial lung disease	**Gender**		
	Male (n = 128)	**Female (n = 175)**	
Yes	69 (53.91%)	67 (38.29%)	
No	59 (46.09%)	108 (61.71%)	0.007
Interstitial lung disease	**History of smoking**		
	Yes (n = 59)	**No (n = 244)**	
Yes	21 (35.59%)	115 (47.13%)	0.110
No	38 (64.41%)	129 (52.87%)	0.110

this condition a part of long term sequelae of COVID-19.[13,14] However, interstitial lung disease has existed long before COVID pandemic. [15] Present study focused on the prevalence of interstitial lung disease and its subtypes while excluding the patients with infective or congenital source of pulmonary fibrosis.

In this study, average age of the patients was fifty years however there were no statistically significant difference in prevalence of ILD with respect to age. This was varying with the findings of multiple studies stating that older age is a major risk factor for developing ILD and eventual fibrosis of the lung parenchyma.[16,17] Based on gender, it was observed in present study that the prevalence of interstitial lung disease in male patients (53.91%) was significantly higher as compared to female (38.29%) patients, (p = 0.007). This was consistent with the results of multiple studies that reported results similar to present study with higher prevalence of ILD among the male population.[18,19] Contrarily, there are studies reporting higher prevalence of interstitial lung disease in women due to higher chances of women to have connective tissue disorders.[20] In present study, prevalence of ILD was higher in patients having no history of smoking as compared to those with positive smoking history but the difference was not of statistical significance (p = 0.110). This may be due undetermined association between smoking and ILD in general, however, when it comes to association with a specific subtype of ILD, some degree of relationship does exist.[21]

When it comes to prevalence of subtypes of interstitial lung disease, in present study highest prevalence was of idiopathic pulmonary fibrosis. Similar to present study, multiple studies have reported IPF to be most prevalence subtype of interstitial lung disease.[11,12,22] In comparison to present study, Dhooria et al. reported that most prevalent subtype of interstitial lung disease was sarcoidosis instead of IPF which was most prevalent subtype in present study.[23] Similarly, in a study conducted by Laz et al. found that instead of IPF, the hypersensitivity pneumonitis (HSP) was the most prevalent subtype of ILD in their study. [24] PAP was the other commonest subtype with 9.56 % prevalence which is much higher from prevalence reported in other studies.[24] We relied mainly on clinicopathological features for the ILD diagnosis and no histopathology report was available which is the limitation of our study.

Present study provides useful insight regarding the prevalence of interstitial lung disease (ILD) subtypes in the population of Khyber Pakhtunkhwa. Moreover, this chronic and debilitating condition persists in our locality, with varying prevalence of subtypes compared to the national ILD PAK registry.

Conclusion

In conclusion, the prevalence of interstitial lung disease

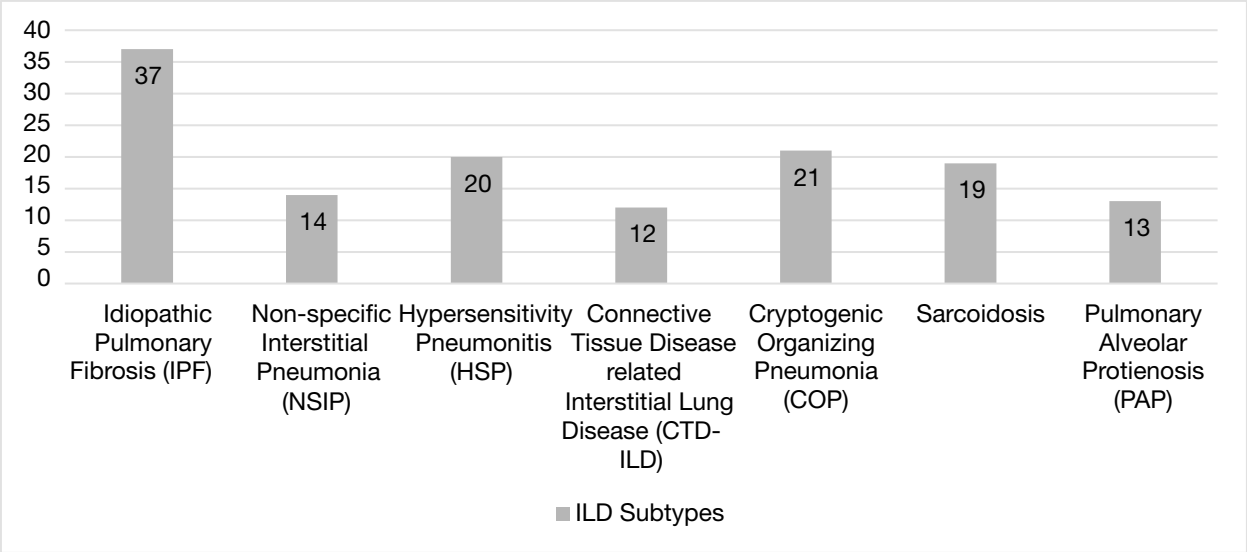

Figure 1. Prevalence of Sub-types of Interstitial Lung Disease (n = 136)

(ILD) in our institution was 44.88% with idiopathic pulmonary fibrosis being the most common subtype. However, to accurately determine the true prevalence of this disease, further larger-scale multi-center studies are necessary, encompassing a broader geographic scope across the province.

Limitations

There was non-availability of histopathological diagnosis, non-inclusion of infective and genetic conditions associated with lung fibrosis, limited sample size and study being confined to a single institution were few limitations of present study.

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