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RESEARCH ARTICLE
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COMPARATIVE HISTOLOGY OF PULMONARY FIBROSIS IN IDIOPATHIC VS. OCCUPATIONAL LUNG DISEASES

Dr. Shabnam Wazir[1], Dr. Zafar Haleem Baloch[2], Dr. Ubaidullah[3], Ambreen Anjum[4], Dr. Sofia Jadoon[5], Dr. Saima Bashir[6*]

[1]Lecturer - Department of Anatomy, Institute of Basic Medical Sciences, Khyber Medical University, Peshawar Pakistan
[2]Senior Lecturer, Department of Anatomy, Sindh Medical College, Jinnah Sindh Medical University, Karachi Pakistan
[3]Assistant Professor Department of Community Medicine, Swat Medical College, Swat Pakistan
[4]Psychology Department, Virtual University of Pakistan
[5]Assistant Professor. Anatomy department. Abbottabad International Medical College, Abbottabad Pakistan
[6*]Department of Pathology, Gomal Medical College, Dera Ismail Khan, Pakistan

***Corresponding Author:** Dr. Saima Bashir
*Department of Pathology, Gomal Medical College, Dera Ismail Khan, Pakistan
Email address: doc.saimabashir@gmail.com

ASBTRACT

Objective: Aim was to determine the histology of pulmonary fibrosis in idiopathic vs occupational lung diseases.

Study Design and Place: This Descriptive study was conducted at Institute of Basic Medical Sciences, Khyber Medical University, Peshawar

Methods: Total 160 cases of pulmonary fibrosis were presented in this study. Surgical biopsies of all patients were taken and went for CT scan. Imaging professionals had no access to all clinical data, including patient demographics, pathologic diagnoses, and results. The CT results were compared to survival, physiologic measures, symptoms, and the histopathologic evidence of fibrosis. To compare continuous variables, a t test was employed.

Results: Males were higher in numbers 97 (60.6%) than females 63 (39.4%). Presented patients had mean age 52.5±3.42 years. Dyspnea, cough and crackle was the most common symptoms and signs. We found abnormal HRCT findings in all cases. Agriculture was the most common occupational fibrosis found in 48 (30%) cases and 35 (21.9%) patients had smoking history. 102 (63.85) cases had transbronchial lung biopsy among all cases.

Conclusion: The prognosis for IPF is worse than that of other ILD. The diagnosis of ILD and OLD is greatly aided by TBLB and HRCT. Only when a patient has no contraindications to surgery and we are unable to diagnose a patient based on clinical, pathologic, HRCT, or TBLB results is surgery saved.

Keywords: HRCT, Trans bronchial lung biopsy (TBLP), IP, Occupational Lung Diseases

INTRODUCTION

Idiopathic pneumonia (IPF) is a chronic widespread interstitial lung condition that is always deadly and is marked by lung parenchymal fibrosis and inflammation. Its cause is not known. Despite inconsistent and little-studied frequency estimates, it's one of the more common chronic interstitial lung illnesses.[-3] Although the prevalence has been shown to be between three and five per 100,000, this relies on reports or case studies [4]. According on an Interstitial Diaphragmatic Database in Bernalillo County, New Mexico, more recent research has discovered greater frequencies of it (20 per 100,000 adult males and 13 per 100,000 adult females). These numbers show that the annual incidence rates are 10.7 and 7.3 per 100,000 for men and women, respectively.[5]

Both the diagnosis of interstitial lung disorders (ILDs) and the confirmation of IPF diagnosis require a thorough clinical evaluation. It is necessary to do a thorough enquiry of exposure to outside factors including mould, birds, and medicines. Evidence of extrapulmonary manifestations, including skin lesions, arthralgia, Raynaud event, dry mouth and eyes, and other symptoms, is crucial to the management of ILDs because these symptoms can aid in the diagnosis of underlying connective tissue diseases (CTDs), which can also exhibit a typical pattern of interstitial pneumonia (UIP). Since genetic diseases and CTDs are probable causes of ILDs, an examination of the family history of lung ailments is also advised.[6-7]

Patients with IPF are primarily in their sixth and seventh decades of life; it is more common in men and smokers or former smokers, and it only affects the lungs. One frequent link is gastroesophageal reflux.[6,8]

Dry cough and increasing dyspnea are two of the primary symptoms of IPF that are frequently nonspecific.Physical examination findings frequently include digital clubbing and bilateral inspiratory crackles (Velcro-like), mainly in the lower lung zones.In [9] Reduced diffusing capacity along with a restrictive pattern are the hallmarks of pulmonary function tests (PFTs) in IPF. Hypoxemia during or after exercise as well as reduced exercise performance are possible.[10]

The symptoms of IPF, a clinico-pathologic syndrome, include basilar crackles, cough, exertional dyspnea, a restrictive pattern on the pulmonary function test, and a honeycomb pattern on the heart rate variability chart. The disease progresses gradually but never stops. Due to respiratory failure, the majority of patients pass away 3–8 years after symptoms first appear and the current therapeutic approaches are futile. Histologically confirmed interstitial pneumonia and clinical characteristics are the gold standard for diagnosing interstitial pneumonia syndrome (IPF). The use of open lung biopsies in all suspected IPF cases is still up for debate.[11, 12]

MATERIALS AND METHODS

This Descriptive study was conducted at Institute of Basic Medical Sciences, Khyber Medical University, Peshawar and comprised of 160 cases. Clinical and pathologic findings compatible with IPF were included in the study.

Ethnicity, married status, education, work, income, and smoking were among the demographic variables. Data were gathered for lists of hobbies, particular occupational agents, and employment activities. Included were occupations and environmental factors that could conceivably cause IPF. Based on the pathophysiology of the illness and comparisons with other lung interstitial disorders, this was done (28). Exposures to elevated dust concentrations or breathing in potentially harmful vapours were included in this. A subject's previous or current employment was relevant to the job activities checklist. Depending on how many hours a week were spent exposed—less than ten or more—occupational agents were divided into several categories.

Two pathologists examined the results of a surgical lung biopsy performed on a patient with chronic HP to check for fibrosis. Systematically, the CT images were examined by two radiologists. The pathologic diagnosis, patient data, and results were all kept secret from the two radiologists.

It was thought that a UIP pattern was created when lower zone predominance and a subpleural reticular pattern were combined. The results of the CT scan were compared with the survival rate, physiologic parameters, and histopathologic evidence of fibrosis. We compared nominal and ordinal variables using the $\chi 2$ or Fisher exact test (each two-tailed). To compare continuous variables, an

unequal variance t test was employed. Comparing Kaplan-Meier survival curves was done using the log-rank method.

RESULTS

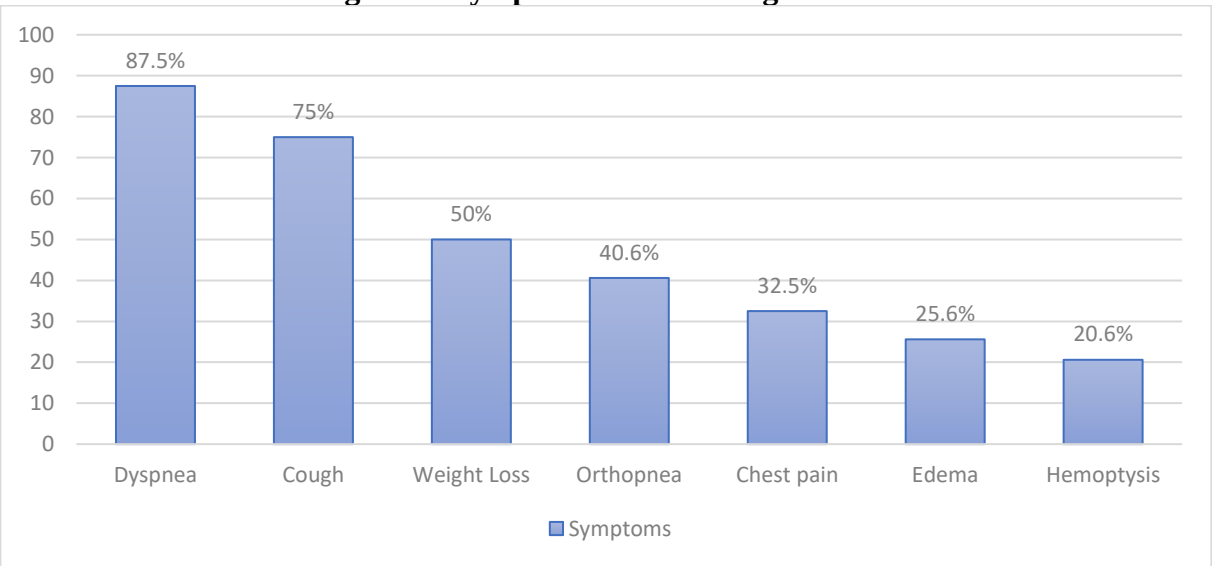
Males were higher in numbers 97 (60.6%) than females 63 (39.4%). Presented patients had mean age 52.5±3.42 years. 59 (36.9%) patients were married, 75 (46.9%) patients had poor socio-economic status and 55 (34.4%) cases had urban residency.(table 1)

Table-1: Baseline demographics of the patients

Variables	Frequency (160)	Percentage
Gender		
Male	97	60.6
Female	63	39.4
Mean age (years)	52.5±3.42	
Marital Status		
Married	59	36.9
Unmarried	101	63.1
Poor-socioeconomic status		
Yes	75	46.9
No	85	53.1
Residence		
Rural	105	65.6
Urban	55	34.4

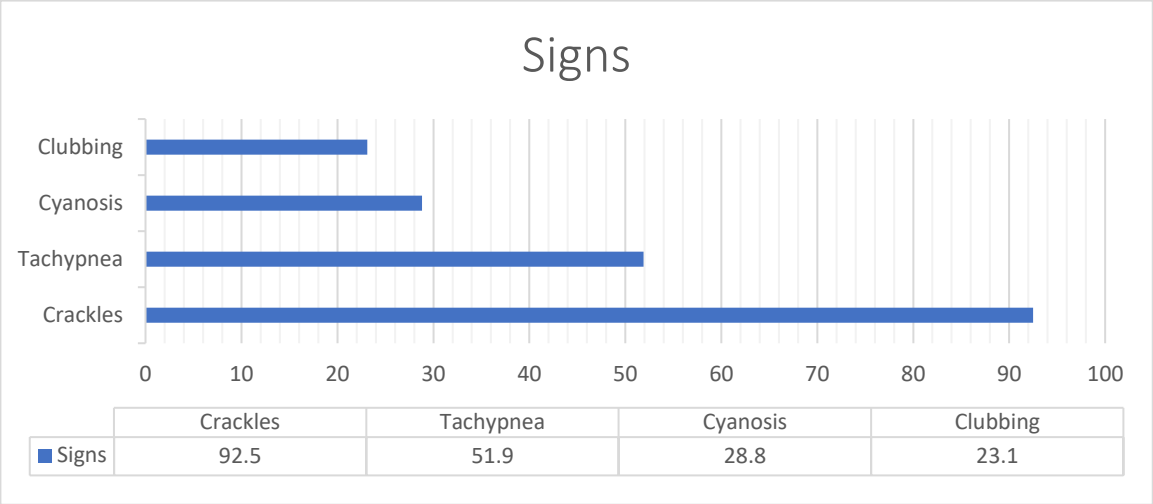
Dyspnea 140 (87.5%), cough 120 (75%) and weight loss were the most common symptoms.(figure 1)

Figure-1: Symptoms of PF among all cases



Crackles 148 (92.5%) and tachypnea were the most common signs.(Figure 2)

Figure-2: Signs of PF



We found abnormal HRCT findings (honey-comb, ground glass, reticular pattern, reticulo-nodular, increased plural thickening) in all cases.(table 2)

Table-2: Findings of HRCT

Variables	**Frequency**	**Percentage**
honey-comb	52	32.5
ground glass	14	8.8
reticular pattern	67	41.9
reticulo-nodular	31	19.4
increased pleural thickening	27	16.9

Agriculture was the most common occupational fibrosis found in 48 (30%) cases and 35 (21.9%) patients had smoking history.(table 3)

Table-3: Occupational distribution of cases with lung diseases

Variables	**Frequency**	**Percentage**
Agriculture work	48	30
Metal dust	21	13.1
Chemicals	16	10
Asbestos	12	7.5
History of baking	8	5
Smoking		
Yes	35	21.9
No	125	78.1

Among all, 102 (63.8%) cases had transbronchial lung biopsy among all cases.(table 4)

Table-5: Types of biopsies among all cases

Variables	**Frequency**	**Percentage**
TBLP	102	63.8
Open biopsy	37	23.1
Video assisted thoracoscopic biopsy	8	5

DISCUSSION

IPF is characterised by increasing dyspnea, loss of pulmonary function, and interstitial pulmonary infiltration, particularly in the radiography-visible bases of the lungs [13]. Males are affected by the disease more often than females.Reference [14]

With an OR ranging from 1.6 to 2.9 in various parts of the world, smoking is thought to be the most significant risk factor for IPF when it comes to risk factors.In [15] According to the majority of articles, up to 75% of IPF patients smoked.In [16] This rate, however, was less than other figures in our analysis, coming in at roughly 21.9%.[17] Apart than smoking cigarettes, other contributing elements were employed in industrial settings and farming. Pneumoconiosis in particular has not yet been identified. Apart from smoking cigarettes, the two occupations with the highest occupational and environmental exposures in our study were farming (30%) and metal dust (13.1%). In total, 72.5% of the cases had references to occupational and environmental exposures, whereas only 27.5% had no prior history of interaction.

According to their contact with elevated levels of dust or aerosols from many sources, such as feed cereals bedding, or excrement, agricultural workers are more susceptible to respiratory symptoms, compromised breathing, or lung fibrosis [18]. Fibrosis and intrinsic allergic alveolitis can both rise in response to wood dust, wood dusting agents, wood glues, and wood-containing mould. Moreover, it has been claimed that being exposed to textile dust during the production of nylon flock and flocked fabrics results in interstitial lung disease.[19,20]

The diagnostic assessment of IPF was altered by HRCT. HRCT reduced the number of differential diagnoses while simultaneously speeding up the diagnosis of IPF. As with previous studies, all of the patients showed aberrant patterns on HRCT, with the reticular pattern being the most common image.[21] PFT showed a restrictive pattern in most individuals, as was to be expected. Stated differently, 82.2% of the participants exhibited a restrictive PFT pattern, whilst the remaining group displayed a mixed pattern, known as obstructive-restrictive. This difference in pattern could be attributed to the impact of smoking on respiratory health.[22]

Regarding the sample technique, the most effective way to get a biopsy for the diagnosis of IPF was either open lung biopsy or VATS (video assisted thoracoscopic lung biopsy).[23] On the other hand, sampling by surgery is less common. In a research including 200 IPF patients from England, only 7.5 percent of the patients had an open lung biopsy. [24]The majority of patients had clinical presentations that led to a diagnosis. Reports of a similar nature have come from other nations as well as the USA.The TBLB, on the other hand, is not acceptable for IPF diagnosis; nonetheless, it is appropriate for diagnosing disorders listed in the IPF differential diagnostic list. [25]

CONCLUSION

The prognosis for IPF is worse than that of other ILD. The diagnosis of ILD and OLD is greatly aided by TBLB and HRCT. Only when a patient has no contraindications to surgery and we are unable to diagnose a patient based on clinical, pathologic, HRCT, or TBLB results is surgery saved.

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