Original Research Paper

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Pulmonary Medicine

ANALYTICAL STUDY OF CLINICAL RADIOLOGICAL AND SPIROMETRIC EVALUATION OF PATIENTS WITH INTERSTITIAL LUNG DISEASE IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND: Interstitial Lung Diseases refers to a heterogeneous collection of more than one hundred distinct lung disorders that tend to be grouped together because they share clinical, radiographic, histologic and pathologic features. This study attempts to clinical ,radiological and spirometrical evaluation of patients with interstitial lung disease.

METHODS: 35 patients of ILD admitted to Alluri sitaramaraju academy of medical sciences, Eluru between December 2015 –December 2017. who met inclusion criteria randomly selected. Detailed history and physical examination findings recorded. Investigations like chest x-ray, spirometry, HRCT chest were done.

RESULTS: The overall mean age at presentation for ILD is 40 to 60 yrs with male preponderance.

Majority of the patients were non-smokers 62.85% and smoking population is 37.14%. 54.5% males were non smokers whereas 76.9% females were non smokers.

62.85% of patients in the present study had Restrictive patterns of spirometry. A mixed pattern was observed in 31.42% of the patients. Only 5.71% cases had a normal spirometry.

In the study population Fibrosis was the most common finding (62.85%) and Diffuse cystic pattern was least common2.85%.Interstitial infiltrates, bronchiectasis and lymphadenopathy (hilar/mediastinal) have equal distribution with 17.14% each. Ground glass appearance was present in 31.42 %..Honeycombing and nodular pattern seen in 5 cases each while bilateral patchy peripheral consolidation was present in 2 cases

CONCLUSION: Early detection and initiation of proper treatment is the corner stone for a better prognosis

Thirty five patients diagnosed as ILD based on clinical, radiological and spirometry findings attending OPD and/or admitted in a tertiary health care centre were included.

It is prospective observational study where statistical analysis was done which proved male preponderence in ILDs and an IPF predominance

The study reinforced the point that ILDs are still an under diagnosed entity and constant vigilance must be employed especially in older male populations presenting with chronic shortness of breath and progressive cough.

KEYWORDS : ILD, IPF, NSIP, LIP, RB-ILD, DIP, AIP,HRCT Patterns, Spirometry,

INTRODUCTION:

Interstitial Lung Diseases refers to a heterogeneous collection of more than one hundred distinct lung disorders. These disorders are sometimes called diffuse parenchymal lung diseases (DPLD).

Commonly, interstitial lung disease (ILD) presents with dyspnoea on exertion, diffuse bilateral infiltrates on chest imaging, and restriction with diffusion impairment on physiologic testing.

When tissue is obtained, the lung parenchyma may contain any combination of abnormalities, including inflammation, fibrosis, and granulomas.

Idiopathic pulmonary fibrosis is the most lethal amongst the interstitial lung diseases and exhibits high heterogeneity in clinical behavior.

ILD of know aetiology only makes up about35%oftheoverall spectrum of which the major ones are, Pneumoconioses , Extrinsic allergic alveolitis and Iatrogenic ILD caused by drugs/radiation .

This study of Clinico- radiological and spirometric evaluation of patients at a tertiary hospital will help to shed some light and bring awareness in diagnosing ILDs.

AIMS AND OBJECTIVES

To profile Interstitial lung diseases in patients presenting to a tertiary institute (ASRAM hospital, ELURU) with thorough clinical evaluation, radiographic and spirometric analysis between years December 2015- December 2017 (without surgical lung biopsy).

To diagnose interstitial lung diseases with reasonable certainity with clinco radiological correlation without surgical lung biopsy.

METHODOLOGY

Study Site: The study was carried out in the Department of Pulmonary Medicine, ASRAM Medical College and General Hospital, ELURU

Study population and sample size: 35 Adult Patients attending ASRAM medical college and general hospital PULMONARY MEDICINE OUTPATIENT department with features of Interstitial Lung Disease, during the period December 2015- December 2017, were considered for the study.

Study Design: Cross sectional Observational study.

INCLUSIONCRITERIA

1. Symptoms & Signs

1. Progressive shortness of breath, cough, with(or/and) wheeze, arthralgia, fever, crepitations and/or clubbing and joint symptoms.

2. Radiology: appearance of reticular, nodular, reticulo-nodular, honeycombing, centrilobular nodules, ground glassing patterns.

3. Age: Patients 35 years and older. Sputum AFB/Mantoux/Lymph node biopsy HPE/FNAC where ever possible were done to rule out Extra pulmonary tuberculosis and malignant lesions and cases negative for the same.

EXCLUSIONCRITERIA

1. Age : patients <35 years
2. Already diagnosed pulmonary/ extra pulmonary tuberculosis patients on Anti-Tubercular therapy
3. Already diagnosed Malignancy cases.
4. Critically ill , mentally ill or uncooperative patients
5. Pregnant Women For want of facilities surgical lung biopsy not done for selected cases

DIAGNOSINGILD: Approach to the diagnosis of ILD has clues beginning From History Clinical features, pulmonary function testing and radiologically.

Clues from the initial evaluation that suggest specific types of ILD

History elicited	Frequently associated ILD or complications of ILD
Rapid onset and worsening	AIP
	Infection
	Acute HP, acute EP
	Drug reaction
	COP
	CTD (e.g. acute lupus pneumonitis)
	DAH (e.g. GPS)
Smoking	RB-ILD, DIP, PLCH
Occupation: Pipefitter, foundry worker, coal miner,	Pneumoconiosis
Pneumotoxic drug exposure	Drug-induced ILD
Hemoptysis	DAH, pulmonary capillaritis, pulmonary venoocclusive disease, LAM
	Superimposed complications (e.g. pulmonary emboli, lung neoplasm)
Pleurisy	CTD (SLE, RA)
Wheezing	HP, EP
Eye symptoms	CTD, sarcoidosis, PAG
Impaired vision combined with albinism & Puerto Rican heritage	HPS
Rash	Sarcoidosis, CTD
Exposure to organic antigens at home or at work (e.g. birds, grain dust, humidifiers, visible molds, hot tubs,etc.)	HP
	Occupational ILD
Abnormal GER, GERD, dysphagia	CTD (especially scleroderma), IPF
Sicca symptoms	Sjögren's disease
Raynaud's phenomenon	CTD
Arthralgias, arthritis	CTD, sarcoidosis
Myalgias, muscle weakness	DM-PM
Morning stiffness	RA, CTD
Age >70 years	IPF > other ILD if HRCT suspicious for IIP

Thoracic imaging patterns

Imaging modality	Pattern	Consistent ILD diagnoses, mimics of ILD, and/or complications of ILD
Routine CXR	Hilar lymphadenopathy	Sarcoidosis, silicosis, CBD, infection, malignancy
	Septal thickening	CHF, malignancy, infection, PVOD
	Lower lung zone predominance	IPF, asbestosis, DIP, CTD, NSIP
	Mid/upper lung zone predominance	Sarcoidosis, silicosis, acute HP, LCH, CBD, AS, chronic EP
	Peripheral lung zone predominance	COP, chronic EP, IPF
	Honeycomb change	IPF, asbestosis, chronic HP, sarcoidosis, fibrotic NSIP, CTD
	Small nodules	Sarcoidosis, HP, infection
	Cavitating nodules	PAG, mycobacterial infection, CA
	Migratory or fluctuating opacities	HP, COP, DIP
	Pneumothorax	PLCH, LAM, neurofibromatosis, TS
	Pleural involvement	Asbestosis, CTD, acute HP, malignancy, sarcoidosis, Radiation fibrosis
	Kerley B line prominence	Lymphangitic carcinomatosis, CHF
HRCT	Nodules	Sarcoidosis HP, CBD, pneumoconiosis, RA, malignancy
	Septal thickening	Edema, malignancy, infection, drug toxicity, PVOD
	Cyst formation	LAM, LCH, LIP, DIP, SS
	Reticular lines	IPF, asbestosis, chronic EP, chronic HP, CTD, NSIP
	Traction bronchiectasis	IPF, other end-stage fibrosis
	Honeycomb change	IPF, chronic EP and HP, asbestosis, sarcoidosis
	Ground-glass opacity	AIP, acute EP, PAP, chronic EP, COP, lymphoma, sarcoidosis, NSIP, infection, hemorrhage

Spirometry Interpretation:

Interpretation of spirometry done with following criteria :

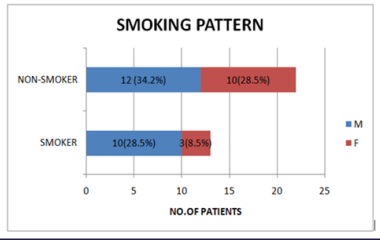
1. Normal spirometry FVC% predicted above 80% and FEV1/FVC ratio above 0.7.
2. Restrictive- FVC% predicted below 80% and FEV1/FVC ratio normal - above 0.7.
3. Obstructive- FEV1 below 80% predicted, FEV1/FVC ratio less than 0.7. Mixed - Coexistence of obstruction and restriction. FEV1/FVC ratio is less than Lower limits of the normal.

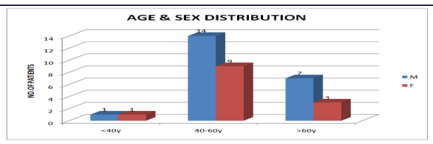
FVC may be reduced in both obstruction, and restriction and therefore, a mixed disorder is suggested.

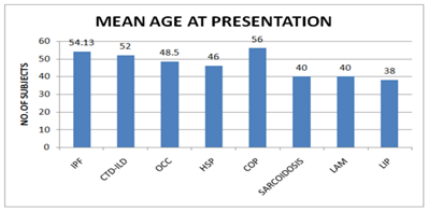
Statistical analysis: data analysis was done using mean ,standard deviation, and chi square test. P value significance taken less than 0.5

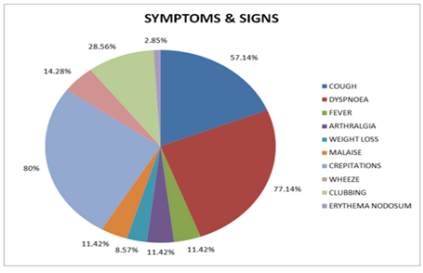
RESULTS: The overall mean age at presentation for ILD is 56.17yrs. Among the individual forms COPD has the oldest mean age of onset at 56yrscloselyfollowed by IPF at 54.13yrs and CTD-ILD at 52yrs.The ILD with the youngest mean age at presentation turned out to be LIP with 38yrs, closely followed by Sarcoidosis and LAM at 40yrs.

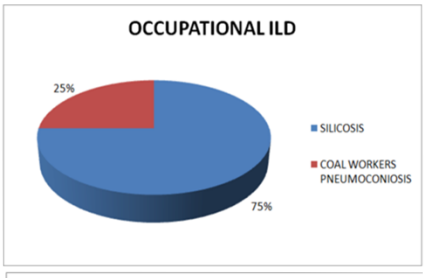
In the present study, majority of the patients were in the age group of 40 - 60yrs. Ensuing to this outcome 14 males and 9 females belonged to this age group. The next age group with highest patients is >60yrs with 7 males and 3females. The under 40yrs group has only 1 male and 1 female.

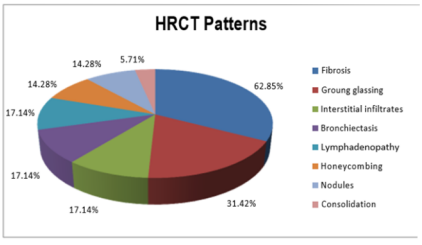




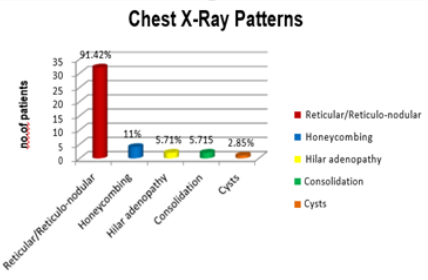








In the study population Fibrosis was the most common finding (62.85%) and diffuse cystic pattern was least common 2.85%. Interstitial infiltrates, bronchiectasis and lymphadenopathy (hilar/mediastinal) have equal distribution with 17.14% each. Ground glass appearance was present in 31.42%. Honeycombing and nodular pattern seen in 5 cases each while bilateral patchy peripheral consolidation was present in 2 cases.



The most common pattern observed is Reticular/Reticulo-nodular(91.42% corresponding to cases of IPF, HSP or few CTD-ILDs. Hilar adenopathy was appreciated in about 5.71% of these cases with sarcoidosis. Honeycombing was appreciated in 11.42%. The least common pattern is B/L consolidation (5.71%) seen in COP.

DISCUSSION

Despite being an increasingly recognized entity in the western world,ILD is still not a commonly made diagnosis as far as our country is concerned, particularly owing to lack of awareness even among health care professionals.

The overall mean age is 56.17yrs.which closely resembles that of B Ducheman et al (52.24) but is higher than Yadav et al (45.24) and Abhishek Tiwari et al (48.8. The higher mean age is due to the predominance of IPF(42.85%) subjects in our study who typically have older age of onset.

In the present study the highest number of patients were present in the age group 40-60yrs i.e., 23 out of 35 cases (65.71%).

The age group of less than 40yrs had the least number with just 2 cases (5.71%). The older age group represented by 10 cases (20%)..Whereas in the study by Jette B Kornum et al 47.95% cases are of older age group of >60yrs followed by 32% in 40-60yrs and 19.90% in <40yrs age group

In the study by Abhishek Tiwari et al the age groups <40,40- 60, >60 are represented by 12%, 80% and 8% respectively which reflects the general trend in the current study.

Whereas in the study by Jette B Kornum et al 47.95% cases are of older age group of >60yrs followed by 32% in 40-60yrs and 19.90% in <40yrs age group.

This difference can probably be attributed to racial and regional differences as the study was conducted in Denmark where the standard of living is higher and life span longer compared to our study population.

In the current study of 35cases62.85%were males and37.14% were females which can be correlated with the studies of Yadav et al with Males (60.34%),Females(39.6 6%); Gagiya A shoketal with Males (66.50%) Females (33.50%); Jette B Kornum et al with Males (58%) Females (42%) asthey have similar selection criteria.

In the current study 37.14% subjects are smokers and 62.85% non smokers

In the study by Abhishek Tiwari et al 16% were smokers and 84% non-smokers with a smoker: non-smoker ratio of 4:21.

Raj Kumar et al study also has a preponderance of non-smokers (73.71%) to smokers (26.29%). Muhammed Shafeeq et al also has more non-smokers (64.29%).

Reticular/ Reticulo-nodular pattern is the predominant finding (91.42%) in the present study which can be well correlated with the studies by Abhishek tiwari etal (82%),Yadav etal (82.71%) and Rajkumar etal (80.70%).

Honeycombing pattern was found in 11.42% patients in our study while in other studies like Abhishek tiwari et al and Rajkumar et al it is 6% & 7.90% which is within similar range. Hilar adenopathy can be accounted for in only 5.71% of subjects in the current study whereas in all other studies it is higher consequent to the fact that the incidence of Sarcoidosis is more compared to this study.

Consolidation is a finding in 5.71% of patients in this study and 4.30% in the study by Yadav et al which is similar.

The pattern of diffuse distribution of cysts was appreciated in 2.85% cases, while in the study by Raj kumar et al it was found in 0.34% cases which is close enough owing to the rarity of the pattern.

Interstitial lung diseases cause stiffness of lungs due to progressive fibrosis leading to a majority Restrictive pattern on spirometry. Present study has a predominant restrictive pattern (62.85%) followed by mixed (31.42%) and normal patterns(5.71%) on spirometry. This can be correlated with the study by Muhammed shafeeq et al with restrictive, mixed and normal subjects being 64.30%, 31.40% and 4.30% respectively.

Even in the study by Venkata Ramana et al majority (50%) have a restrictive pattern only. But the normal variant is slightly higher (14%) which could be attributable to younger age group of patients and early diagnosis of disease.

In the present study out of n=35 cases 20% were diagnosed CTD-ILD among which Systemic sclerosis has highest predominance with 42.85%cases followed by RA (28.47%) and SLE (28.57%). The incidence of SSc and RA in E.Bodolay et al is 45% & 30% while in S.Kundu is 58.60% & 27.505 which can be correlated with this study.

Incidence of SLE is higher in our study may be attributed to a comparatively small sample size.

IPF: The current study showed an incidence of 42.85% which is similar to the study conducted by Yadav et al which had the incidence at 40.51%. Singh S et al had the lowest incidence of IPF at 13.70% which was attributed to a very high incidence of HSP 47.30% could be due to selection bias and apparent exposure to air coolers and A/C vents.

CTD-ILD : 20% of patients had connective tissue disorder related ILD in current study. The incidence of CTD- ILD in this study correlated well with other studies like Abhishek tiwari et al, Singh s et al, gagiya ashok et al and B Duchemann et al.

HSP : The incidence of hypersensitivity pneumonitis in the present study is 8.5% which is closely reflected in the studies of Esamal hamad et al (6.3%) and Raj kumar et al (7%). Singh S et al stated a very high incidence of 47.30%for HSP which is nearly half the study population.

CONCLUSION:

Interstitial lung diseases include many entities that injure the interstitium and lung parenchyma, producing diseases with similar clinical, radiographic, and physiologic features. Early detection and initiation of proper treatment is the cornerstone for a better prognosis. A multi-disciplinary approach with involvement of a Pulmonologist, Pathologist and radiologist is essential in the overall management and effective outcome.

In the present study, thirty five patients diagnosed as ILD based on clinical, radiological and spirometry findings attending OPD and/or admitted in a tertiary health care centre were included. It was a prospective observational study where statistical analysis was done which proved male preponderance in ILDs and an IPF predominance. The study reinforced the point that ILDs are still an under diagnosed entity and constant vigilance must be employed especially in older male populations presenting with shortness of breath and progressive cough.

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