

Study of Clinical Correlation with HRCT Pattern of Interstitial Lung Disease in Patients at Tertiary Hospital

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Abstract:

Interstitial lung disease refers to a diverse group of over 100 different lung diseases that are often grouped by clinical, radiological and Pathological features. As there are 200 distinct subtypes of ILD, physicians may find it difficult to make an appropriate diagnosis. A thorough medical testing, physical examination, review of laboratory data, physical examination, radiography, is needed in certain cases lung biopsy is needed. A multi-disciplinary review is a key element of the process that may have a big influence on diagnosis and treatment. As these illnesses have similar clinical presentation plain radiograph of chest remains the corner stone of basic imaging in ILDS. HRCT is more sensitive than chest radiograph and can reveal problems earlier. HRCT can often reveal structural abnormalities in the lungs in people with normal chest x ray because 10-25% of the patients with ILDS have a normal HRCT. This study compares clinical conventional chest radiography and HRCT findings in the assessment of ILDS

Keywords: ILD, Interstitial Lung Disease, Consolidation, HRCT Chest, Lung Disease.

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Introduction

Early diagnosis of ILDS is essential for preventing permanent lung damage during inhalation, alveoli of a healthy lung is filled with air, the alveolar walls allow oxygen from the air to enter the blood. CO₂ flows from the blood in to the alveoli in the opposite direction during exhalation. The tissue that supports the alveoli becomes inflamed and rigid as a result of ILD, making it harder for the alveoli to fully expand [1].

The aberrant interstitium restricts the oxygen delivery to the body and CO₂ elimination from the body. The supporting tissue scars and thickens the alveolar walls [3]. As the interstitial lung disease illness advances it severely reduces lung compliance [2]. The build-up of fluid cells, fibrous tissue can cause interstitial thickening. Inflammation may be limited to one or more parts of the lung. It is how ever typically diffuse and it affects both the lungs. Respiratory bronchiolitis, ILD, Desquamating interstitial pneumonia are two types of ILD that can be caused by cigarette smoke inhalation. Idiopathic pulmonary fibrosis,

interstitial pneumonia, cryptogenic organizing pneumonia are all diseases linked with inflammation, etiology of ILD is also uncertain in some circumstances. ILD is most common in 5th or 6th decades [4].

Aims and Objectives

1. To correlate the clinical findings with conventional chest radiography and HRCT in patients with ILD.
2. To study the different radiographic patterns evident in both conventional chest radiography and HRCT.

Materials and Methods: 50 patients with ILD admitted to GGH Kakinada from NOV 2022 to OCT 2023 were studied. It is a prospective study. All the patients are evaluated in terms of their clinical history and examination, radiological evaluation and laboratory tests. History of smoking and history of the family was thoroughly investigated. Occupational history with any exposure to carpentry, painting, welding, smoke or

dust is recorded. Positive signs such as clubbing, lymphadenopathy, Irregular breath sounds and added sounds such as crackles were identified thorough examination. CVS system was auscultated in case CVS co-morbidity is identified, 2D ECHO was done in addition to that GIT, Eye And Musculoskeletal System [5] was examined, cutaneous manifestations like rashes, skin nodules were observed, significant lymphadenopathy is examined.

In all patients chest x ray and HRCT CHEST was done. The pattern of lung damage associated with various forms of all ILD are identified. Chest x ray may be used to track the progression of ILD. HRCT is used to see the fine details of the case that may not be visible on chest x-Ray [6].

In some cases a specific diagnosis such as idiopathic pulmonary fibrosis can be confirmed based on the CT appearance. CT SCAN can often help to detect the extent of lung damage.

Thorough examination of the tracheobroncheal tree was done with an inspection of all the accessible segments on both sides bronchial washings are collected from the most appropriate segments

graded by HRCT scan in each case. In all cases Bronchial washings were submitted for specific examination. Comprehensive serological tests which include ANA-RH factor Anti SS-A and SS-B were done.

Inclusion Criteria

1. Patients with cough and breathlessness on exertion with or without extra pulmonary manifestations like arthralgia, Skin rashes, dry mouth, dry eyes suggest Reynaud’s phenomenon.
2. Patients with crackles on clinical examination suggestive of ILD.
3. Patients with radiological features suggestive of ILD.

Exclusion Criteria

1. ILD in infants extra pulmonary TB and pneumocystis pneumonia.
2. ILD like malignancies e.g. lymphangitis carcinomatosis.
3. Pulmonary Koch’s co existing with ILD.

Results:

Table 1: Sex Distributions

Sex	Number	Percentage
Males	26	52%
Females	24	48%

Table 2: Age Distribution of the Study Group

Age Group (Yrs)	No. of Patients	Percentage
20-30	1	2%
31-40	3	6%
41-50	9	18%
51-60	18	36%
61-70	14	28%
>71	5	10%

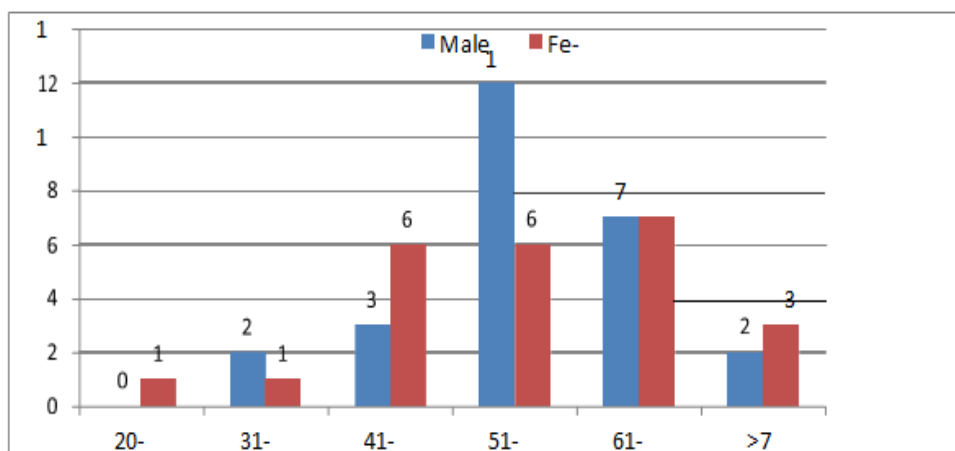
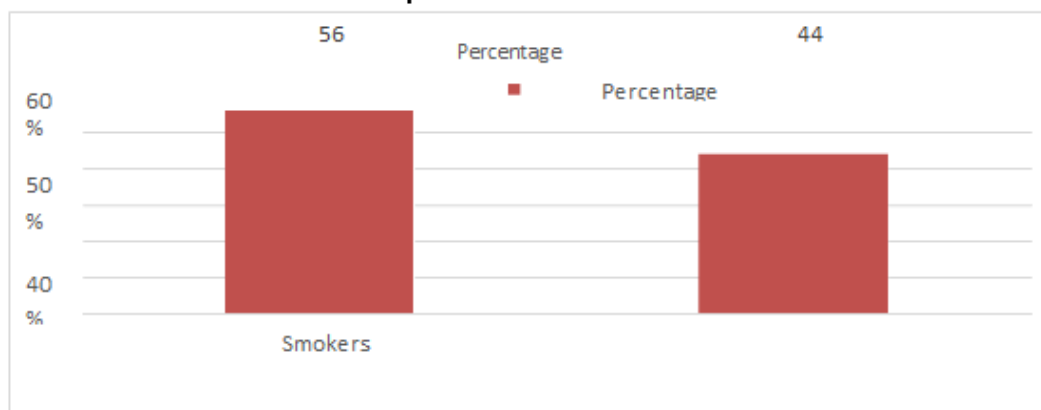


Figure 1: Age Distribution According To Sex

Table 3: Chief Complaints among the Study Group

Chief Complaints	Number OfPatients	Percentage
Dyspnea	50	100%
Cough	42	84%
Joint Pains	10	20%
Chest Pain	6	12%
GERD	14	28%
Dysphagia	2	4%
Skin Lesions	4	8%
Xerophthalmia & Xerostomia	1	2%
Hemoptysis	1	2%

**Figure 2: History of Smoking in ILD****Table 4: Statistical significance between radiological findings on Chest x-ray and HRCT in ILD's**

	On chest x-ray	On HRCT	P-value
Incidence of reticular pattern	60%	80%	0.0036
Incidence of GGO's	28%	60%	0.001
Incidence of nodular pattern	12%	20%	0.001
Incidence of consolidation	16%	18%	0.03

Table 6: Zonal Distribution in the Study Group

Zonal Distribution	No. of Patients	Percentage
Upper Zones Only	4	8%
Middle Zones Only	6	12%
Lower Zones Only	14	28%
Mid & Lower Zones	18	36%
All Zones	8	16%

Discussion

The exact incidence of ILD is unknown due to lack of knowledge and diagnostic tools. In recent decade reports from the Western studies suggest rise in the prevalence and incidence of ILD. However diagnosis of ILD in India is limited. The goal of study was to assess the clinical and radiological characteristics of ILD among the patients. In our study 36% of patients are 51-60 age group, 28% in 61-70 age group and 18% in 41-50 years age group.

ILDs are uncommon below 40 years. Mean age group being 51-70 years. Males are most affected male to female ratio is 1:1. Males represents 52% females 48%. Dyspnea 100% of cases cough 84% of cases GERD 28% joint pains 25% in present study

smokers accounts for 56% non-smokers accounts for 44%. Nicotine enhances fibrinogenesis through several mechanisms including endothelial and epithelial damage mediated by cytokines, TGF-beta, macrophages, fibroblasts etc. ILDs are frequently associated with digital clubbing. On chest x ray reticular pattern is most common finding being observed in 60% of study group followed by the incidence of GGOS in 28% of study group.

Most common zone involved is MID and LOWER zones (36%), Lower zone alone involved (26%) UPPER zone involved alone 8%. All the zones involved is 16% of the study group. HRCT is both sensitive and specific in diagnosis of ILD. The ability to recognize the distinct appearance of

diffuse parenchymal lung disease on HRCT has significantly decreased the necessity for biopsy. HRCT is considered as a standard procedure for the evaluation of all the patients in ILD.

The incidence of reticular pattern of HRCT is 80% of study group followed by the incidence of GGOS is 60% honeycombing in 44%, nodular pattern in 20% consolidation in 18% of the study group.

Statistical Significance

The incidence of reticular pattern on chest x ray is 60% and on HRCT is 80% there is a statistical significance with a P value =0.0036%, the incidence of GGO on chest x ray is 28% and HRCT is 68% there is a statistical significance of P value =0.01%. The incidence of nodular pattern on chest x-ray is 12% and on HRCT is 20%.

There is a statistical significance with a prevalence =0.1, p value is <0.05. This demonstrates that HRCT was superior to chest radiography in detecting all basic pattern in ILD patients.

Chest radiography is a nonspecific investigation that can be used as 1st step in diagnosis of ILD patients. In our study, common chest x-ray and HRCT abnormalities are reticular opacities, GO, honeycombing, septal thickening, nodules and consolidation,

Conclusion

ILDs are heterogeneous group of diseases that differs significantly. Combined clinical, radiological, pathological evaluation is important for the appropriate diagnosis of ILD. In India ILD are not rare. Our studies show M:F =1.08:1. The disease tends to be most common in 51-60 years with mean age of 56 years. IDLs are more prevalent among smokers than non-smokers. Dyspnea on exertion and cough are the most common symptoms. Reticular pattern is most predominant pattern accounting for 60% of patients. Middle and lower zones together are most commonly involved accounting for 36% while lower zone alone is 26%. Most common ILD in the study was Idiopathic Pulmonary Fibrosis accounting for 48% followed by NSIP =10%. To establish the incidence and to study the spectrum of diseases large clinical studies are required. In the majority of cases proper history, clinical examination along with significant radiological

abnormalities in chest x ray and HRCT chest will diagnose ILD. HRCT lung is the non-invasive investigation of the chest that is used to visualize the distorted architecture of the lung parenchyma, in such cases surgical lung biopsy can be curtailed, to prevent hemothorax and pneumothorax.

Through clinical examination a good clinician can mark an accurate diagnosis of ILD with a high specificity of more than 90% even without a surgical lung biopsy. Diagnosis of ILD at an early stage is paramount to prevent the delay of progression to irreversible damage of the lungs. Hence education and awareness of general practitioners about ILDS is our special intention.

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