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Accuracy of Clinical evaluation and HRCT in the diagnosis of ILD

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Abstract: ***Introduction:****ILD refers to a heterogeneous collection of more than one hundred distinct lung disorders that are grouped together as they share similar clinical, radiographic, and pathologic features. Clues from the clinical history along with the examination and radiologic findings provide the initial basis for prioritising diagnostic possibilities for a patient with ILD.* ***Aims and Objectives****:TO Determine the accuracy of clinical evaluation and HRCT chest in the diagnosis of ILD without the need for surgical lung biopsy (SLB).****Materials and Methods:****ThoroughRespiratory system examination, 6-minute walk test, Chest x-ray PA view, Pulmonary function test, DLCO, HRCT chest.****Results****: The diagnosis was suggestive of ILD basedon clinicalassessment,spirometry, DLCO and 6-minute walk test in 90% patients. Through HRCT we could conclude ILD in 93% cases. In 2 cases out of 30, the HRCT was not conclusive, so we had to go for a CT guided biopsy which finally confirmed the diagnosis of COP.Amongst the ILD most common was NSIP (30%) followed by UIP (27%) followed by COP (20%) followed by HSP (10%) and RB ILD (10%) and the least common pattern was IPF (3%).****Conclusion****: Over the last few years, the abnormal patterns of ILD and IPF on HRCT scans have been refined and are being increasingly recognized as diagnostic patterns. This has led to the increasing use of HRCT scans in conjunction with a thorough clinical assessment. It has been suggested that an accurate diagnosis of ILD can be made without SLB. In this study also, it is evident that the confirmatory diagnosis rarely requires surgical lung biopsy.*

Keywords*: ILD, clinical evaluation, HRCT chest, Surgical lung biopsy.*

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I. Introduction

The interstitial lung diseases (ILDs) are a diverse group of disorders characterised by a varying combination of inflammation and fibrosis of the pulmonary parenchyma. Besides a thorough history and clinical examination, the protocol should include a 6-minute walk test, spirometry, chest radiography, high-resolution computed tomography and when necessary, a lung biopsy. The final diagnosis of ILD entities requires dynamic interaction between clinicians, radiologists and pathologists to reach a conclusive clinic-radiologic-pathologic diagnosis, the gold standard no longer being the histology but rather a multidisciplinary approach.

Aims and objectives:

1) Todetermine the accuracy of clinical examination, spirometry, 6-minute walk test, DLCO and HRCT chest in the diagnosis of ILD without the need for surgical lung biopsy (SLB).

II. Materials And Methods

This study was a prospective observationalone performed in the Department of Respiratory Medicine, Maharaja Institute Of Medical Sciences, Andhra Pradesh from June 2018 to December 2019 with a sample size of 30. Among them,15 were male, and 15 were female.

Study Design: Prospective observational study

Study Location: The study was done in a tertiary care teaching hospital in the Department of Respiratory Medicine at Maharajah Institute Of Medical Sciences, Andhra Pradesh, India.

Study duration: June 2018 to December 2019

Sample size: 30

Materials:

1. Thorough history taking
2. Respiratory system examination

3. 6-minute walk test
4. Chest x-ray PA view
5. Spirometry
6. DLCO
7. HRCT chest in clinically suspicious cases
8. CT guided biopsy in undiagnosed cases

Methods: Thorough history was taken followed by respiratory system examination in all the cases. 6-minute walk test, spirometry, chest X-Ray PA view, DLCO and HRCT chest was done in all the case suspicious of ILD. In 2 patients,the diagnosis could not be concluded, so we had to go for a CT guided biopsy.

Inclusion criteria:
1. Patients who had a history and clinical examination suggestive of ILD
2. Patients who had a significant desaturation on the 6-minute walk test
3. Patients who had a restrictive/ mixed pattern in spirometry and reduced DLCO
4. Patients with chest x-ray and HRCT chest suggestive of ILD
5. Patients who were willing for the study.

Exclusion criteria:
1. Patients who do not give consent
2. Patients with very severe breathlessness were excluded
3. Recent myocardial infarction
4. Poor general condition
5. Already diagnosed case of ILD

Images:

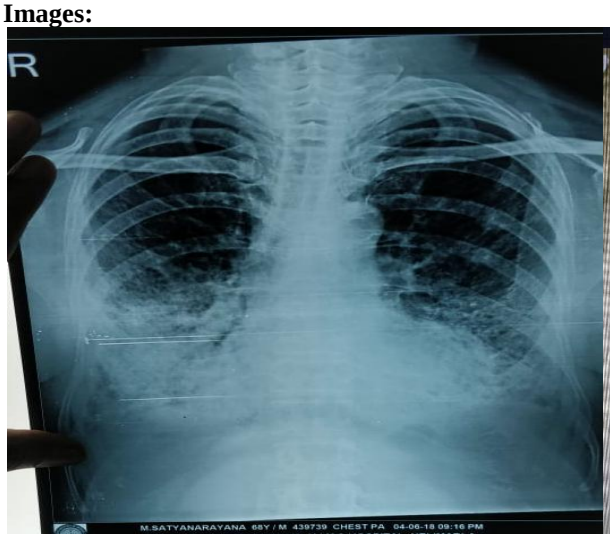


Figure-1
Chest X-Ray showing bilateral lower zone reticular pattern

Figure-2
HRCT chest showing UIP pattern

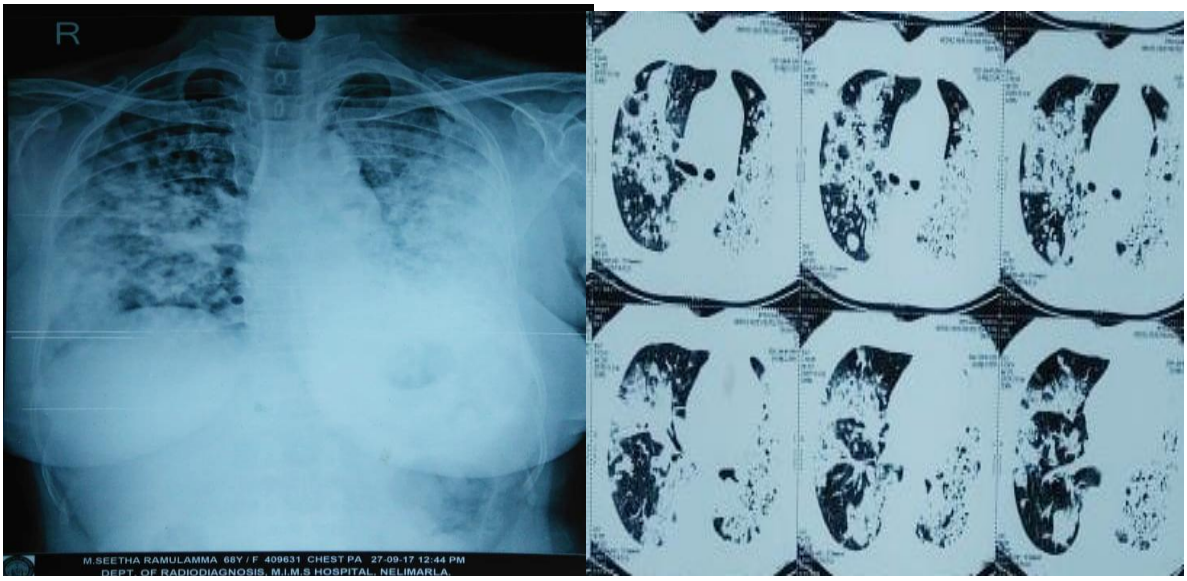


Figure 3 and Figure 4 - Chest X-ray and HRCT chest showing bilateral lower zone consolidation (COP)

III. Results

Among 30 patients, 15 were male, and 15 were female. All the 30 patients underwent the 6-minute walk test, spirometry, DLCO, chest X-Ray, HRCT chest. Basing on clinical and radiological modalities, we could diagnose 28 cases as ILD. Only 2 cases out of30 cases required a CT guided biopsy for a conclusive diagnosis.Out of 30 patients,nine were diagnosed as NSIP, eight as UIP, six as COP, three as HP, three as RB ILD and 1 case of IPF. The diagnostic yield of the clinical evaluation was 73.33%, 6-minute walk test was 80%, spirometry was 86.66%, DLCO was 86.66%, chest X-Ray was 60% and HRCT chest was 93.33%. The overall diagnostic yield is around 80%.

Chart 1: Shows the diagnostic yield of clinical evaluation and 6-minute walk test

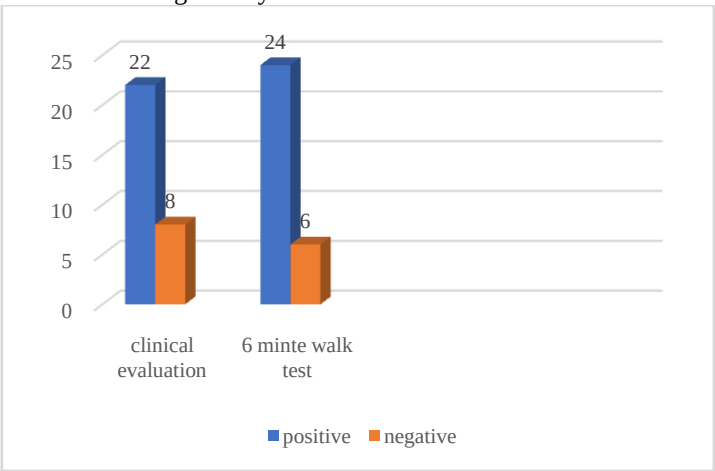


Chart 2: Shows spirometry results

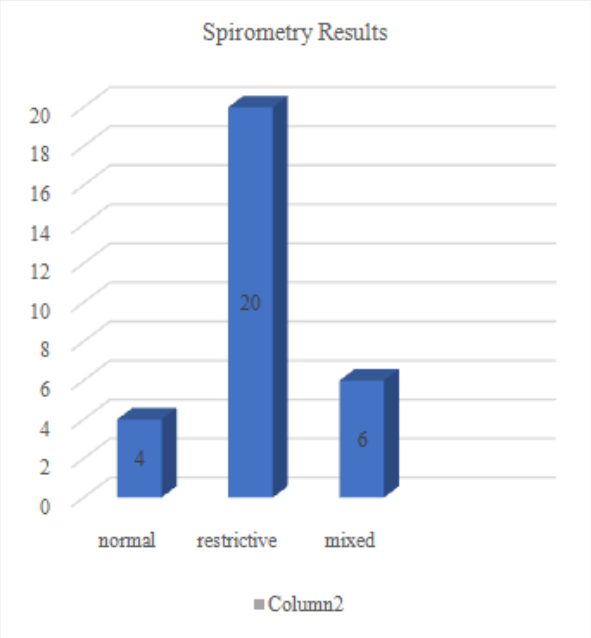


Chart 3: Shows DLCO results

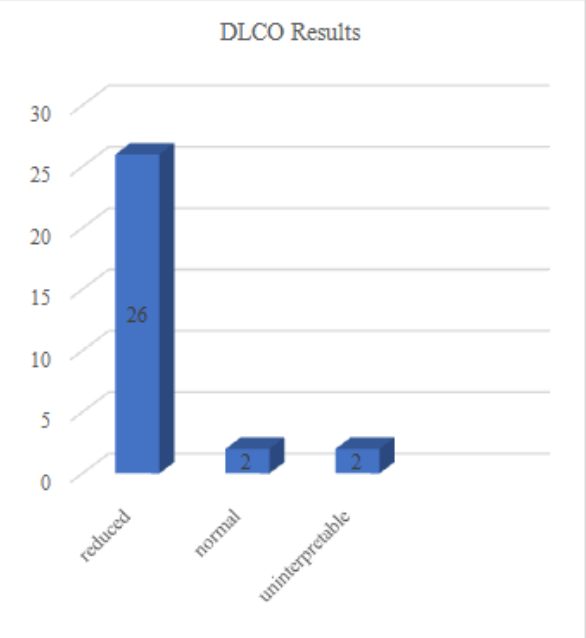


Chart 4: Shows diagnostic yield of all modalities

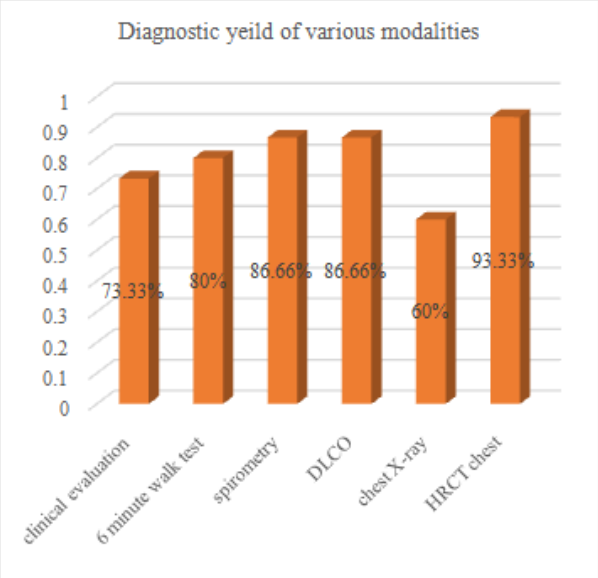
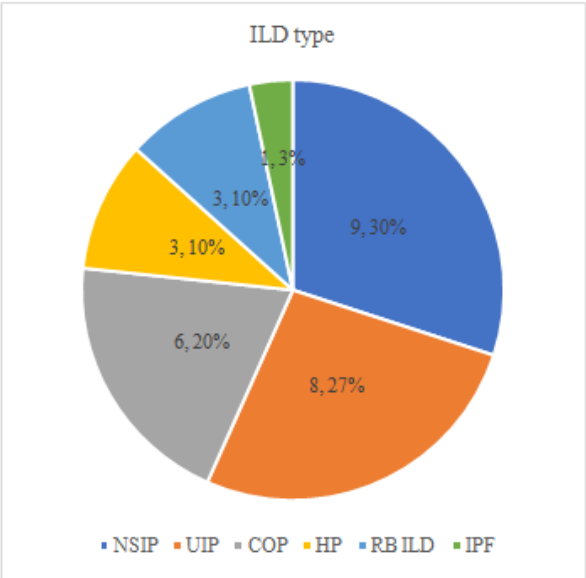


Chart5: Shows types of ILDs diagnosed in the study



IV. Discussion

In the present study, 30 patients were included. The male:female ratio is 1:1 which is comparable with Ganesh Raghu et al[1] andOrens JB et al[2] which was 1.5:1 and 1.8:1 respectively.In the study conducted by Raghu et al[3] the clinical evaluation and HRCT patterns were taken into consideration for the diagnosis of ILD and IPF which is similar to the present study. In the present study, we tried to highlight the importance of 6-minute walk test, spirometry, DLCO, Chest x-ray also. The diagnostic yield of clinical evaluation in the present study was 73.33% which is comparable with the Remy-Jardin et al[4], which is 80 %. The different ILD types encountered in the present study were 9 cases of NSIP, 8 cases of UIP, 6 cases of COP, 3 cases each of HP and RB ILD and 1 case of IPF. In another study by King et al[5] most commonly encountered ILD was IPF followed by NSIP, UIP and COP.

Surgical lung biopsy has always been the gold standard for diagnosing ILDS and will always be[6]. But in recent times the advancements in clinical evaluation and high-resolution CT scan it has become easier to come to a conclusive diagnosis. Alone with the clinical examination, spirometry, DLCO, 6- minute walk test about 70-80% cases can be diagnosed. Radiological modalities like HRCT chest adds up to the confirmation of

the diagnosis by identifying the pattern of involvement[7]. This helps us shift toa non-invasive mode of diagnosing the disease. CT guided biopsy was required in only 6% cases in the present study which proves the least necessity of an invasive procedure. The pathological results take a minimum of 5 to 10 days time whereas with HRCT, we can instantaneously confirm the pattern of ILD and start the patient on appropriate treatment as soon as possible. Early diagnosis and early treatment are the main aims of any disease management which in ILD can be fulfilled by clinical evaluation and HRCT chest. These modalities are also cost-effective and have the least complications when compared to lung biopsy[8]. In a study by Mathieson[9] HRCT chest was found to be more reliable than chest x-ray. As mentioned earlier ILD is a heterogeneous group of disorders that share similar clinical and radiological features so it becomes difficult for the clinicians to diagnose them based on history and examination alone. With the advent of HRCT chest, the various patterns in ILD have thoroughly studied and classified based on the patterns[10] . In some instances, the overlapping features also correlate with other infectious diseases like tuberculosis and also some malignancies like adenocarcinoma. In such cases, HRCT alone may not be confirmatory and a need for lung biopsy comes into play[11]. Earlier surgical lung biopsy was done, with recent interventional advances simpler biopsy methods like tru-cut biopsy guided by CT or ultrasound lung are in use. Histopathological examination is the gold standard investigation, and theyields are as high as 95 % which is comparable with that of HRCT yields which are 90%[12].

In the present study, both spirometry and DLCO were found to be reliable. Their diagnostic yield was 83%. But similar spirometry results and DLCO patterns can be seen in other diseases also. Even the 6-minute walk test was correlating with the diagnosis in 80% cases. 6-minute walk test has good sensitivity but is not specific for interstitial lung diseases. Coming to Chest x-ray, it is not found to be useful in diagnosing ILDs in early stages. In most of the cases with significant history and clinical findings,a chest x-ray was almost normal.[13,14] This lead to increased utilization of HRCT chest in confirming the diagnosis of ILD in clinically suspicious cases.[15]

Anyone modality is not sufficient enough to diagnose a case of ILD. It requires a great deal of coordination and interaction between a clinician and a radiologist to confirm the diagnosis of ILD. In institutions where the facilities of biopsy are not available must not lag behind in diagnosing ILD. A thorough history, clinical examination and HRCT with supportive investigations like spirometry, DLCO and 6-minute walk test have been found capable enough to come to a conclusive diagnosis of ILD[16]. It was also supported by various studies conducted worldwide.

V. Conclusion

The positive diagnostic yield of the clinical evaluation was 73% and that of HRCT chest was 93%. In 2 patients the clinical history was overlapping with malignancy and tuberculosis so we had to proceed with CT guided biopsy in them. We hereby in this study conclude that the combined yield of clinical evaluation and HRCT chest are promising enough to lessen the use of invasive modalities like biopsy. These modalities are cheaper and safer also when compared to a tru-cut biopsy or a surgical lung biopsy. So it is advisable to utilize the available resources and clinical expertise to diagnose a case of ILD.

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