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ORIGINAL ARTICLE

ROLE OF TRANSBRONCHIAL LUNG BIOPSY IN DIFFUSE PARENCHYMAL LUNG DISEASES

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ABSTRACT: Diffuse parenchyma lung disease (DPLD) encompasses a hetero-geneous group of disorders, characterized by a spectrum of inflammatory and fibrotic changes affecting alveolar walls and air spaces. They comprise over 200 entities and include a wide spectrum of diseases, many uncommon and many of unknown etiology. The incidence and prevalence rates of DPLD have not been precisely estimated due to difficulties in ascertaining a specific diagnosis on a specific disease. **MATERIAL & METHODS:** Prospective observational study done on 20 adult patients with radiologically diffuse parenchymal lung disease admitted between January 2010 and May 2015 in Govt. General & Chest Hospital, Hyderabad were subjected for Transbronchial Lung Biopsy via flexible fibreoptic bronchoscopy, without fluoroscopic guidance. **RESULTS:** Out of 20 patients studied adequate lung tissue was obtained in 15 patients, yield of the procedure was 75%. Out of 15 patient's histopathological diagnosis of chronic interstitial pneumonia is seen in 5 members, interstitial fibrosis is seen in 4 members, non caseating granulomas seen in 4 members, pulmonary alveolar protenosis was seen in 1 member and normal lung histopathology was seen in 1 members. Diagnostic yield of the procedure was 93.3% and overall diagnostic yield was 70%. Two patients developed post procedure pneumothorax. Both of them underwent closed-tube thoracostomy, lung expanded well and ICD was removed in 4 days. No significant bleeding was observed in any patient. No mortality was observed after the procedure. **CONCLUSIONS:** Transbronchial lung biopsy through flexible bronchoscopy is a simple, safe and effective procedure for the diagnosis of diffuse parenchymal lung diseases. Complications were observed in only few patients out of twenty, which were successfully managed with ICD.

KEYWORDS: Diffuse parenchyma lung disease (DPLD), HRCT, Flexible fiberoptic bronchoscopy (FOB), trans bronchial lung biopsy (TBLB).

INTRODUCTION: Diffuse parenchyma lung disease (DPLD) encompasses a heterogeneous group of disorders, characterized by a spectrum of inflammatory and fibrotic changes affecting alveolar walls and air spaces.(1) They comprise over 200 entities and include a wide spectrum of diseases, many uncommon and many of unknown etiology.(2) The onset, rate of progression and duration of symptoms are extremely variable, however, and presentations range from and asymptomatic patient with long standing radiological changes to an acute onset of breathlessness over days leading rapidly to respiratory failure and death. DPLDS account for 15% of diseases seen in Pulmonary Medicine practice. The incidence and prevalence rates of DPLD have not been precisely estimated due to difficulties in ascertaining a specific diagnosis on a specific disease. Moreover ILD usually remains a diagnosis of exclusion requiring extensive investigations to differentiate ILD from other diseases.[3] In a study undertaken in the Bernalillo county, New Mexico, USA, data from a dedicated ILD registry

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estimated the incidence of ILD at 30 per 100,000 per year , with approximately one- third in the idiopathic pulmonary fibrosis(IPF) category. The estimated incidence was higher for men than women.[4] International differences in the prevalence of DPLD exist: in Japan it was estimated to be 4.1 per 100,000.[5] where as in Finland it was estimated to be 7-12 per 100,000.[6]

MATERIAL & METHODS: Prospective observational study done on 20 adult patients with radiologically diffuse parenchymal lung disease admitted between January 2014 and May 2015 in Govt. General & Chest Hospital, Hyderabad were subjected for Transbronchial Lung Biopsy via flexible fibreoptic bronchoscopy, without fluoroscopic guidance. The study was commenced after obtaining approval from the institution's ethical committee. All adult patients having radiologically (chest x-ray PA view and HRCT - chest) diffuse parenchymal lung disease, who were not diagnosed by clinical, radiological and routine laboratory investigations were included in the study. Patients having Obvious lung mass, Sputum for AFB (D/S) positive, Not willing to give informed consent, Unfit for bronchoscopy are excluded from the study. After obtaining informed consent from the patients, the procedure was performed using flexible fiber optic bronchoscope (Olympus BfTE2 & Fujinon). Pre-medication was done with atropine 0.6mg i.m and 2% lignocaine spray was done through atomizer in patient's mouth in the direction of fauces and transnasal topical 2% lignocaine gel was given into each nostril.

The lung lobe having the maximum radiological abnormality was chosen and FOB wedged into the bronchus of that segment. When the pulmonary disease was equally distributed in both lungs, the basal segments of lower lobes were selected for TBLB. Biopsy forceps was advanced beyond the tip of the scope until resistance was met. The forceps was then withdrawn by 1 to 2cm and cup of the forceps was opened. The patient was then asked to inhale deeply and the forceps was re-advanced during inhalation for 2-3cms or till resistance was met. The patient was asked to exhale and forceps was closed at the end of expiration and the biopsy forceps was withdrawn and the sample was collected. An average of four lung biopsy samples were taken (Ranging between 3 to 6) and kept in 10% formalin and were subjected for histopathological examination. Chest X-ray P-A view in expiration was taken for all patients within 4-6hrs of the procedure to check for post-procedure pneumothorax. Patients were kept under observation for dyspnoea and hemoptysis.

RESULTS: Out of 20 patients studied 12 were males and 8 were females. 5 patients were aged between 15-30years, 9 were aged between 31-45 years and 6 were aged more than 46 years. Results are shown in table 1&2. More than half of the patients in the study were house wife's (11), 3 were business men, 3 were daily wage labor, 1 security guard 1 farmer and 1 politician shown in table 3. Chet xrays findings in study group include reticulonodular in 7 patients, micronodular in 5 patients macronodular in 1 patient, ground glass in 4 patients and consolidation in 3 patients was shown in table 4. HRCT findings include ground glass in 5 patients airspace consolidation in 5 patients, reticular in 4 patients, nodular in 4 patients and Honey combing/ traction bronchiectasis/cystic changes in 2 patients was shown in table5. Out of 20 patients studied adequate lung tissue was obtained in 15 patients, yield of the procedure was 75%. Out of 15 patient's histopathological diagnosis of chronic interstitial pneumonia is seen in 5 members, interstitial fibrosis is seen in 4 members, non caseating granulomas seen in 4 members, pulmonary alveolar protenosis was seen in 1 member and normal lung histopathology was seen in 1 members results were shown in table1. Diagnostic yield of the procedure was 93.3% and overall diagnostic yield was 70%.

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Two patients developed post procedure pneumothorax. Both of them underwent closed-tube thoracostomy, lung expanded well and ICD was removed in 4 days. No significant bleeding was observed in any patient. No mortality was observed after the procedure.

DISCUSSION: The diagnosis of diffuse parenchymal lung disease is often challenging due to wide variety of causes included in the group and their varied presentations. Chest radiograph is an essential test, diagnostic in at least 50% of cases. It has limited sensitivity and specificity in diagnosis of DLD. Up to 10% patients of biopsy proven DPLD have normal chest X-Ray.[7] Regardless of the initial insult, the repertoire of histopathological responses in the lung is relatively restricted and therefore, the spectrum of patterns on chest radiography is generally narrow. Radiological patterns include Reticular (Fine net like appearance), nodular, linear (Fine lines), ground-glass opacification (Veil-like opacification of the lungs that renders vessels indistinct), and airspace opacification or consolidation (poorly defined areas of increased density in which an airbonchogram may or may not be visible). HRCT has evolved into a standard procedure during the evaluation of almost all patients with ILD.

It is more sensitive than plain chest radiograph in identifying ILD (Sensitivity greater than 90%) and the image pattern of parenchymal abnormalities on HRCT often suggest a particular set of diagnostic abnormalities. HRCT is often in itself diagnostic, and should always precede biopsy in the investigation of DPLD. HRCT also identifies 'mixed' patterns of disease (ILD and emphysema) or additional pleural, hilar or mediastinal abnormalities. It has a better correlation with physiologic impairment and is especially useful in guiding the site of BAL or lung biopsy. Normal HRCT essentially rules out IPF but does not rule out microscopic inflammation and granulomatous changes. HRCT makes a greater diagnostic contribution in the IIPs because an obvious etiological factor is lacking.

In many cases, the diagnosis is obvious clinically an HRCT is merely confirmatory. However, in an important subset, the clinical presentation is not definitive and diagnostic HRCT findings are extremely influential. HRCT plays an important diagnostic role in LCH, LAM, alveolar proteinosis and lymphangitis carcinomatosis. Fiber optic bronchoscopy with BAL or TBLB may substantiate specific diagnosis in some patients (eg-sarcodosis, LCG, LAM. CEP, COP). BAL may be adequate in to diagnose specific infections (TB, Histoplasmosis, coccidioidomycosis, endemic fungal infections) and selected non- infections disease – e.g., LCG, LAM.[8] BAL cell profiles may narrow the differential diagnosis.[9] Increase in BAL lymphocytes suggests sarcoidosis HP,[10] or other granulomatous processes. TBLB achieves a high diagnostic yield in DPLDs with centrilobular attenuation, such as granulomatous and metastatic diseases, infection, alveolar proteinosis and eosinophilic pneumonias.[11]

This study was undertaken to evaluate the diagnostic yield of transbronchial lung biopsy in diffuse parenchymal lung disease in this institution. The present study has a diagnostic yield of 70%, which is comparable with many other studies which are shown in table 2. In the present study, two patients developed pneumothorax, which was treated with closed tube thoracostomy and is comparable with other studies which are shown in table 3. In the study done by Prakash et al,[12] transbronchial lung biopsy was done with the aid of fluoroscopy with a diagnostic yield of 75.9% and complications (pneumothorax) were observed in 1.26% patients. Transbronchial lung biopsy can be performed safely and effectively on out-patient basis in selected cases as done by Suri et al and Hernández Blasco et al.[13,14]

CONCLUSIONS: Transbronchial lung biopsy through flexible bronchoscopy is a simple, safe and effective procedure for the diagnosis of diffuse parenchymal lung diseases. Complications were observed in only few patients out of twenty, which were successfully managed with ICD.

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Age	Number of Patients
15–30 Yrs	5
31–45 Yrs	9
>46 Yrs	6

Table 1: Age Distribution of Patients

Sex	Number
Male	8
Female	12

Table 2: Sex Distribution of Patients

House wife	11
Businessmen	3
Politician	1
Security guard	1
Farmer	1
Daily wage labor	3

Table 3: Occupation

Reticulo – nodular	7/20
Micronodular	5/20
Macronodular	1/20
Ground-glass	4/20
Consolidation	3/20

Table 4: Chest X-Ray Patterns

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Reticular	4/20
Ground – glass	5/20
Air – space consolidation	5/20
Nodular pattern	4/20
Honey combing/ traction bronchiectasis / cystic changes	2/20

Table 5: HRCT Chest–Predominant Patterns

Interstitial Fibrosis	4
Chr. Interstitial Inflammation	5
Granuloma (Non-Caseating)	4
Pulmonary Alveolar Proteinosis	1
Normal Lung Tissue In The Specimen	1
Inadequate Lung Tissue	5
Total	**20**

Table 6: Bronchoscopic Biopsy Findings

References	No. of Patients	Diagnostic Yield
Kalra et al[15]	26	76%
R.K.Ailani[16]	30	77%
Andersen[17]	939	79.4%
Milman et al[18]	126	66.7%
Mitchell et al[19]	183	61%
Szlubowski et al[20]	123	65%
Ibrahim AS et al[21]	71	81.7%
Ahluwalia et al[22]	25	80%
Present study	**20**	**70%**

Table 7: Comparison of Diagnostic Yield in Various Studies

References	No. of Patients	Complication Rate (Pneumothorax)
Kalra et al	26	11%
R.K.Ailani	30	3%
Andersen	939	10%
Ibrahim AS et al	71	9.8%
Hanson RR et al	164	4%
Present study	**20**	**10%**

Table 8: Comparison Of complications In Various Studies

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