

## Role of Lung Biopsy in Diagnosis of Pulmonary Tuberculosis (Hospital Based Observational Study)

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**Abstract:** This descriptive observational study evaluated the frequency of histopathological diagnosis of pulmonary tuberculosis in AFB negative cases by trucut lung biopsy and determined frequency of complications in patients having undergone trucut lung biopsy. The study was conducted in Medical and Pulmonology department of Liaquat University of Health Sciences, Jamshoro during a span of one year (April 2006 to March 2007). The sample size was comprised of 50 patients and sampling technique was non probability purposive. Patients with history suggestive of pulmonary tuberculosis but their three sputum smears found negative for acid fast bacilli were enrolled. Lung biopsy was conducted in ward procedure room under all aseptic measures after pre biopsy bleeding and clotting profile. This study was approved by ethical review committee of Liaquat University of medical and health sciences. Data was entered and analyzed on SPSS 10 version. Thirty (60%) biopsy specimens were found positive for tuberculosis. Histopathological findings were inconclusive in (30% revise) cases. Overall 9 (18%) patients experienced complications (Pneumothorax in 12% cases and Haemoptysis in 6% cases). It was concluded that trucut lung biopsy is sensitive and safe technique in the diagnosis of pulmonary tuberculosis.

**Key words:** Lung biopsy • Diagnosis • Tuberculosis

### INTRODUCTION

Tuberculosis was declared as a global emergency by WHO in 1993 [1-3]. Pakistan accounts for 44% of the total burden of tuberculosis in the East Mediterranean region (EMR) and ranks 6<sup>th</sup> among the countries with the highest number of cases. While 2, 10,000 new tuberculosis cases occur each year, only one in four cases are properly diagnosed in Pakistan [4].

Six high burden countries, which account for over 50% of the tuberculosis epidemic, are in Asia. According to WHO estimates, 4.5 million of the eight million new cases that occur each year are in India, China, Bangladesh, Indonesia, Philippines and Pakistan [5].

Tuberculosis is a social disease with medical implications. It has always occurred disproportionately among disadvantaged populations such as the homeless, malnourished and overcrowded. Within the past decade it also has become clear that the spread of HIV infection and the immigration of persons from areas of high incidence have resulted in increased numbers of tuberculosis cases [6].

Tuberculosis (TB) is an infection with mycobacterium tuberculosis, a type of bacterium. It is estimated that as many as 30% of the world population is infected. Tuberculosis infection typically occurs after repeated or prolonged exposure to the coughing of an actively infected person. Infection can involve any organ in the body, but the lungs are the most common site. In active infection there is damage to organs. In latent infection the person carries the bacteria but does not have current signs of active infection. Latent TB infection is important to be diagnosed and treated because it can become active infection [7].

The diagnosis of tuberculosis depends upon clinical history, radiography and sputum examination for acid fast bacilli (AFB) [8-9]. Clinical and radiological findings are only suggestive of tuberculosis which is confirmed by demonstration of AFB in sputum by direct smear or by culture.

It is observed that some radiographic findings are unrelated to pulmonary tuberculosis. These findings include mass in lung, atelectasis, homogenous consolidation etc; and accounts for 15-30% cases [10].

In such cases the sputum smear negative for AFB make a diagnostic dilemma for physicians. In these cases lung biopsy has to be done to solve these dilemmas.

It is a challenge in developing country like Pakistan because of the limited resources for diagnosis of common diseases like tuberculosis. The long duration of therapy with potential side-effects further pose a burden onto the pocket and health.

The purpose of the study was to diagnose pulmonary tuberculosis in situation of diagnostic dilemma and establish the frequency of positivity rate for tuberculosis through this invasive but useful technique.

### MATERIALS AND METHODS

This study was carried out in the General Medicine ward, Liaquat University Hospital Jamshoro in the period from April 2006 to March 2007. The study included fifty patients admitted through the outpatient department, as well as from casualty department of Liaquat University Hospital Jamshoro/Hyderabad. All the data was entered in a specified proforma designed for this purpose. Detailed History was taken from all the patients with special regard to cough for more than six weeks, fever, weight loss, night sweats, poor appetite, fatigue, hemoptysis, chest pain and taking ATT (Antituberculous therapy) less than two weeks. Detailed Clinical examination of the patient was done. Systemic review was also done to see any co-morbidity. All patients underwent

for base line and specific investigations especially sputum for acid fast bacilli and radiological findings on x-ray chest. All patients after counseling for study and taking written consent, above 18 years of age with either sex admitted in general medicine ward through outpatient department and diagnosed as case of pulmonary tuberculosis disease on the basis of history, clinical examination and investigations especially on trucut biopsy were included in this study. Exclusion criteria included low platelets counts, suspected lung carcinoma, arteriovenous malformation and pulmonary hypertension. Data were analyzed through SPSS software version 16.0.

### RESULTS

Out of 50 patients included in this study 27 were women (54%) and 23 patients were male (46%); with male to female ratio of 1:1.2 (Table 1)

There was a wide variation of age ranging from a minimum of 15 year to 60 year. The mean age was 42±3.2 year (Table 2). The total number of +ve family history of pulmonary T.B was 16(32%) while 34(68%) were negative. The results showed that females (24%) had more positive family history of tuberculosis, when compared with males (8%) of suspected cases of pulmonary tuberculosis (p-value <0.001) (Table 3). Out of the studied fifty patients; 36% had history of fever, 24% presented with productive cough, 26% had hemoptysis, 4% had chest pain and 30% lost weight (Table 4). The histopathologic

Table 1: Gender Distribution Among the Studied Cases

No. of Patients	Gender	%
23	Male	46
27	Female	54

Male: Female Ratio = 1:1.2

Table 2: Age Distribution Among the Studied Cases

Age	No. of patients (n=50)	%
15-30 years	11	22
31-45 years	26	52
46-60 years	13	26

Means Age = 42±3.2 years

Table 3: Comparison of Family History of Tuberculosis Positivity in Male and Female Study Subjects

Family History	Male		Female		Total	
	No: of Patients	(%)	No: of Patients	(%)	No: of Patients	(%)
Family History of T.B +ve	4	8	12	24	16	32
Family History of T.B -ve	19	38	15	30	34	68

P-Value <0.001\*

\*Statistically significant

Table 4: Clinical features Presented by the Studied Patients

Symptoms & sign of patients	No. of patients (n=50)	(%)
Fever	18	36
Productive Cough	12	24
Haemoptysis	13	26
Chest pain	02	04
Weight loss	30	60

Table 5: Histopathologic Findings of the Studied Patients' Lung Biopsies (n = 50)

Histopathologic Findings	No. of Patients	%
Caseating Granuloma	30	60
Non-Caseating Granuloma	06	12
Non-specific inflammation	10	20
Carcinoma	4	8

Table 6: Complications of the Studied Patients' Lung Biopsies (n = 50)

Complications	No. of Patients	%	P-value
Pneumothorax	6	12	0.001*
Hemoptysis	3	6	
No-Complication	41	82	
Total	50	100	

\*Statistically significant

findings revealed that there was a caseating granuloma in 30(60%) patients, non-caseating granuloma in 06 (12%) patients, non-specific inflammation in 10(20%) patients and carcinoma in 4(8%) patients (Table 5). The common complications of lung biopsy seen in this study were pneumothorax in 12% of cases and hemoptysis in 6% of cases (p-value 0.001) (Table 6).

### DISCUSSION

Tuberculosis is established as a treatable endemic disease. Diagnosis of tuberculosis is challenge in developing countries especially where the prevalence of HIV is high [2, 8]. In many areas of world despite suggestive clinical and radiological findings, sputum negative pulmonary tuberculosis frequently poses difficulties in diagnosis [11]. Even negative cytology does not exclude possibility of active disease.

The male to female ratio seen in our study was 1:1.2. However the male to female ratio given by Golsha [12] (1:1.1) is almost the same as the present study.

In our study age ranged from 15 to 60 years with mean age was 42±3.2 years. The peak age group for presentation of pulmonary tuberculosis in our study is 31 to 45 years. However Chowell [13] showed mean age of males 50.19±19.9 years whereas for females was 38.89±19.5 years and Wiwatworapan [14] showed mean age 51.62±18.07 years.

In our study 16 (32%) patients had family history of tuberculosis while 34(68%) were negative. In male to female comparison we found that female (24%) had more positive family history of tuberculosis than males (8%) in suspected cases of pulmonary tuberculosis. Similar studies favour these results [15, 16]

In our study, 36% of the investigated patients had history of fever, 24% presented with productive cough, 26% had haemoptysis, 4% had Chest pain and 30 % showed weight loss. However in the study of Shaikh *et al.* [17], the patients presented with history of fever and cough, haemoptysis was present in 72%, chest pain in 18% and dyspnea in 22% of cases.

The clinical parameters were further supported by trucut biopsy which revealed caseating granuloma in 60%, non-caseating granuloma in 12%, non-specific inflammation in 20% and carcinoma in 8% of the examined cases. Shaheen *et al.* [18] conducted a study in Pakistan on 159 lung biopsies and they reported an adenocarcinoma in 27.67%, squamous cell carcinoma 25.78%, small cell carcinoma 8.17% and tuberculosis 5.03% of the examined cases [18].

The study conducted by Mujahid *et al.* [19] included 92 cases and histological diagnosis of tuberculosis was made in 72.8% of cases that is consistent with our results but our results were more reliable because through trucut technique we obtained adequate biopsy material hence less chances of bias or diagnostic inaccuracy.

Muldhure *et al.* [20] also reported cytological results identical to our study.

Fukuda *et al.* [21] in Japan conducted a study on 30 patients and amongst them 21, (70%) showed histopathologic findings consistent of tuberculosis. These results are compatible with our study. The only difference is the gender distribution. In our study, female patients predominated as compared to the study by Fukuda, *et al.* [21] where number of male patients was relatively higher. In our study, 9 (18%) patients experienced complications of trucut lung biopsy; this was our secondary objective. Pneumothorax in 6 (12%) and haemoptysis in 3 (6%) of cases were the complications but they were transient and did not require any active management. Thus it was a safe diagnostic procedure. Mujahid *et al.* [19] reported such complications in 12% of the studied cases. It is concluded that trucut lung biopsy is a sensitive and safe technique providing diagnosis of suspected AFB –ve patients.

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