

## Original article :

# Closed Pleural Biopsy and Thoracoscopic Guided Pleural Biopsy in Pleural Effusion Patients: An Institutional Study

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### Abstract

**Background:** Pleural effusion is a common complication of systemic and localized disease. This study was conducted to compare the efficacy of closed pleural biopsy and thoracoscopic guided pleural biopsy in diagnosing pleural effusion.

**Materials & Methods:** This study was conducted on 40 patients of exudative pleural effusion. A pleural fluid analysis including cytopathological examination was also performed. A CPB was done using Cope's pleural biopsy needle and tissue sent for histopathological examination (HPE). Thoracoscopy was done with the patient lying in lateral decubitus position with the affected side upward.

**Results:** Out of 40 patients, males were 16 and females were 24. Out of 40 patients, CPB diagnosed 6 cases of TB and TPB 8 cases of TB. Carcinoma was diagnosed in 16 cases in CPB and 10 by TPB. The difference was significant ( $P < 0.05$ ). In TB patients nodularity was seen in 40%, adhesions in 60% and hyperemic in 65% of cases. In carcinoma patients, nodularity was seen in 70%, adhesions in 35% and hyperemic in 45% of cases. The difference was significant ( $P < 0.05$ ).

**Conclusion:** TPB is a minimally invasive procedure has greater diagnostic efficacy and with minimal to no complications as compared to CPB.

**Keywords:** Pleural Biopsy, Nodularity, Pleural Effusion.

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## INTRODUCTION

Pleural effusion is a common complication of systemic and localized disease. Most common causes of pleural effusions in India are tuberculosis, pneumonia, malignancies, congestive heart failure, renal failure, connective tissue disorders and pulmonary embolism.<sup>1</sup> It is excessive accumulation of fluid in the pleural space- indicates an imbalance between pleural fluid formation and removal. The normal pleural space contains a relatively small amount of fluid, 0.1 to 0.2 mL/kg of body weight on each side. Pleural fluid is formed and removed slowly, at an equivalent rate, and has a lower protein concentration than lung and peripheral lymph.<sup>2</sup>

It can accumulate by one or more of the following mechanisms such as increased hydrostatic pressure in the microvascular circulation. Clinical data suggest that an elevation in capillary wedge pressure is the most important determinant in the development of pleural effusion in congestive heart failure. Second phenomenon is decreased oncotic pressure in the microvascular circulation due to hypoalbuminemia, which increases the tendency to form pleural interstitial fluid.<sup>3</sup> The diagnosis of pleural effusion is achieved by history, clinical examination, radiology and by investigating the pleural fluid. 15–20% of all pleural effusions remain undiagnosed despite intensive efforts. In order to diagnose cases, other diagnostic modalities

are looked forward. This includes closed pleural biopsy (CPB) and thoracoscopic pleural biopsy (TPB). By CPB, 45- 50% cases can be diagnosed. It has the highest diagnostic yield in detecting TB and malignancy. Other suggested method is TPB. Using thoracoscopy, the diagnostic accuracy could reach 96% with 91% sensitivity and 100% specificity.<sup>4</sup> This study was conducted to compare the efficacy of both techniques in diagnosing pleural effusion.

## MATERIALS & METHODS

This study was conducted in the Department of Pathology, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India. It comprised of 40 patients of exudative pleural effusion. Written consent was taken from all patients. Patient information like name, age, gender etc was recorded. A complete clinic-radiological evaluation of the patient was done. A pleural fluid analysis including cytopathological examination was also performed. A CPB was done using Cope's pleural biopsy needle and tissue sent for histopathological examination (HPE). Thoracoscopy was done with the patient lying in lateral decubitus position with the affected side upward. During the procedure, local anesthesia was used. Rigid endoscope with viewing angle of zero degrees was used. Biopsy specimens of the parietal pleura were obtained under direct vision and were sent for HPE. Results thus obtained were tabulated and subjected to statistical analysis using chi square test. P value <0.05 was considered significant.

## RESULTS

Table I shows that out of 40 patients, males were 16 and females were 24.

Table II, Graph 1 shows that out of 40 patients, CPB diagnosed 6 cases of TB and TPB 8 cases of TB. Carcinoma was diagnosed in 16 cases in CPB and 10 by TPB. The difference was significant ( $P<0.05$ ).

Graph II shows that in TB patients nodularity was seen in 40%, adhesions in 60% and hyperemic in 65% of cases. In carcinoma patients, nodularity was seen in 70%, adhesions in 35% and hyperemic in 45% of cases. The difference was significant ( $P<0.05$ ).

## DISCUSSION

The symptoms include accumulation of pleural fluid produces a restrictive ventilatory defect and decreases total lung capacity, functional capacity, and forced vital capacity. It may cause ventilation-perfusion mismatches due to partially atelectatic lungs in dependent areas and, if large enough, may compromise cardiac output by causing ventricular diastolic collapse.<sup>5</sup>

The symptoms depend on the amount of fluid and the underlying cause. Many patients have no symptoms at the time a pleural effusion is discovered. Possible symptoms include pleuritic chest pain, dyspnea, and dry nonproductive cough. Physical findings are reduced tactile fremitus, dullness on percussion, and diminished or absent breath sounds. A pleural rub may also be heard during late inspiration when the roughened pleural surfaces come together. This study was conducted to compare the efficacy of both techniques in diagnosing pleural effusion.<sup>6</sup>

In present study; it was found out that out of 40 patients, CPB diagnosed 6 cases of TB and TPB 8 cases of TB. Carcinoma was diagnosed in 16 cases in CPB and 10 by TPB. This is similar to James et al.<sup>7</sup> The main conditions that can be established with needle biopsy of the pleura are tuberculous

pleuritis and malignancy of the pleura. Needle biopsy is currently recommended when tuberculous pleuritis is suspected and the pleural fluid adenosine deaminase or interferon- gamma levels are not definitive. We found that TB patients nodularity was seen in 40%, adhesions in 60% and hyperemic in 65% of cases. In carcinoma patients, nodularity was seen in 70%, adhesions in 35% and hyperemic in 45% of cases. This was similar as in study done by Ogirala et al.<sup>8</sup> François et al<sup>9</sup> found that in all 46 patients both CPB and TPB were performed. TPB was diagnostic in 36 cases (78.2%) while CPB was diagnostic only in 10 cases i.e. 21.7%. 10 (21,7%) cases remained undiagnosed. On thorascopic examination 30 patients were having nodularity, 25 (54.3%) were having adhesions and 20 (43.5%) were having hyperemia. 79.3% of the patients with nodularity turned out to be malignant and 71.4% of patients with adhesions and hyperemia tubercular. TPB has much greater diagnostic efficacy than CPB. Maskell et al<sup>10</sup> found that all patients who were

admitted with pleural effusions underwent a clinical workup for pleural effusions. Light's criterion was used to differentiate between exudative and transudative pleural effusions. Those patients with exudative pleural effusions, who did not have a specific diagnosis, were included in the study. Fifty eight patients were included in the study and they were randomized into 2 Groups of 29 patients each. One group was subjected to medical thorascopic pleural biopsy and the other to closed pleural biopsy with Abraham's needle. Demographic, clinical and biochemical characteristics, diagnostic yields and the complications among the two groups were compared. Medical thorascopy has a diagnostic yield of 86.2% with complication rate of 10.3% compared to 62.1% and 17.2% respectively in closed pleural biopsy group.

## CONCLUSION

TPB is a minimally invasive procedure has greater diagnostic efficacy and with minimal to no complications as compared to CPB.

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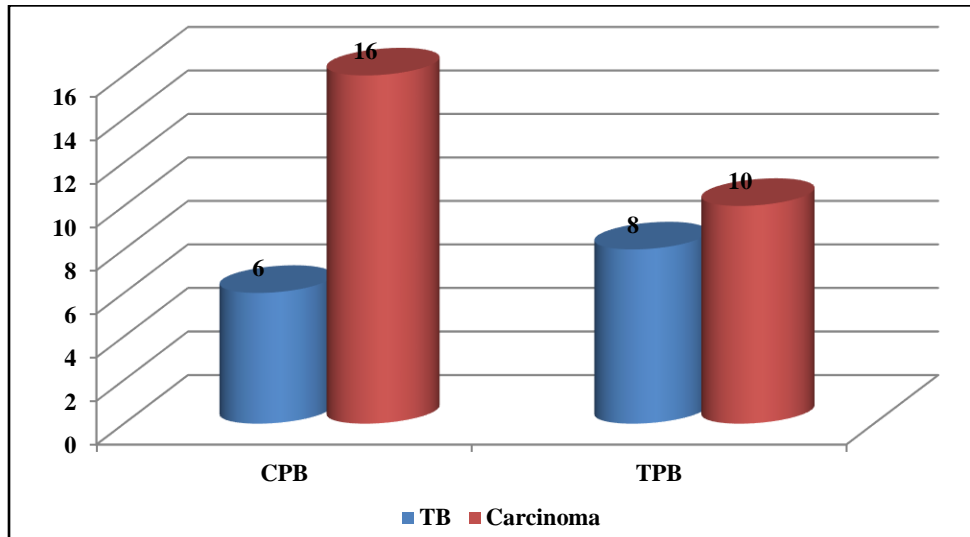
**Table I: Distribution of patients**

Male	Percentage	Female	Percentage
16	40	24	60

**Table II: Tuberculosis and carcinoma using CPB and TPB**

Detection	CPB	TPB	P value
TB	6	8	0.02
Carcinoma	16	10	0.01

**Graph 1: Tuberculosis and carcinoma using CPB and TPB**



**Graph II: Distribution of disease according to thoracoscopy findings**

