

## UTILITY OF BLIND PLEURAL BIOPSY IN UNDIAGNOSED PLEURAL EFFUSION USING ABRAMS NEEDLE

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### ABSTRACT

#### BACKGROUND

As many as one-fifth of all the exudative pleural effusions remain non-diagnostic, despite all the routine biochemical and cytological examinations of pleural fluid.

The aim of the study is to examine the role of closed pleural biopsy using Abrams needle in such cases of pleural effusion in a tertiary care hospital of central India.

#### MATERIALS AND METHODS

All the patients with initial non-diagnostic pleural fluid thoracentesis from January 2017 to October 2017 were included in the study and subjected to closed Abrams pleural biopsy. Biopsy sample was sent for histopathological examination, culture and CBNAAT (cartridge based nucleic acid amplification test) for tuberculosis. The patients who still remained nondiagnostic, further underwent other procedures as per the physician's decision. Statistical analysis was then done on the data collected.

#### RESULTS

Closed percutaneous pleural biopsy was performed in 60 patients. It yielded granulomatous inflammation suggestive of tuberculosis in 17 (28.33%), out of them, 15 cases were also detected by the CBNAAT. All of them were rifampicin sensitive. Malignancy was detected in 12 (20%) patients, mixed inflammatory pattern with pus cells in 9 (15%) patients. Almost, 22 samples (36.66%) were declared nondiagnostic.

#### CONCLUSION

Our age old closed biopsy technique was diagnostic in almost 64% cases of non-diagnostic pleural fluid exudates on thoracentesis. This study supports the use of Abrams needle for investigation purpose of pleural fluid in economically constrained countries.

#### KEYWORDS

Abrams Needle, Pleural Biopsy, Undiagnosed Pleural Effusion.

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#### BACKGROUND

Pleural effusion patients happen to be a common visitor to a clinical setup both respiratory and non-respiratory. In practice, pleural fluid analysis including the microbiological, biochemical and cytological tests diagnose the majority of the situation. Despite that, almost one-fifth of the exudates remain undiagnosed of their aetiology. Of these, the major junk remains to be the tuberculosis and malignancy.

Pleural biopsy is an important adjunct to the thoracentesis for both tuberculosis as well as the malignancy.<sup>1</sup> Abrams needle biopsy remains our age old procedure. It has been an easy to perform, inexpensive and

safe procedure to have a pleural junk, which can then be subjected to histopathology, microbiological examinations, nucleic acid based tests like CBNAAT and also the immunohistochemistry.

The closed percutaneous Abrams pleural biopsy is a well-known and frequently done procedure as the microbiological yield of pleural fluid analysis is not very convincing.<sup>2</sup> Though the procedure is not very fruitful in malignancy cases due to skip lesions in pleura as compared to the thoracoscopic biopsy, the cost of the later maybe a limiting factor in many setups.<sup>3,4</sup>

The present study was an effort to have an idea of add on diagnostic yield of closed pleural biopsy, when the pleural fluid analyses as exudates prove to be non-diagnostic. It was also an attempt to find the relative frequency of TB and malignancy in this scenario accurately diagnosed by this inexpensive procedure.

#### MATERIALS AND METHODS

This study was conducted at a tertiary care teaching and referral hospital in central India. The study period was

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between the January 2017 and October 2017. Patients diagnosed of pleural fluid on radiographic or ultrasound imaging were subjected to diagnostic thoracentesis after ruling out the congestive cardiac failure. Further subdivision was made based on the tests pertaining to Light's criteria. All the exudates were then sent for routine microscopy, Adenosine Deaminase (ADA), microbiological examinations including the staining and culture methods, biochemical examinations including the triglycerides, amylase, etc. and the cytology. Haemorrhagic fluids were sent for haematocrit estimation and if found more than 50% of the blood haematocrit were labelled haemothorax and excluded from the study.

After all these dedicated tests, if still the fluid remained nondiagnostic, the patients were then subjected to Abrams pleural biopsy with all aseptic precautions and thorough consideration of contraindication to the procedure, if any including the bleeding diathesis. The biopsy procedure was done by the trained pulmonary specialist.

After anaesthetising the skin and pleura by a local anaesthetic 2% lignocaine, a small nick in the skin was given by a surgical blade and the biopsy needle was then entered into the pleural space. It was further crosschecked by free-fluid aspiration through the needle via a syringe. The needle was slightly pulled backward and when no more fluid was aspirated, the needle was locked and taken out with the pleural biopsy specimen.

The diagnosis of tuberculosis was made if a typical tubercular granuloma was evident on histopathological examination or bacilli was visualised under the microscopy or if there was microbiological confirmation including the newer diagnostic tool CBNAAT. Malignant effusion was diagnosed when the sample was reported to be conclusively positive for the same. If needed, further immunohistochemical staining was performed to ascertain the diagnosis or to rule out the doubt between two malignancies like adenocarcinoma and mesothelioma.

If all these tests remained inconclusive, further interventions were done depending upon the physician's decisions and is out of the scope of the present study.

Informed written consent was taken from each patient before the procedure.

Data was collected and analysed statistically. All the demographic variables are presented as mean and range, while other findings have been presented in absolute figure and the percentages.

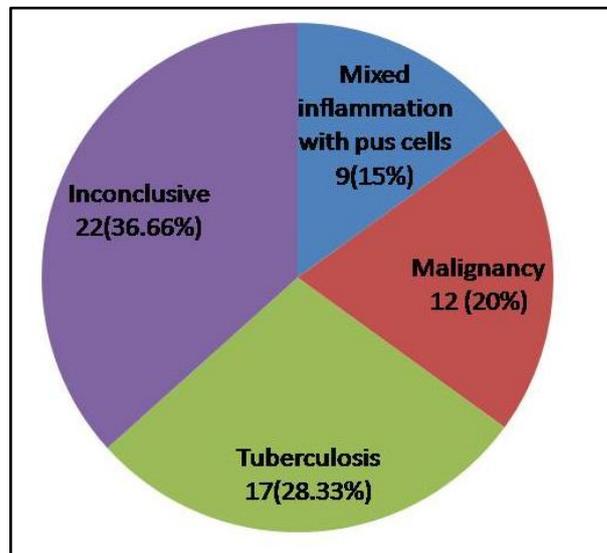
**RESULTS**

Out of the 60 included patients during the study period, majority 44 (73.33%) were males and 16 (26.66%) were females making a ratio of 2.75:1. The mean age happened overall to be 38 years with the range being 15-73 years. Women happened to be younger with a mean age of 33 versus men with a mean age of 39 years. Overall, TB cases had a younger subgroup as compared to the malignancy.

Patients were current smokers and ex-smokers in almost 73.33%, while non-smokers in 26.66%. Most smokers were men.

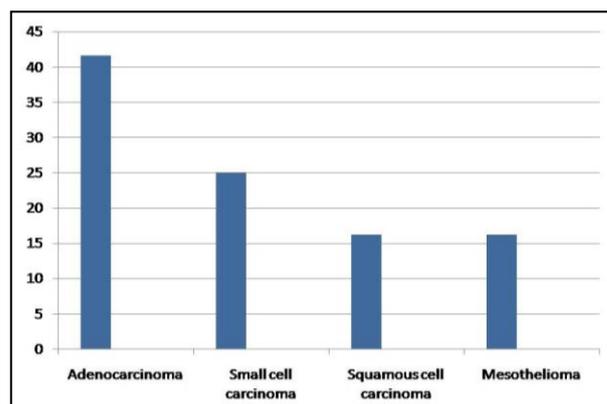
Pleural fluid in our study was straw coloured in 44 (73.33%), while it was haemorrhagic in 16 (26.66%). TB was consistent with 100% straw-coloured fluid, while malignant effusion was mostly haemorrhagic, i.e. in 10 (84%) out of the 12 cases.

A diagnosis of TB was evident in almost 17 (28.33%) patients on histopathology, out of which, 15 (25%) were also detected by the CBNAAT (Figure 1). All the 15 patients detected by the CBNAAT were rifampicin sensitive.



**Figure 1. Various Diagnosis Made on Pleural Biopsy Samples**

Malignancy was conclusively diagnosed in 12 (20%) patients, of which adenocarcinoma 5 (41.66) lead the list (Figure 2). Other being the small cell carcinoma 3 (25%), squamous cell carcinoma 2 (16.25%) and mesothelioma 2 (16.25%). The diagnosis of mesothelioma was further confirmed on immunohistochemical staining.



**Figure 2. Bar Diagram showing Various Malignancy Subtypes Diagnosed on Pleural Biopsy Samples**

Almost, 9 (15%) cases were having findings of empyema with mixed inflammatory cell population and pus cells without any granuloma or microbiological confirmation of TB including the test of CBNAAT.

Biopsy samples remain inconclusive to be rendered as nondiagnostic in 22 (36.66%) cases, which were then

further subjected to other interventions beyond the scope of this study.

There was no mortality with the procedure. There happened to be skin bleeding in one patient, but was eventually secured by deep pressure. No pneumothorax or the procedure related need for Intercostal Chest Tube Drainage (ICTD) ever happened during the procedure.

## DISCUSSION

Recently, there have been emphasis on image guided or direct visualising procedures like thoracoscopy for a better safety and increased yield especially in the malignant pleural effusion cases. The limit to this notion happens to be the resource constraints in developing countries like India. The higher cost, increased hospital stay and increased ICTD-related morbidity also favours the closed blind pleural biopsy with Abrams needle. Moreover, the different epidemiological profile of TB in developing countries and the increased yield via pleural biopsy for the same also adds to the point for this procedure.

In our study, malignancy was diagnosed in almost 20% of cases. There happens to be discordance in the previous studies with a sensitivity of Abrams needle biopsy ranging from 46-72%.<sup>5</sup> In one study with 414 patients, they showed an additional diagnosis of only 7% as compared to pleural fluid cytological analysis. Whereas, Mungall et al in their study showed highest diagnostic rates, i.e. 72% for malignant effusion and 88% for tubercular exudative pleuritis.<sup>6</sup>

We diagnosed 2 cases of mesothelioma in our study. Beauchamp et al showed the highest sensitivity in his study, while Boutin et al in his series showed the Abrams biopsy yield to be 20.7%.<sup>7,8</sup>

In our study, TB was diagnosed in 17 (28.33%) cases. In one study with 248 patients, the biopsy of the pleura via needle was having its own yield of almost 80%, which increased to 91% when staining and culture of the fluid was added.<sup>9</sup> Separate or multiple biopsy samples may also increase the yield.<sup>10,11</sup> Though thoracoscopy have an added advantage of direct visualisation and identification of the biopsy site, the added yield is not convincing possibly due to relative uniformity of the lesion as compared to the skip lesions in malignant effusions.<sup>12,13</sup>

In our study, adequate biopsy sample with pleural tissue on histopathology was obtained in almost 93%. This was relatively in agreement to the Cowie et al in whose series almost success in getting the pleural tissue was 90%. Walshe et al had slightly lower rates of 71%, but was done by non-respiratory experts.<sup>14,15</sup>

We were able to diagnose almost 63% of the nondiagnostic cases via blind needle biopsy, which can draw an inference of alleviation of costly procedures and morbidity related to them. Even the burden on Radiology Department can be reduced by this. Moreover, the complication rate attributable to the procedure happens to be minimal, which in our study was just a skin bleed in only one case. This can have economic as well as quality of life advantage in countries like India, where TB is endemic.

## CONCLUSION

In conclusion, our study advocates the use of blind pleural biopsy using the Abrams needle in our country whenever pleural fluid analysis is nondiagnostic considering the acceptable yield of the procedure, its safety, limited resources and increased burden of the patients on the healthcare and the endemicity of the TB.

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