

DIAGNOSTIC YIELD OF PLEURAL BIOPSY USING ABRAMS NEEDLE

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ABSTRACT

Background: To determine the diagnostic yield of closed percutaneous pleural biopsy using Abrams needle and obtaining specific diagnosis in cases of exudative pleural effusion.

Material & Methods: This observational study was undertaken during March 2015 to September 2015 in the Department of Thoracic Medicine Jinnah Post Graduate Medical Center Karachi. All patients with pleural effusion who were admitted and fulfilling the inclusion criteria were included in the study. Percutaneous pleural biopsy using Abrams needle was performed in all patients, the samples were sent for histopathology. The data was entered in a pre-designed performa.

Results: A total of 60 patients participated in the study. The male to female ratio was 1.6:1. Average age of patients was 42.8 years. Data revealed that yield of pleural biopsy using Abrams needle was 70%. Specific diagnosis through Abram's biopsy have shown 21 (35%) cases of tuberculosis, 16 (26.7%) cases of adenocarcinoma, 4 (6.7%) cases of chronic non specific inflammation, one (1.7%) case of lymphoma and 18 (30%) cases could not be reached for any diagnosis.

Conclusion: Due to availability of newer techniques and image guided biopsies, closed needle biopsy procedures are becoming less common in developed countries. However, in a set up like Pakistan, due to the higher cost and lack of availability of newer techniques, closed biopsy procedures remain the standard of management for the diagnosis of pleural effusions.

KEY WORDS: Abrams biopsy; Pleural effusion; Pleural biopsy.

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INTRODUCTION

Pleural effusion is a commonly encountered pathology by any pulmonary physician. Any abnormal disease process which results in excessive fluid production or reduced fluid absorption leading to fluid collection within the pleural space can lead to formation of pleural effusion.¹ Every year, approximately 320 per 100,000 people develop pleural effusion.² Pleural effusion may be transudative or exudative as classified by pleural fluid protein to se-

rum protein ratio and pleural fluid LDH to serum LDH ratio. Though it has many different causes, exudative pleural effusion secondary to tuberculosis remains the most common cause.³ Tuberculosis affects approximately 1/3rd of the entire world's population and the incidence of tuberculous pleural effusion is directly proportional to the prevalence of this disease in any area.⁴ Other causes of pleural effusion include malignancy, congestive cardiac failure and pneumonia which constitute 23%, 18% and 14% respectively.⁵

In exudative pleural effusion when there is no evidence of acute infection like pneumonia and pleural fluid is dominant with lymphocytes then there is a need to investigate the patient for cause like malignancy or tuberculosis. Pleural biopsy should be performed when cytological and microbiologic work up do not help.³ Pleural biopsy can be performed by Abrams needle, pleuroscopy, video assisted thoracoscopic surgery and thoracotomy. VATS and thoracotomy requires general anesthesia in the operating room but the other two procedures are performed under local anesthesia.

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In our country, pleuroscopy is still a relatively newer practice and not widely available in many pulmonary units due to cost. However, percutaneous pleural biopsy using Abrams needle is being performed successfully as a diagnostic procedure in most of the pulmonology units as it is cost effective. Our aim is to determine the diagnostic yield of closed percutaneous biopsy using Abrams needle biopsy technique.

MATERIAL AND METHODS

This study was conducted during March 2015 to September 2015 at the Department of Thoracic Medicine Jinnah Post Graduate Medical Center Karachi. The inclusions were based on the age above 14 years of either sex with exudative pleural effusion. A set of three different criteria were used to label the pleural effusion as exudative. If the pleural fluid protein was $>3\text{g/dl}$, the pleural fluid to serum protein ratio was >0.5 and the pleural fluid LDH to serum LDH ratio was >0.6 , the effusion was labeled as exudative. Those patients who had advanced empyema thoracis, pleural thickening, hemodynamic instability, bleeding disorder, inability to tolerate lateral decubitus position, or severe uncorrectable hypoxemia were not included.

Informed consent was taken from all the patients. Closed pleural biopsy using Abram's needle was performed. Four to five pleural tissue samples were taken and sent to the department of histopathology of the same hospital. A pre-designed Performa was used for data collection. Results are presented as percentages and frequency distribution tables.

RESULTS

A total of 60 patients participated in this study. There were 37 (61.7%) males and 23 (38.3%) females. The male to female ratio was 1.6:1. Mean age of 60 patients was 42.8 (Range = 15-80) years. Two age groups in this study i.e. 31-40 years and 51-60 years were equally common with the frequency of 12 (20%), followed by 15-20 years (18.3%), 21-30 years (15%), 41-50 years (13.3%) and two old age groups 61-70 years and 71-80 years were equally frequent with 4 (6.7%) patients.

Yield of Abram's biopsy in the diagnosis of exudative pleural effusion was 42/60 (70%) while

Table 2: Cause of pleural effusion and diagnostic accuracy

Cause of pleural effusion	Diagnostic accuracy
Tuberculosis	21 (35%)
Malignancy	16 (26.7%)
Chronic non specific inflammation	4 (6.7%)
lymphoma	1 (1.7%)

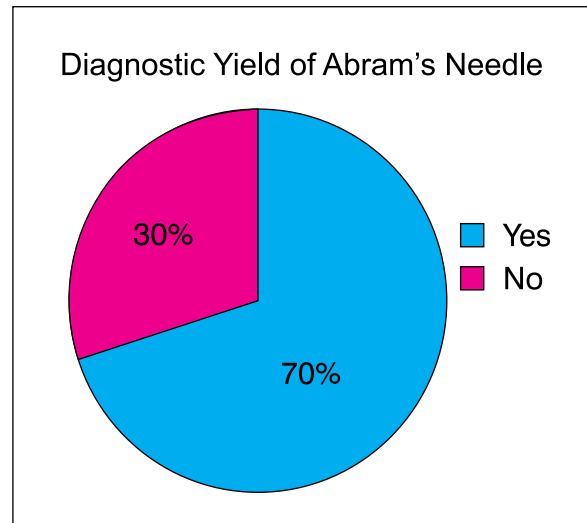


Figure 1: Diagnostic yield of Abram's needle biopsy

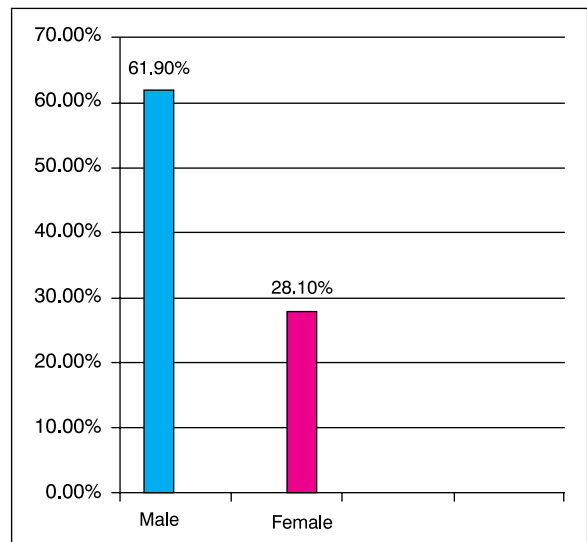


Figure 2: Gender comparison of yield of percutaneous biopsy using Abram's needle.

no specific diagnosis was found in 18 (30%) cases [table 1]. Specific diagnosis through Abram's biopsy have shown 21 (35%) cases of tuberculosis, 16 (26.7%) cases of adenocarcinoma, 4 (6.7%) cases of chronic non specific inflammation, one (1.7%) case of lymphoma (Table 2). No diagnosis could be determined in 18 (30%) cases. Our study showed that the yield of Abram's needle in the diagnosis of pleural effusion secondary to tuberculosis was higher when compared to the diagnosis of malignant pleural effusion.

DISCUSSION

The diagnosis of pleural diseases is not always easy. Despite repeated thoracentesis and biopsies, about 20% of pleural effusions remain un-

diagnosed.⁶ Tuberculosis and neoplasia is the most common cause of undiagnosed pleural effusions. Various techniques are employed for diagnosing the cause of these effusions but diagnostic evidence can be provided via biopsy. Studies have revealed that the yield of biopsies is higher in areas with a higher pre-test probability of disease; in areas of India and Pakistan where TB is endemic, Abrams needle biopsy yields excellent results. Abrams needle biopsy gives positive results in about two thirds of patients with pleural disease secondary to malignancy⁷ and around 75% in patients with tuberculosis.⁸ This shows that biopsy via Abram's needle has a higher ability to detect tuberculosis as the cause of pleural effusion as compared to malignant pleural effusion. We found similar results during our study. The yield of Abram's needle biopsy technique was higher for tuberculosis (35% of the cases detected) than malignancy (26.7% cases detected). This is in contrast to a study conducted in Israel by Nusair et al which revealed that out of the 29 patients who participated in the study, 10 had a malignancy where as only one patient had pleural effusion secondary to tuberculosis. This discrepancy can be explained by the lower incidence and prevalence of tuberculosis in Israel as compared to third world countries.⁹

Another study reveals that yield of closed biopsy using Abrams needle in the detection of malignancy ranges from 27-56%,¹⁰ we have observed a similar yield of 26.7% in our study. Over all, percutaneous pleural biopsy by Abrams needle yields positive results in about 50 to 60% of the cases.¹¹ Our study revealed positive results in 70% which is comparable to other studies.

The male to female ratio in our study was 1.6:1. This is comparable to a South African study by Coenraad et al where the male to female ratio was 1.5:1.⁴ A similar study conducted in Iran revealed a male to female ratio of 2.4:1 and a mean age of 38.9 years. In our study, the average age of patients was 42.8 years.¹²

Closed needle biopsy can be done either with an Abrams needle or using a Tru-cut biopsy needle. Studies have shown that the yield of Abrams needle is higher as compared to tru-cut biopsy needle. Koegelenberg et al concluded in their study that Abram needle was more likely to capture pleural tissue to confirm the diagnosis of pleural TB when compared to a tru-cut biopsy needle.⁴

Pleural fluid cytology is an excellent way to differentiate between TB or malignancy.¹³ Cytology for cancer cells is positive in approximately 71% of patients who develop pleural effusions secondary to malignancy.¹⁴ Percutaneous needle biopsy can detect upto 57% of cases of malignant pleural effusion.¹³

The procedure of closed pleural biopsy using

Abram needle are usually well tolerated with no to very few complications like pneumothorax or bleeding. In our study, all the patients tolerated the procedure well with no complications.

CONCLUSION

Due to availability of newer techniques and image guided biopsies, closed needle biopsy procedures are becoming less common in developed countries. However, in a set up like Pakistan, due to the higher cost and lack of availability of newer techniques, closed biopsy procedures remain the method of choice to determine the cause of pleural effusion.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

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Data collection, analysis & interpretation:	NS, SB, NHS, NR, AAZ
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