

## A Comparative Study by Using Abrams and Cope Needles in Pleural Biopsy Exudative Effusions

<sup>1</sup>R. Manju, <sup>2</sup>R. Venkateswara Babu, <sup>3</sup>S. Vinod Kumar and <sup>4</sup>Bhawana Ashok Badhe

<sup>1</sup>Department of Pulmonary Medicine, Indira Gandhi Government Medical College and Hospital, India

<sup>2</sup>Government Hospital for Chest Diseases, Pondicherry-605 006, India

<sup>3</sup>Department of Pulmonary Medicine, India

<sup>4</sup>Department of Pathology, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry-605 006, India

**Abstract:** Tuberculosis pleurisy remains the commonest cause of exudative effusions in areas with a high prevalence of tuberculosis and histological and/or microbiological confirmation on pleural tissue is the gold standard for its diagnosis. As many as 15 to 20% of all pleural effusions remain undiagnosed despite intensive efforts. In a developing country like India, infections particularly tuberculosis is still the predominant cause. Uncertainty remains regarding the choice of closed pleural biopsy needles. The purpose of this study was to compare between Abrams and Cope needles in performing pleural biopsy, as regard their diagnostic yield and complications of pleural effusions. 60 patients (30 each) in the age group of 20-70 years of both sexes were selected from the Department of Tuberculosis and Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry. The patients were randomized and underwent pleural biopsy with either Abrams or Cope needle by the standard and recommended techniques. Based on Light's criteria exudative pleural effusion inclusion and exclusion criteria were undertaken. The results proved that the overall diagnostic sensitivity of Abrams needle and Cope needle with regard to diagnostic yield in granulomatous pleurisy and neoplasia were equal and no significant difference was observed. In conclusion Both Abrams and Cope needles were equally efficacious in the investigation of pleural biopsy, diagnostic yield and complications in pleural effusions.

**Key words:** Abrams Needle • Cope Needle • Pleural Effusion • Tuberculosis • Pneumothorax • Neoplasia

### INTRODUCTION

Fluid collection, pneumothorax and pleural thickening are frequently encountered in pulmonary practice. Although the radiographical detection of pleural abnormalities may be obvious, determination of a specific diagnosis can represent a major challenge. Thoracoscopy can play a large diagnostic role in exudative pleural effusions and it is safe but leaves most patients without a diagnosis [1, 2]. Uncertainty remains regarding the choice of closed pleural biopsy needles. Pleural biopsy is indicated to improve the diagnostic yield of unexplained pleural effusion or pleural thickening, particularly when pleural carcinomatosis or tuberculosis is suspected [3].

The Abrams and Cope needles began the era of closed pleural biopsy providing a safe and easy bedside procedure to evaluate suspected pleural effusion [4, 5]

US-assisted pleural biopsies performed with Abrams needle are more likely to contain pleura and have a significantly higher diagnostic sensitivity for pleural TB [6]. Malignancies require a more targeted sampling than pleural TB, which is more generalised. In many hospitals pleural biopsies are carried out by radiologists using CT guidance. The diagnostic yield is good (87%) but radiation exposure is high, patient inability to sit for 20 minutes and coagulopathy are the main problems [7, 8]. The current work was carried out in Department of Tuberculosis and Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, Which is a multispecialty teaching and research institute. And thus the aim of the present study was to compare the efficacy of Abrams and Cope needles in doing pleural biopsy, as regard their diagnostic yield and complications.

## MATERIALS AND METHODS

Sixty patients in the age group of 20-70 years of both male and female were selected from the Department of Tuberculosis and Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry. The patients were randomized and underwent pleural biopsy with either Abrams or Cope needle by the standard and recommended techniques. Ethical approval from Ethical committee, JIPMER, Pondicherry was obtained for the study. Written informed consent was taken from each subject after the detailed procedure and purpose of the study was explained to the subjects. The following inclusion and exclusion criteria were applied for the selection process.

**Inclusion Criteria [9, 10]:** Exudative pleural effusion (based on Light's criteria)

- Pleural fluid protein/serum protein >0.5
- Pleural fluid LDH/serum LDH > 0.6
- Pleural fluid LDH/ >2/3 of upper normal limits of serum LDH.

**Exclusion Criteria [11, 12]:**

- Empyema
- Acute coronary syndrome
- Pyoderma, Herpes Zoster, bleeding diathesis, respiratory failure, patients on oral anticoagulants.

The participants were made to relax and be comfortable prior to the tests. Detailed clinical history about chest disease was collected; physical examination such as height and weight was recorded. General and systemic examinations pertaining to respiratory and cardiovascular system were done and findings were recorded. The pulse rate, respiratory rate and blood pressure were recorded in each subject under resting condition. If the first pleural biopsy attempt was not success the second attempt was made if it failed third attempt with alternative needle was done. All the biopsy specimens of Abrams or Cope needles were handled identically for histopathological examinations and patients were treated accordingly.

The following parameters were studied in pleural effusion:

- Distribution of malignant type cells in first attempt.
- Comparison of yield in both needles in second attempt.

- Distribution of neoplasia cases.
- Comparing the complications of both needles in the first attempt.
- Comparison of the non-diagnostic yield of both Abrams and Cope needles in plural biopsy specimens in first attempt.

Statistical analyses were done by Chi square test. P values were 0.5.

## RESULTS

Write a short comment on each of the displayed tables and figures???

## DISCUSSION

The present study was carried out in the Department of Tuberculosis and Chest Diseases in collaboration with Department of Pathology, JIPMER, Pondicherry, during the period 2004-2006. Patients attending the outpatient department of Tuberculosis and Chest Diseases, who were clinically examined and diagnosed with pleural effusions were taken up for the study. By block randomization it was ensured that the patients were equally distributed between two groups.

In our study, out of 30 patients the distribution of malignant cell type in was identified in 17 cases in the first attempt and the patients were differentiated as follows (Table 1). 6 patients were diagnosed under poorly differentiated carcinoma (35.3%); 5 patients were Adeno carcinoma (29.4%); 2 were metastatic Adeno carcinoma (11.8 %); one patient was non Hodgkin's lymphoma (5.9%); remaining 3 were suspicious of malignancy to (17.6%). The Microscopical sections of pleural biopsy were presented in the Fig. 1, 2, 3, 4.

Table 2 displays the 2<sup>nd</sup> attempt; Out of four patients; one case was neoplasia and other two cases were non-diagnostic and the pickup rate for Abrams needle was 25%, with Cope needle; Out of six patients; four cases were neoplasia, one case was non-diagnostic and one was inadequate hence the pickup rate for Cope needle was 66.6%. In early studies Hoff DD von and Li Volsi [10] and Scerbo *et al.* [11] who reported 27 and 30% pickup rate with Cope needle respectively. In our study the diagnostic yield with Abrams needle was 64.7 % and Cope needle was 55.6% in both attempts. Our results coincide with Joseph J and Sahn SA [12] who reported that repeat pleural biopsy has increased the diagnostic yield in patients with malignancy.

Table 1: Distribution of malignant cell type in first attempt

Malignant cell type	No. of patients	Percentage (%)
Poorly differentiated carcinoma	6	35.3
Adeno carcinoma	5	29.4
Suspicious of malignancy	3	17.6
Metastatic Adeno carcinoma	2	11.8
Non Hodgkin's lymphoma	1	5.9
Total	17	100.0

Table 2: Comparison of yields in both needles in second attempt

Needle type	Inadequate	Granulomatus pleurisy	Neoplasia	Non-diagnostic	Total
Abram's	1(25%)	-	1(25%)	2(50%)	4(100%)
Cope	1(16.7%)	-	4(66.6%)	1(16.7%)	6(100%)
Total	2	-	5	3	10

(p value=0.405)

Table 3: Distribution of neoplastic cases

Malignant cell type	No. of patients
Poorly differentiated Anaplastic carcinoma	1
Adeno carcinoma	1
Suspicious of malignancy	1
Squamous cell carcinoma	1
Mesothelioma	1
Total	5

(p value=1)

Table 4: Comparing the complications of both needles in the first attempt

Needle type	Total No. of cases	Pneumothorax	Lung tissue	Subcutaneous emphysema
Abram's	30	4(13.3%)	1(3.3%)	-
Cope	30	2(6.7%)	1(3.3%)	1(3.3%)

(p value=0.429)

Fig. 1, 2, 3 and 4: Microscopical sections of pleural biopsy

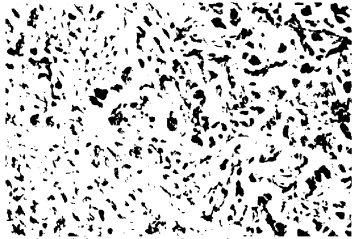


Fig. 1: Pleural biopsy showing metastatic poorly differentiated carcinoma (H&Ex200) (Hosp. No C467579)

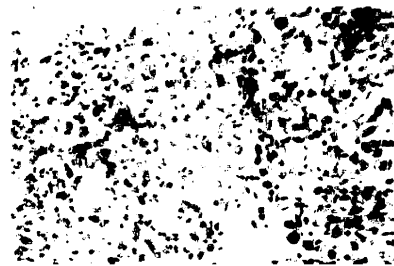


Fig. 3: Pleural biopsy showing Pleural metastatic from a case of Bronchogenic carcinoma large cell type (H&Ex200) (Hosp. No E291018)



Fig. 2: Pleural biopsy showing Pleural metastatic from a case of papillary adenocarcinoma of lung (H&Ex200) (Hosp. No D950256)

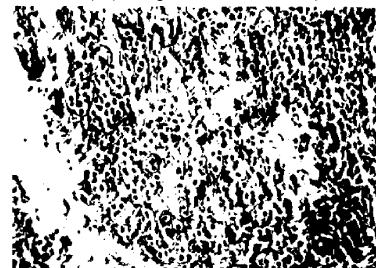


Fig. 4: Pleural biopsy showing metastatic Non-hodgkins lymphoma (H&Ex200) (Hosp. No E302232)

Out of 30 pleural biopsies pneumothorax was developed in 4(13.3%) patients with Abrams needle 2(6.7%) with Cope needle. The lung tissue was found in both needles by 3.3%; subcutaneous emphysema was found in Cope needle in one patient. Intercostal tube drainage was done for 2(6.7%); other two cases 2(6.7%) were neoplasia. Raja and Lalor [13] and Mungall *et al.* [14] reported 0 to 8% pneumothorax but in our study it was (13.3%). Carlos *et al.* [15] found subcutaneous emphysema 1%, while in our study 3.3% has developed subcutaneous emphysema by Cope needle. In our study in the first attempt, there was no statistically difference between Abrams needle and Cope needle with regard to complication rate. All the patients were treated according to the diagnosis; both Abrams and Cope needles are equally efficacious.

In our study in the first attempt, there was no statistically significant difference between Abrams and Cope needles, with regard in both the diagnostic yield and the completion rate. Hence, Abrams and Cope needles are equally efficacious.

#### REFERENCES

1. Light, R.W., 1995. Thoracentesis (diagnostic and therapeutic) and pleural biopsy. In: Pleural Disease. Ed., R.W. Light, Philadelphia, Lee and Febiger., 107: 1598-1603.
2. Kohan, J.M., R.H. Poe and R.H. Israel, 1986. Value of chest ultrasonography versus decubitus roentgenography for thoracentesis. *Am. Rev. Respir. Dis.*, 133: 1124-1126.
3. James, P., R. Gupta, D.J. Christopher and T. Balamugesh, 2010. Evaluation of the diagnostic yield and safety of closed pleural biopsy in the diagnosis of pleural effusion. *Indian J. Tuberc.*, 57: 19-24.
4. Abrams, L.D., 1958. A pleural-biopsy punch. *Lancet*, 1: 30-31.
5. Cope, C., 1958. New pleural biopsy needle. *JAMA*, 167: 1107-1108.
6. Coenraad Frederik, N., Koegelenberg, Christoph, Thomas, Bolliger, Johan, Theron, Gerhard, Walzl, Colleen Anne, Wright, Mercia Louw and Andreas Henri, Diacon, 2010. Direct comparison of the diagnostic yield of ultrasound-assisted Abrams and Tru-cut Needle Biopsies for Pleural Tuberculosis. *Thorax* doi:10.1136/thx.2009.125146.
7. Mungall, I.P., P.N. Cowen, N.T. Cooke, T.C. Roach and N.J. Cooke, 1980. Multiple pleural biopsy with the Abrams needle. *Thorax.*, 35: 600-602.
8. Ghosh, D., A. Thomas and T. Howes, 2007. Ultrasound Guided Abrams' Pleural Biopsy done by Chest Physicians: A prospective study. *Am. J. Respir Crit Care Med.*, pp: 175.
9. Light, R.W., M.I. MacGregor and P.C. Luchsinger, 1972. Pleural effusions: the diagnostic separation of transudates and exudates. *Ann. Intern. Med.*, 77: 507-13.
10. Canto, A., J. Rivas and J. Saumench, 1983. Points to consider when choosing a biopsy method in cases of pleurisy of unknown origin. *Chest.*, 84: 76-9.
11. Von Hoff, D.D. and V. Li Volsi, 1975. Diagnostic reliability of needle biopsy of the parietal pleura: A review of 272 biopsies. *Am. J. Clin Pathol.*, 64: 200-203.
12. Scerbo, J., H. Keltz and D.J. Stone, 1971. A prospective study of closed pleural biopsies. *JAMA*, 218: 377-80.
13. Joseph, J. and S.A. Sahn, 1993. Connective tissue diseases and the pleura. *Chest.*, 104: 262-70.
14. Raja, O.G. and A.J. Lalor, 1980. Modification to the technique of percutaneous pleural biopsy using Abram's needle. *Br J. Dis. Chest.*, 74: 285-86.
15. Mungall, I.P., P.N. Cowen, N.T. Cooke, T.C. Roach and N.J. Cooke, 1980. Multiple pleural biopsy with the Abrams needle. *Thorax.*, 35: 600-602.
16. Escudero, B.C., C.M. Garcia and C.B. Cuesta, 1990. Cytologic and bacteriologic analysis of fluid and pleural biopsy specimens with Cope's needle. Study of 414 patients. *Arch Intern Med.*, 150: 1190-4.