

Pleural Biopsy in Exudative Effusions - A Comparative Study Using Abram's and Cope Needles

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Abstract: Pleural effusion is a common complication of systemic and localised disease. 15% to 20% of all exudative pleural effusions remain undiagnosed despite intensive efforts. In exudative pleural effusions, thoracentesis and closed pleural biopsy are commonly employed investigative modalities to diagnose pleural disease of unknown etiology. It eliminates the need for a diagnostic thoracotomy. Different needle designs have been used, but the most popular are Abram's needle and Cope needle. Uncertainty remains regarding the choice of closed pleural biopsy needles. The current study was undertaken to compare between Abram's and Cope needles in pleural biopsy, as regards their diagnostic sensitivity in pleural effusions. 60 patients (30 each) in the age group of 20-70 years of both sexes were selected from the Department of Tuberculosis & Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry. The results proved that there was no statistically significant difference between Abram's and Cope needles, with regard to the diagnostic yield, in exudative pleural effusions. Both Abram's and Cope needles were equally efficacious.

Key words: Abram's Needle • Cope Needle • Pleural Effusion • Tuberculosis

INTRODUCTION

Exudative pleural effusions are frequently encountered in pulmonary practice [1, 2]. Determination of a specific diagnosis can represent a major challenge. Pleural biopsy is indicated to improve the diagnostic yield of unexplained pleural effusion, particularly when pleural carcinomatosis or tuberculosis is suspected [3, 4]. Uncertainty remains regarding the choice of closed pleural biopsy needles.

The Abram's and Cope needles began the era of closed pleural biopsy providing a safe and easy bedside procedure to evaluate suspected pleural effusion [5, 6]. USG-assisted pleural biopsies performed with an Abram's needle are more likely to contain pleura and have a significantly higher diagnostic sensitivity for pleural TB [7]. 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.

The current work was carried out in Department of Tuberculosis & Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry, which is a multispecialty teaching and Research institute. JIPMER has full-fledged setup with trained doctors and they can maintain the level of skill needed for closed pleural biopsy procedure. The present research was focussed to evaluate & compare the efficacy of Abram's and Cope needles in exudative pleural effusions.

MATERIALS AND METHODS

60 patients in the age group of 20-70 years of both sexes were selected from the Department of Tuberculosis & Chest Diseases, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry.

The patients were randomized and they underwent pleural biopsy with either Abram's or Cope needle by the standard recommended technique [5, 6, 8]. 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: [9, 10]

- 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 and general examination 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 successful, the second attempt was made. If it failed third attempt was done with alternative needle. All the biopsy specimens of Abram's or Cope needles were handled identically for histopathological examinations and patients were treated accordingly.

The following parameters were studied

- Sex distribution,
- Comparison of tissue bit obtained,
- Comparison of Mesothelial cells in tissue bit obtained,
- Comparison of Skeletal muscle in tissue bit obtained,
- Comparison of the diagnostic yield of both Abram's & Cope needle in pleural biopsy specimen in first attempt,

- Comparison of the non-diagnostic yield of both Abram's & Cope needle in pleural biopsy specimen in first attempt.

The statistical analyses were done by *Chi square test*.

RESULTS AND DISCUSSION

The present study was carried out in the Department of Tuberculosis & Chest Diseases in collaboration with Department of Pathology, JIPMER, Pondicherry, during the period 2004-2006. Patients attending the outpatient department of Tuberculosis & Chest Diseases, who were clinically examined and diagnosed with pleural effusions were taken up for the study (Fig. 1). By block randomization it was ensured that the patients were equally distributed between two groups.

Among 30 patients subjected to pleural biopsy with Abram's needle, 70.0% were male; females were 30.0% and the mean age was 48.8 years. Among 30 patients subjected to pleural biopsy with Cope needle, 60.0% were male; females were 40.0% and the mean age was 48.2 years (Table 1).

With Abram's needle the tissue bits obtained (Table 2, Fig. 2) was less than 2mm in 40%, more than 2mm in 60%; with Cope needle the tissue bits obtained was less than 2mm in 43.30%, more than 2mm in 56.7% and there was no statistical significance between both needles.

With Abram's needle mesothelial cells (Table 3) were present in 76.6% specimens; in 23.3%, mesothelial cells were absent. Whereas with Cope needle, mesothelial

Table 1: Sex Distribution

Needle type	Male	Female
Abram's	21(70.0%)	9(30.0%)
Cope	18(60.0%)	12(40.0%)

Table 2: Comparison of tissue bit obtained

Needle type	<2mm	>2mm
Abram's	12(40.0%)	18(60.0%)
Cope	13(43.3%)	17(56.7%)

(p value=1)

Table 3: Comparison of mesothelial cells in tissue bit obtained

Needle type	Present	Absent
Abram's	23(76.7%)	07(23.3%)
Cope	24(80.0%)	06(20.0%)

(p value=1)

Table 4: Comparison of skeletal muscle in tissue bit obtained

Needle type	Present	Absent
Abram's	14(46.7%)	16(53.3%)
Cope	10(33.3%)	20(66.7%)

(p value=0.429)

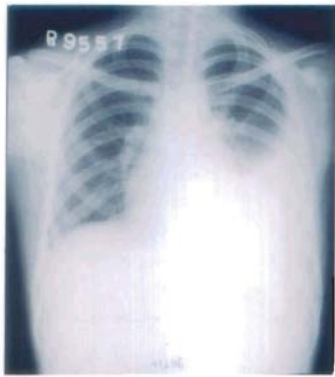
Table 5: Comparison of the diagnostic yield of both Abram's & Cope needle in pleural biopsy specimen in first attempt

Needle type	Inadequate	Granulomatous pleuritis	Neoplasia	Non-diagnostic	Total
Abram's	05(16.67%)	10(33.3%)	11(36.67%)	04(13.3%)	30
Cope	05(16.67%)	10(33.3%)	06(20%)	09(30%)	30
Total	10	20	17	13	60

(p value=0.335)

Table 6: Comparison of the non-diagnostic yield of both Abram's & Cope needle in pleural biopsy specimen in first attempt

Needle type	Non specific pleuritis	Acute & Chronic inflammatory cells	Reactive mesothelial cells	pleural fibrosis	Normal pleura	Total
Abram's	-	02(50%)	02(50%)	-	-	04
Cope	-	02(22.2%)	01(11.1%)	05(55.5%)	1(11.1%)	09



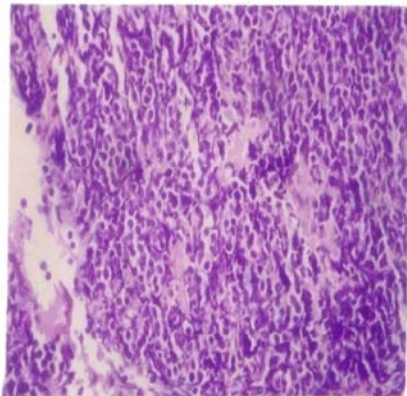
Chest roentgenogram showing left side moderate pleural effusion (Hosp. no E139216)



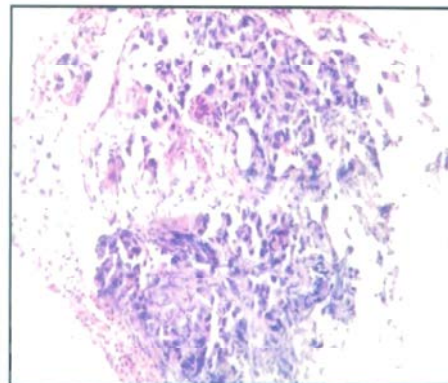
Pleural biopsy tissue bits

Fig. 1:

Fig. 2:



Pleural biopsy showing metastatic Non-Hodgkins lymphoma (H&Ex200) (Hosp.no E302232)



Pleural biopsy showing pleural metastasis from squamous cell carcinoma of lung (H&Ex200) (Hosp. no E43638)

Fig. 3: (Pleural biopsy specimen in Abram's needle)

Fig. 4: (Pleural biopsy specimen in Cope needle)

cells were present in the tissue bit obtained in 80%; absent in 20%. Here also there was no statistical significance between both needles.

With Abram's needle, skeletal muscle (Table 4) was present in the tissue bit obtained in 46.7%; in 53.3%, it was absent. With Cope needle, skeletal muscle was present in the tissue bit obtained in 33.3% and in 66.7%, it was absent. However with both needles there was no statistically significant difference. Morrone *et al.* [11] has worked on Abram's and Cope needle in same patients; In our study also, we have compared the efficacy of both Abram's & Cope needle in the different patients; hence our study was innovative and cannot be compared with above authors.

Regarding the diagnostic yield in the first attempt, the yield of Abram's needle were 33.3% - granulomatous pleuritis, 36.67% - neoplasia, 13.3%- non-diagnostic, 16.67% - inadequate ; the yield of Cope needle were- 33.3% - granulomatous pleuritis, 20% - neoplasia, 30%- non-diagnostic, 16.67% - inadequate (Table 5, Fig. 3, 4); the above sensitivities were not obtained in single Abram's needle by Mestitz *et al*; Mungall *et al*; Raja *et al* [12-14], but in our case even though we have worked with both Abram's & Cope needle, sensitivities were easily obtained.

Regarding the non diagnostic yield, Abram's needle resulted in 50% - acute & chronic inflammatory cells; 50% - reactive mesothelial cells; pleural fibrosis, normal pleura and non specific pleuritis were absent. Cope needle resulted in 22.2% - acute & chronic inflammatory cells; 22.2% - reactive mesothelial cells; 55.5% -pleural fibrosis; 11.1%- normal pleura; non specific pleuritis was absent (Table 6).

The overall diagnostic sensitivity of Abram's needle (granulomatous pleuritis and neoplasia) was 70 % and the overall diagnostic sensitivity of Cope needle (granulomatous pleuritis and neoplasia) was 53.3%. Even though higher diagnostic sensitivity was obtained with Abram's needle, when compared to Cope needle, it was not statistically significant (p value=0.335) and also the sample size is less [30 each in Abram's and Cope needles]. Hence in our study with regard to diagnostic yield, both Abram's and Cope needles were equally efficacious.

CONCLUSION

In the present study in the first attempt, there was no statistically significant difference between Abram's and Cope needles, with regard to the diagnostic yield. Hence, Abram's and Cope needles are equally efficacious.

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