



EXUDATIVE PLEURAL EFFUSION;

Comparison of diagnostic yield between pleuroscopic and closed percutaneous pleural biopsies in patients

dr.niazhussainsoomro@gmail.com

1. MBBS, FCPS
Assistant Professor Pulmonology
Jinnah Postgraduate of Medical
Centre (JPMC) Karachi
2. MBBS, FCPS
Assistant Professor,
Ojha Institute of Chest Diseases
Dow University Hospital
Ojha Campus, Karachi
3. MBBS, FCPS
Assistant Professor,
Department of Thoracic Surgery
Ojha Institute of Chest Diseases
Dow University Hospital Karachi
4. MBBS, FCPS
Professor of Pulmonology
Jinnah Postgraduate of Medical
Centre (JPMC) Karachi.

Correspondence Address:

Dr. Niaz Hussain Soomro
MBBS, FCPS
Assistant Professor,
Department of Thoracic Surgery
Ojha Institute of Chest Diseases
Dow University Hospital Karachi
dr.niazhussainsoomro@gmail.com

Article received on:

22/04/2016

Accepted for publication:

21/06/2016

Received after proof reading:

08/08/2016

INTRODUCTION

Pleural effusion, is a common problem in pulmonary practice. Approximately a million patients worldwide develop pleural effusion each year.¹ The causes of pleural effusion depend on the incidence of tuberculosis in the specific region. The common causes of pleural effusion in an area with a high incidence of tuberculosis include pneumonia (14%), congestive cardiac failure (17.9%), neoplasia (22.9%), tuberculosis (25%).² 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 workup do not help.¹

Pleural biopsy can be performed by Abrams needle, pleuroscopy, video assisted thoracoscopic surgery and thoracotomy. VATS

Dr. Nosheen Saifullah¹, Dr. Saifullah Baig², Dr. Niaz Hussain Soomro³, Prof. Dr. Nadeem Rizvi⁴

ABSTRACT... Objectives: To compare the pleuroscopic and closed pleural biopsy by Abrams needle in terms of diagnostic yield and obtaining specific diagnosis in cases of exudative pleural effusion. **Study Design:** Cross sectional study. **Period:** August 2014 to February 2015. **Setting:** Department of Thoracic Medicine Jinnah Post Graduate Medical Center Karachi. **Methodology:** All patients with pleural effusion who were admitted and fulfilling the inclusion criteria were included in the study. Closed pleural biopsy using Abrams needle followed by pleuroscopy with a flexible pleuroscope was performed from the same incision, in the same sitting. The samples were sent for histopathology. To control bias samples were coded as A and B and the code was not known to the histopathologist. **Results:** Among 60 patients, Mean age was 42.85 years with ± 18.2 standard deviation and male to female ratio was 1.6 :1. Specific diagnosis through pleuroscopic biopsy had shown 27 (45%) cases of tuberculosis, 25 (41.7%) of adenocarcinoma, 5 (8.3%) of chronic non specific inflammation, one (1.7%) case of lymphoma and 2 (3.3%) cases could not be reached for any diagnosis. **Conclusion:** Pleuroscopy has better yield than the Abrams needle biopsy in terms of both diagnostic yield and specific diagnosis

Key words:

Pleuroscopy, Abrams biopsy, pleural effusion and biopsy.

Article Citation: Saifullah N, Baig S, Soomro NH, Rizvi N. Exudative pleural biopsies; Comparison of diagnostic yield between pleuroscopic and closed percutaneous pleural biopsies in patients. Professional Med J 2016;23(8):970-974. DOI: 10.17957/TPMJ/16.3415

and thoracotomy requires general anesthesia in the operating room but former procedures are performed under local anesthesia. Pleuroscopy performed on patients under conscious sedation, it has lower complication rate. The major and minor complication reported in an study are 6% and 18.4% respectively.³

Pleuroscopy less invasive procedure that allows access to the pleural space, it can be performed for diagnosis (pleural biopsy) and therapeutic (pleurodesis) purpose.⁴ Lack of a pleural space due to advanced empyema, pleural thickening, hemodynamic instability, bleeding diathesis and severe uncorrectable hypoxemia are contraindications to the procedure.⁵

In our country pleuroscopy is a new technique therefore yield of the procedure in our setting is not established. Percutaneous pleural biopsy is being performed successfully as a

diagnostic procedure in most of the tertiary care pulmonology units. Various studies have been done in Pakistan to assess the yield of closed percutaneous pleural biopsy by Abrams needle in exudative pleural effusion and it was found that in 46 to 50% of patients a definite diagnosis established.^{6,7} However no such study has been done in Pakistan to see the role of pleuroscopy in terms of diagnostic yield and obtaining specific diagnosis in exudative pleural effusion. Therefore there is a need to establish the diagnostic yield of pleuroscopy and compare it with the yield of percutaneous pleural biopsy in undiagnosed exudative pleural effusions.⁸

METHODOLOGY

This cross sectional study was conducted during August 2014 to February 2015 in 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. Exudative pleural effusion were based on one or more (a) Pleural fluid protein more than 3 g/dl, (b) Pleural fluid and serum protein ratio more than 0.5 and (c) Pleural fluid LDH to serum LDH ratio more than 0.6. Those patients who had advanced empyema thoracic, pleural thickening, hemodynamic instability assessed by monitoring pulse rate and blood pressure, bleeding disorder assessed by performing platelet count PT, APTT and INR, inability to tolerate lateral decubitus position, severe uncorrectable hypoxemia assessed through pulse oximetry were excluded from study.

Informed consent was taken from all the patients. Closed pleural biopsy using Abram's needle immediately followed by pleuroscopy with a flexible pleuroscope of Olympus under local anesthesia was performed. Four to five pleural tissue samples were taken and sent to the department of histopathology of same hospital. To control bias, samples were coded as A and B to blind the histopathologist. A pre-designed proforma was used for data collection.

A database on the basis of proforma was developed on SPSS version 17 for windows

and relevant tests were applied. Frequencies and percentages were computed for categorical variable like age group and sex. Mean and standard deviation were computed for numeric variables like age, hemoglobin, platelets. Gender-wise stratification was done to evaluate the effect of gender discrimination on yield of diagnosis from obtained tissues. Concordance between the diagnoses from two procedures was also presented through cross-tabulation. Chi square test was used to compare the results in terms of diagnostic yield and specific diagnosis for closed percutaneous biopsy and pleuroscopic biopsy.

RESULTS

Among 60 patients, 37 (61.7%) were males and 23 (38.3%) were females with male to female ratio 1.6: 1. Mean age of 60 patients was 42.85 ± 18.22 (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 & 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 no specific diagnosis was found in 18 (30%) cases. On the other hand, yield of pleuroscopy biopsy in the diagnosis of exudative pleural effusion was 58/60 (96.7%) while no specific diagnosis was found in 2 (3.3%) cases.

While comparing the yield of diagnosis of Abram's and Pleuroscopy biopsies, data revealed significantly high diagnostic yield of pleuroscopy biopsy than Abram's biopsy (96.7% vs. 70%, $p < 0.001$) as shown in Table-I.

Diagnosis	Biopsy	
	Pleuroscopic	Abram's needle
Yes	58 (96.7)*	42 (70)
No	2 (3.3)	18 (30)
Total	60	60

Table-I. Comparison of yield of pleuroscopic biopsy and abram's needle biopsy in the diagnosis of exudative pleural effusion (n = 60)

Key: Values given in parentheses are percentages.

* ($\chi^2 = 13.5, p < 0.001$).

Among 58 cases diagnosed on Pleuroscopic biopsy, 36 (62.1%) were male and 22 (37.9%) female while among 42 cases diagnosed on Abram’s biopsy, 26 (61.9%) were male and 16 (28.1%) female (Figure-1).

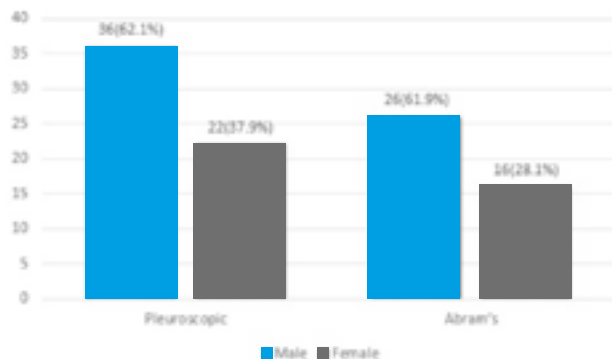


Figure-1. Bar chart shows. Gender-Wise Comparison of yield of Pleuroscopic biopsy and Abram’s biopsy in the diagnosis of exudative pleural

Specific diagnosis through pleuroscopic biopsy have shown 27 (45%) cases of tuberculosis, 25 (41.7%) cases of adenocarcinoma, 5 (8.3%) cases of chronic non specific inflammation, one (1.7%) case of lymphoma and 2 (3.3%) cases

could not be reached for any diagnosis. 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 (Figure-2).

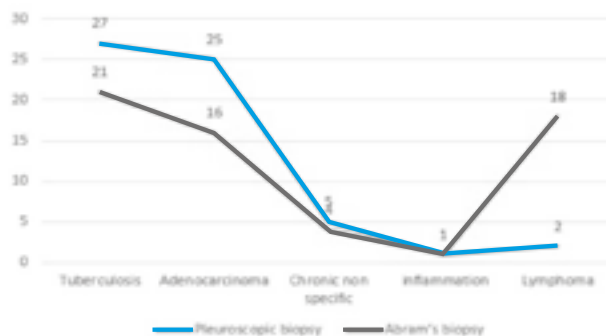


Figure-2. graph shows. Specific Diagnosis from Pleuroscopic and Abram’s Biopsies (n = 60)

To see concordance between specific diagnosis from pleuroscopic and Abram’s biopsies, it was observed that there was no differential diagnosis yielded (Table-II).

Abram’s biopsy	Pleuroscopic biopsy				
	Adeno carcinoma	Ch non sp infl	Lymphoma	TB	Not reached
Adenocarcinoma	16 (26.7)	0	0	0	0
Ch non sp infl	0	4 (6.7)	0	0	0
Lymphoma	0	0	1 (1.7)	0	0
Tuberculosis	0	0	0	21 (35)	0
Not reached	9 (15)	1 (1.7)	0	6 (10)	2 (3.3)

Table-II. Concordance between specific diagnosis from pleuroscopic and abram’s biopsies (n = 60)
Key: Values given in parentheses are percentages.

DISCUSSION

The diagnosis of pleural diseases is usually a lengthy and difficult process. About 20% of pleural effusions remain undiagnosed despite repeated thoracentesis and close needle biopsy. When these patients were subjected to diagnostic pleuroscopy its diagnostic yield was found to be 95% for malignancies and 100% for benign diseases.⁶ In malignant pleural diseases only 40 to 60% of patients have positive Abrams needle biopsy³ and around 75% in patients with tuberculosis.⁴ In another study the diagnostic

yield of closed pleural biopsy by Abrams needle is only 50 to 60% in cases of pleural malignancies, Contrary to pleural fluid aspiration and percutaneous biopsy, pleuroscopy allows biopsy with direct visualization. Pleuroscopy is usually performed after one or two thoracentesis and at least one closed percutaneous biopsy which is non diagnostic.

Our study showed that the diagnostic yield of pleuroscopy was 96.7%. Blanc FX, et al showed the diagnostic yield of 93.3%.⁹ In our study the

diagnostic yield of Abrams biopsy was 70% which is comparable with the diagnostic yield of Abrams by other studies. The semi rigid pleuroscope allows visualization of diseased site and biopsy under direct vision, this prevents the problems of blind pleural biopsies, which are often nondiagnostic.

Castardoy et al have found that pleuroscopic biopsy to be a good technique for the diagnosis of pleural effusion secondary to tuberculous¹⁰, while others authors have claimed that it is superior than the closed biopsy of the pleura for diagnosis of tuberculosis.¹¹ However, Menzies and Charbonneau reported contrary, that pleuroscopic biopsy does not increase the yield for tuberculosis but it increases the yield for malignancy.¹²

In malignant pleural effusion pleural fluid cytology for malignant cells is one of the best technique for the confirmation of the diagnosis.¹³ According to a data, up to 71% of patients having pleural effusion secondary to malignancy have positive cytology for malignant cells, the remaining cases required pleural biopsy.^{14,15} Closed pleural biopsy by Abrams needle can confirm the malignant pleural effusion up to 57% of cases.¹⁶

When cytology for malignant cells in pleural fluid is negative, the diagnostic yield for malignancy by closed pleural biopsy is lower as observed by Shan et al. In this study, it was also observed that in patients having age more than 50 years the diagnostic value of pleuroscopy is 88.88%, thus makes the diagnosis of malignancy more frequent than biopsy by closed technique, but both are statistically impressive.¹⁷ The reasons for such differences are, in case of pleuroscopic biopsy large areas of both parietal and visceral pleura can be visualized and grossly abnormal site can be biopsied. This is much helpful when diaphragmatic and visceral pleura are involved as these areas are not accessible by Abram's needle in closed pleural biopsy technique.^{18,12} Oldenburg et al have found in their study that the diagnostic value pleuroscopy by rigid pleuroscope is superior as compare to flexible pleuroscope.¹⁹

CONCLUSION

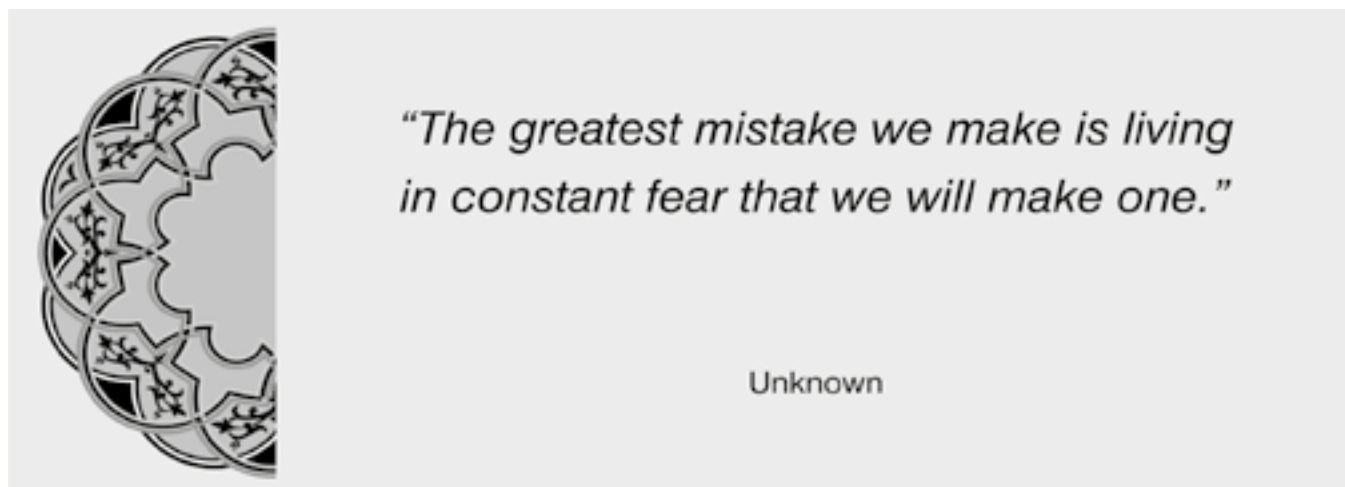
Pleuroscopy by a semi-rigid pleuroscope has emerged as a valuable equipment to take pleural biopsy which help in the diagnosis of pleural effusions of unknown etiology. It is a safe procedure, well-tolerated by patients with a high diagnostic yield for pleural diseases. Careful selection of cases and experience will improve the diagnostic and therapeutic utility of the procedure.

Copyright© 21 June, 2016.

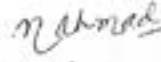

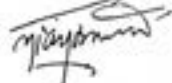
REFERENCES

1. San Jose ME, Alvarez D, Valdes L, et al **Utility of tumor markers in the diagnosis of neoplastic effusion.** Clin Chim Acta 1997; 265: 193-207.
2. Valdes L, Alvarez D. **The Etiology of Pleural Effusion in an Area with high Incidence of Tuberculosis.** Chest: 1996; 158-62.
3. Blanc F X, Atassi K. **Diagnostic Value of Medical Thoracoscopy in Pleural Disease.** Chest.2002; 121:1677-83.
4. Ernst A, Hersh CP, Herth F. **A novel instrument for the evaluation of the pleural space.** Chest.2002; 122:1530-4.
5. Rodriguez Panadero F, Janssen JP, Astoul P. **Thoracoscopy: general overview and place in the diagnosis and management of pleural effusion.** Eur Respir J 2006; 28; 409-22.
6. Magsi JA, Khan SU, Awan SR. **Pleural biopsy in the diagnosis of lymphocytic exudative pleural effusion.** Ann King Edward Med Coll Dec 2005; 11(4):572-4.
7. Khurram M, Jaffery AH, Khar HB. **Evaluation of lymphocytic exudative pleural effusion with pleural biopsy.** J Coll Physicians Surg Pak Feb 2002; 12(2):74-7.
8. Emad A, Rezaian GR. **Diagnostic value of closed percutaneous pleural biopsy vs pleuroscopy in suspected malignant pleural effusion or tuberculous pleurisy in a region with a high incidence of tuberculosis: a comparative, age-dependent study.** Respir Med.1998 Mar; 92(3):488-92.
9. Blanc FX, Atassi K, Bignon J; et al **Thoracoscopy in malignant pleural effusions CHEST in 2002;** 121: 1677 – 1683.
10. Castardoy J, Chiner E, Herrejon A, Alter F, Marin- Pardo

- J. **Tuberculosis: yield of thoracoscopy.** Ann Intern Med 1989; 6: 67-70.
11. Sarker SK, Purohit SD, Sharma TN, Sharma VK, Ram M, Singh AP. **Pleuroscopy in the diagnosis of pleural effusion using a flexible fiberoptic bronchoscopy.** Tubercle 1985; 66: 141-144.
 12. Menzies R, Charbonneau M. **Thoracoscopy for the diagnosis of pleural diseases.** Ann Intern Med 1991; 114: 271-276.
 13. Mare1 M, Stastny B, Melinova L, Svandova E, Light RW. **Diagnosis of pleural effusion.** Experience with clinical studies, 1986 to 1990. Chest 1995; 107: 1598-1603.
 14. Nance KV, Shermer RW, Askin FB. **Diagnostic efficacy of pleural biopsy as compared with that of pleural fluid examination.** Mod Pathol 1991; 4: 320-324.
 15. Fenton KN, Richardson JD. **Diagnosis and management of malignant pleural effusions.** Am J Surg 1995; 170: 69-74.
 16. Tomlinson JR, Sahn SA. **Invasive procedure in the diagnosis of pleural disease.** Semin Respir Med 1987; 9: 30.
 17. Sahn SA. **Malignant pleural effusions.** Semin Respir Med 1987; 9: 43.
 18. Robinson GR, Gleeson K. **Diagnostic flexible fiberoptic pleuroscopy in suspected malignant pleural effusions.** Chest 1995; 107: 424-429.
 19. Oldenburg FA, Newhouse MT. **Thoracoscopy. A safe, accurate diagnostic procedure using the rigid thoracoscopy and local anesthesia.** Chest 1979; 75: 45-50.



AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Nosheen Saifullah	Conception & design, Statistical expertise, Critical revision of the article for important intellectual content	
2	Dr. Saifullah Baig	Data Collection	
3	Dr. Niaz Hussain Soomro	Drafting of the article	
4	Prof. Dr. Nadeem Rizvi	Critical revision of the article for important intellectual content	