

DIAGNOSTIC VALUE OF PLEURAL BIOPSY IN EXUDATIVE PLEURAL EFFUSION

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ABSTRACT

Background: Exudative pleural effusion is a common diagnostic problem. This study was conducted to find the diagnostic yield of pleural biopsy in exudative pleural effusion.

Material & Methods: This descriptive study was conducted in Medical B unit, Khyber Teaching Hospital Peshawar, from January 2009 to December 2009. Cases were confirmed through history, clinical examination and routine investigations. Patients with pleural effusion were first subjected to pleural fluid aspiration. The standard criteria for exudative pleural effusion were used and pleural biopsy was performed in patients with exudative pleural effusion. Specimens were placed in 10% formalin and sent for histopathology.

Results: Fifty patients fulfilled the inclusion criteria; 33(66%) male and 17(34%) female. Out of these, 45(90%) had adequate specimen while in 5(10%) the tissue was inadequate. Among the 45 cases with adequate specimen, 40(80%) had a positive yield whereas in 5(10%) the result was nonspecific inflammation. In 40 cases with positive yield, 27(67.5%) were found to be granulomatous inflammation, 10(25%) malignant and 3(7.5%) parapneumonic. The most common complication of pleural biopsy was pain at biopsy site experienced in 100% cases and 3(6%) patients had pneumothorax.

Conclusion: Pleural biopsy is safe, minimally invasive procedure and has a high diagnostic yield in exudative pleural effusion.

KEY WORDS: Pleural effusion, Exudative pleural effusion, Pleural biopsy.

INTRODUCTION

Exudative pleural effusion is a common clinical and diagnostic problem.^{1,2} The diagnosis is usually difficult on clinical examination and radiological findings.^{1,2} It accounts for approximately 4% of all attendances to general medical outpatient department.³ Twenty percent remain undiagnosed despite extensive investigations.³

The effusion may be exudative and transudative. Common causes of transudative pleural effusion are heart failure, hypoproteinaemia (nephrotic syndrome, liver cirrhosis), constrictive pericarditis and hypothyroidism. Tuberculosis, lung cancer, pneumonia and pulmonary infarction are common causes of exudative pleural effusion.⁴

Differentiation between exudative and transudative pleural effusion is usually based on protein and lactate dehydrogenase concentration in pleural fluid with relation to their serum concentration.⁵⁻⁷

Ultrasound and computed tomography of chest are now standard investigations in most centres prior to biopsy and aspiration in order to detect evidence of malignant diseases, either primary or secondary.^{8,9} These are useful in localising the site for pleural fluid aspiration and biopsy.¹⁰ If clinical

examination, aspiration and biopsy fail to give the diagnosis thoracoscopy with rigid thoracoscope or video assisted techniques with biopsy of any pleural lesions may be needed.^{11,12}

The routine investigations of pleural fluid and pleural biopsy still remains the best methods of diagnosis.¹³ Pleural fluid provides presumptive diagnosis as compared to the biopsy of pleura in reaching the diagnosis.^{14,15} Different pleural biopsy needles are used for pleural biopsy like Abram's biopsy needle, Cope needle, Trucut and Raja pleural biopsy needle. The Abram's and Cope needles began the era of closed pleural biopsy as a safe and easy bedside procedure. The yield of positive pleural specimens using the Cope, Abram's or Raja needles is variable, and success rate is reported to be 70%.¹⁶

Pleural biopsy is safe, easy to perform and useful in the diagnosis of tuberculosis and malignant pleural effusions.¹

This study was conducted to find the histopathological picture and diagnostic yield of pleural biopsy in exudative pleural effusion.

MATERIAL AND METHODS

This descriptive study was conducted from January 2009 to December 2009 at Medical B unit,

Khyber Teaching Hospital Peshawar. Patients who visited the OPD with symptoms and signs and x-ray chest suggestive of pleural effusion were admitted. Critically ill patients or having bleeding diathesis and hemodynamic instability were excluded. In every patient informed consent was taken, followed by detailed clinical history including occupation and contact with tuberculous patient. A thorough clinical examination was performed, looking for signs helpful in the diagnosis of the cause of effusion. Ultrasound chest was performed as a confirmatory test for effusions.

The cause was confirmed by laboratory investigations which included Hb, TLC, DLC, ESR, urea, sugar, urine routine examination, along with serum protein and lactate dehydrogenase levels (LDH). Mantoux test, sputum for acid fast bacilli and where indicated, RA factor and ANF were also performed. Abdominal ultrasound and in some cases CT chest and bronchoscopy were also done where necessary.

Pleural fluid was aspirated and examined for its color, proteins, cells, LDH, glucose, malignant cells, micro-organisms and AFB. Some specific investigations such as serum amylase and RA factor were also performed whenever indicated. Pleural fluid aspiration for diagnostic purpose was performed before pleural biopsy was attempted. The following criteria for exudative pleural effusion was taken as standard; Pleural fluid /serum protein >0.5, Pleural fluid LDH /serum LDH >0.6, and Pleural fluid LDH more than two third of serum LDH or pleural fluid LDH greater than 200 IU.

The biopsy site was selected on the basis of area of maximum dullness and chest x-ray. The standard procedure was followed in obtaining biopsies. Abram's biopsy needle was used throughout the study. Lidocaine 2% was injected at the biopsy site. After cleaning the site of pleural biopsy with saline and iodine a small skin incision was made. Once in place through the pleura, the back part of the needle was rotated to open the notch which was kept pointing forward. With lateral pressure the needle was withdrawn so that the notch stroke against the pleura. The needle was held firmly and the hexagonal grip was twisted clockwise to cut the biopsy. The notch was directed upwards when the biopsy was taken in order to avoid damage to the intercostal nerves and vessels. Four to 6 pieces were obtained in each case. All specimen were put in 10% formaldehyde solution and sent for histopathology. Skin incision was stitched and antiseptic dressing done. Chest x-ray was performed after the procedure to rule out pneumothorax.

The data was entered in an objectively structured proforma and analysed by SPSS version 14.

RESULTS

Pleural biopsy was performed in 50 patients with exudative pleural effusions; 33 (66%) males and 17 (34%) females, Biopsy specimen was adequate in 45 (90.0%) cases while in 5 (10%) patients the tissue was inadequate. Out of 45 cases, 40 (88.88%) had a positive histologic yield, whereas in 5 (11.1%) cases the result was non-specific inflammation. In 40 cases with positive yield, 27 (67.5%) were found to be granulomatous inflammation, 10 (25%) malignant and 3 (7.5%) parapneumonic.

Regarding symptoms of patients who presented with pleural effusion, non-productive cough was mostly found in 43 (86%) patients, 33 patients (66%) with chest pain, 18 patients (36%) presented with breathlessness whereas 22 patients (44%) had fever. (Table 1)

The most common complication seen was biopsy site pain (residual) 100%. Only 3 (6%) patients developed pneumothorax.

DISCUSSION

Exudative pleural effusion is a common clinical and diagnostic problem.¹⁷ Most of the pleural effusions in our country are due to either tuberculosis or malignancy.¹ These are difficult to differentiate on clinical grounds and pleural fluid analysis.¹ Therefore pleural biopsy is needed to establish the exact diagnosis¹. By closed pleural biopsy 49.1% of undiagnosed exudative effusions can be diagnosed.^{18,19}

The diagnostic yield in our study was 88.9% which differ from the study done by Light²⁰, showing 17% diagnostic yield. A study by Ogirala et al showed yield of 52% with Abram's needle.²¹ Our study result coincided with Maskeel et al²⁶ which showed 88% positive diagnostic yield and Akhter²² with 70-80% diagnostic yield.

Tuberculosis was found to be the most common cause of exudative pleural effusions with a percentage of 67.5% in our study. These results are comparable to results seen in study by Javaid et al¹ and Maskeel et al.²⁶

In our study the percentage of malignant pleural effusion was 25%. The results coincided very well with Javaid et al 2001,¹ showing a yield of 24%. The results of Akhter showed malignancy rate of 40-50%.²² Light RW showed positive yield in malignant pleural effusion of only 17% but the biopsy was done only in those patients whose pleural fluid cytology was negative.²⁵ Maskell et al 2003 showed pleural biopsy yield for malignancy was 57%,²⁶ which contradicts our findings. The reason may be due to a very large number of patients included.

Common complications include site pain, pneumothorax, vasovagal reaction, haemothorax, site haematoma and transient fever. In this study biopsy site pain (residual) were observed in all cases and 3 cases of pneumothorax were seen.

CONCLUSION

Pleural biopsy is safe minimally invasive procedure which has a high diagnostic yield in exudative pleural effusion.

REFERENCES

1. Javaid A, Amjad M, Shah N, Samad A, Ullah Z. Diagnostic evaluation of exudative pleural effusion the value of pleural biopsy. *Chest* 2001;7:12-20.
2. Hussain SF, Mujahid S, Khan JA. Diagnostic Evaluation of pleural effusion and the role of needle pleural biopsy. *J Pak Med Assoc* 1995;45:127-9.
3. Dev D, Barsan GS. Pleural effusion a clinical review. *Monaldi Arch Chest Dis* 1994;49:25-35.
4. Light RW, Jenkinsion SG, Minch VO, George RB. Pleural diseases observations on pleural fluid pressure as fluid is withdrawn during thoracentesis. Cells in the pleural fluid their value in the differential diagnosis. *Am Rev Respir Dis. Lea and Febiger 2nd ed* 1990;121:799-804.
5. Davies RJ. Investigations in Respiratory Diseases. *Clinical Medicine by Kumar P and Clark M. 3rd ed*:1994:645-51.
6. Crompton GK, Haslett C. Diseases of pleura, diaphragm and chest wall. *Davridson's Principles and practice of Medicine* 1995; 17th ed; 396-8.
7. Light RW. *Pleural Diseases*. Philadelphia, Lea and Febiger, 1983. pp. 61-7.
8. Scatt EM, Marshall TJ, Flower CD, Stewart S. Diffuse Pleural thickening: percutaneous CT-guided cutting needle biopsy. *Radiology* 1995;194:867.
9. Qureshi N, Momin ZA, Brandstetter RD. Thoracentesis in clinical practice. *Heart lung* 1994;61:127.
10. O'Donovan PB, Eng P. Pleural changes in malignant pleural effusions: appearance on combined computed tomography. *Cleve Clin J Med* 1994;61:127.
11. Baumgartner WA, Mark JBD. The use of thoracoscopy in the diagnosis of pleural disease. *Arch Surg* 1980;115:420.
12. Allen MS, Jrastek VF, Daly RC, Deschamps C, Pairolero Pc. Equipment for thoracoscopy. *Ann Thorac Surg* 1993;56:620.
13. Aziz S, Agha F, Rizvi SM. Diagnosis of pleural effusion. *JPMA J Pak Med Assoc* 1992;42:178-9.
14. Fijalkowski M, Bloch P, Kalig A. Pleural needle biopsy in diagnosis of pleural effusion. *Pneumonol Allergol Pol* 1996;64:64-73.
15. Al-Qorain, Larbi Eb, Al-Muhana F. Pattern of pleural effusion in eastern province of Saudi Arabia. A prospective Study. *East Afr Med J* 1994;71:346-93.
16. Mathur PN, Loddenkemper R. Biopsy techniques in the diagnosis of pleural diseases. *Eu Respir Jo* 2002;7:120-30.
17. Mohamed KH, Mobasher AA, Yousef AI, Saleh A, Ramadhan MA, Emam Ak. Pleural lavage: a novel diagnostic approach for diagnosing exudative pleural effusion *Lung* 2000;178:371-9.
18. Sahn SA. Malignancy metastasis to the pleura. *Clin Chest Med* 1998;19:351-304.
19. Al Shimemeri AA, Al Ghadeer HM, Giridhar HR. Diagnostic yield of closed pleural biopsy in exudative pleural effusion. *Saudi Med J* 2003;24:282-6.
20. Hirasuana JD. Anatomy and physiology of pleura. *BMJ* 2000;320:1318-21.
21. Ogirala RG, Agarwal V, Vizioli LD, Pinsker KL, Aldrich TK. Comparison of the Raja and the Abram's pleural biopsy needle in patients with pleural effusion. *Am Rev Respir Dis* 1993;147:1291-4.
22. Sohail Akhter. How to investigate a case of pleural effusion? *Pakistan journal of chest medicine* 1997;3:15-17.
23. Serman. Advances in the treatment of malignant mesothelioma. *Chest* 2000;116:504.
24. Shur D. Indications and diagnostic yields. An undiagnosed exudative pleural effusion has been the traditional indications for pleural biopsy. *T Bronchol* 1998;5:332.
25. Light RW. Diagnostic approach in patients with pleural effusion. *Eu Respir J* 2002;7:131-45.
26. Maskell NA, Buttand RJA. BTS guidelines for the investigation of unilateral pleural effusion in adults. *Thorax* 2003;58:1-25.

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