ROLE OF PLEURAL BIOPSY IN DIAGNOSIS OF EXUDATIVE PLEURAL EFFUSION

MOHAMMAD SAJJAD¹, HAMIDA QURESHI², HAMIDULLAH SHAH³, ZARD ALI KHAN⁴.

ABSTRACT

OBJECTIVES: To find out the role of pleural biopsy in diagnosis of exudative pleural effusion.
STUDY DESIGN: An Observational study.
PLACE AND DURATION: Pathology Department Bannu Medical College Bannu KPK. Pakistan. The duration was two years from 1st January, 2012 to 31st December, 2013.
METHODOLOGY: In this study 74 cases of exudative pleural effusion not otherwise specific (NOS) were included, all were subjected to blind pleural biopsy. Pleural biopsy was carried out under aseptic technique. The biopsy was fixed in formalin, processed in grades of alcohol, xylene, paraffin wax, block prepared, freeze-dried and 5 micron thick sections taken, slide prepared and mounted in DPX, labeled and read out by histopathologist, diagnosis recorded. The data was collected on designed proforma and results analyzed using SPSS 16.
RESULTS: In this study of 74 pleural biopsy the age range was 30-65 years. Male were 47 and female were 27, male to female ratio was 1.74:1. The most common age group involved was 45 to 55 years followed by 35-45 years. Out of 74 pleural biopsies the histopathology was conclusive in 67 (90.54%) cases and in 07 (9.45%) cases four cases were of nonspecific inflammation and in three cases the biopsy material was insufficient. Chronic granulomatous inflammation (tuberculosis) 45 (60.81%) cases were the commonest lesions followed by malignancy both primary and metastatic 22 (29.72%) cases, chronic nonspecific inflammation 4(5.40%) cases and in 3 (4.05%) cases the biopsy material was insufficient.
CONCLUSION: Pleural biopsy is one of the significant tool in the final diagnosis of exudative pleural effusion. I will be more accurate if microbiological and immunohistochemical markers are added as adjuvant diagnostic tools.
KEYWORDS: Pleural Biopsy, Exudative pleural effusion, Tuberculosis, Malignancy.

INTRODUCTION

Pleural effusion is an abnormal collection of fluid in the pleural cavity resulting from increased production or decreased absorption. It is the most common manifestation of pleural or lung diseases¹. Needle biopsy is the procedure in which a sample of the pleura taken with a special biopsy needle to determine the cause of pleural effusion, infection, malignancy or any other abnormality present there. The etiology of pleural effusion remains unclear in about 20% of cases. There are three types of pleural biopsies i.e. needle biopsy, thoracoscopic biopsy and open biopsy⁷.

Pleural effusions are generally classified as transudate or exudate, based on the mechanism of fluid formation and pleural fluid chemistry. Exudative effusion is produced by a variety of inflammatory conditions and often require more extensive evaluation and treatment than transudate⁶. Exudative pleural effusions are common in the clinical practice. The most common causes of undiagnosed exudative pleural effusion are tuberculosis and malignancy. To find out the cause of pleural effusion, biochemical, cytological and microbiological analysis of pleural fluid is a common practice. It may provide good diagnostic evidence for para-pneumonic effusion, however this initial analysis can not detect many cases of tuberculosis and malignancy. Pleural biopsy provides diagnostic evidence for both tuberculosis and malignancy¹⁴.

Many studies have reported that relatively large numbers of patients with pleural effusion in whom a definite diagnosis could not be made, despite extensive investigations. In such patients final diagnosis is done by biopsy of which needle biopsy is most easily performed as compared to thoracoscopic and open biopsy. The objective of this study is to find out the exact diagnosis of undiagnosed exudative pleural effusion patients¹⁷.

METHODOLOGY

This study was conducted in Pathology Department Bannu Medical College Bannu KPK. Pakistan. The duration of this study was one year 1st January, 2013 to 31st December, 2014.

All the 74 exudative pleural effusion cases not otherwise specified (NOS) were subjected to pleural biopsy. Pleural biopsy was performed under aseptic technique. Inclusion criteria was all exudative pleural effusion cases of any age and sex. Exclusion Criteria was post pneumonic exudative pleural effusion patients and autolysed biopsy specimen. All the pleural biopsy specimens were received in 10% buffered formalin, labeled, processed in alcohol, xylene, paraffin wax, block prepared, freeze-dried in refrigerant, microtome sections 5 micron thick taken, at least three sections were taken, slides prepared, stained with Hematoxylin and Eosin, mounted with DPX, labeled and reported by histopathologist and diagnosis recorded. The

1. Associate Professor
2. Assistant Professor
   Department of Pathology
   Bannu Medical College, Bannu.
3. Associate Professor of Pathology
   Bacha Khan Medical College, Mardan.
4. Assistant Professor of Pathology
   Lady Reading Hospital Peshawar.

Corresponding to:
Mohammad Sajjad
Associate Professor of Pathology,
Bannu Medical College, Bannu.
Email: sajjadhkhattak66@gmail.com
data was collected on designed proforma and results analyzed for frequency, mean and standard deviation by using SPSS version 16.

RESULTS

In this study of 74 cases of pleural biopsies the age range was 25-65 years. Male were 47 and female were 27, male to female ratio was 1.74:1 Fig-1.
The most common age group involved was 45 to 55 years followed by 35-45 years Table - I.
The laterality of pleural effusion was 41 (55.40%) cases on right side 32 (43.24%) on left side and in 01 (1.35%) case it was bilateral.
Out of 74 pleural biopsies the histopathology was conclusive in 67 (90.54%) cases and in 07 (9.45%) cases four cases were of non specific inflammation and in three cases the biopsy material was insufficient. Chronic granulomatous inflammation (tuberculosis) 45 (60.81%) cases were the commonest lesions followed by malignancy both primary and metastatic 22 (29.72%) cases, chronic non specific inflammation 4(5.40%) cases and in 3 (4.05%) cases the biopsy material was insufficient Table - II.

![FIGURE - 1: GENDER RATIO OF PLEURAL BIOPSY OF EXUDATIVE PLEURAL EFFUSION PATIENTS (n=74)](image)

| TABLE - I: COMMON AGE GROUP OF PLEURAL BIOPSY OF EXUDATIVE PLEURAL EFFUSION PATIENTS (n=74). |
|-----------------|-----------------|-----------------|
| S. NO | AGE GROUP | NUMBER OF PATIENTS | PERCENTAGE | VALID PERCENT |
| 1 | 25-35 YEARS | 10 | 13.51% | 13.51% |
| 2 | 36-45 YEARS | 37 | 50.00% | 50.00% |
| 3 | 46-55 YEARS | 14 | 18.91% | 18.91% |
| 4 | 56-65 YEARS | 13 | 17.56% | 17.56% |
| 5 | Total | 74 | 100% | 100% |

| TABLE - II: PATHOLOGICAL LESIONS IN PLEURAL BIOPSY IN EXUDATIVE PLEURAL EFFUSION PATIENTS (n=74). |
|-----------------|-----------------|-----------------|
| S. NO | DISEASE | NUMBER OF PATIENTS | PERCENTAGE | VALID PERCENT |
| 1 | Chronic granulomatous inflammation | 45 | 60.81% | 60.81% |
| 2 | Malignancy | 22 | 29.72% | 29.72% |
| 3 | Chronic non specific inflammation | 04 | 5.40% | 5.40% |
| 4 | Insufficient biopsy material | 03 | 4.05% | 4.05% |
| 5 | Total | 74 | 100% | 100% |

DISCUSSION

Exudative pleural effusions are common and can be caused by a wide variety of disease processes. Pleural effusion analysis alone is usually non diagnostic. The technique of closed pleural biopsies using a needle was first described by De Francis, Klosk and Albano in 1955 using Vim Silverman needle (cutting/puncture type needle). However it was noted in a couple of studies between 1957-1960 that the sample by Vim Silverman needle were inadequate in most of the cases and it was needed to have an improved technique. In 1958 Abrams popularized the use of a needle (punch biopsy needle), now called Abrams needle. These needles are still in use these days having better diagnostic yield. The Abrams needle is superior in providing larger quantity of tissue, improved mesothelial sampling, and greater cutting surface.

The diagnosis of a pleural effusion can often be challenging when initial testing is negative. In countries where tuberculosis and malignancy remain the most important considerations in patients with undiagnosed exudative effusions. Pleural biopsy is often considered the next step in the diagnostic process of these effusions. However, despite a higher diagnostic yield, there are several limitations including need for expertise, cost, invasiveness and lack of availability in some regions that restrict its widespread use. In these instances these procedures can increase the diagnostic yield compared to thoracentesis alone; more so in cases of tuberculosis compared to malignancy.

In the present study of 74 cases of pleural biopsies the age range was 25-65 years with mean age of 47 years±14.5. Male were 47 and female 27, male to female ratio was 1.74:1. In a study conducted by Shah et al in 2008 in Peshawar the age range was 18-60 years with mean age of 46.8 years. Male to female ratio was 2:1. Another study by Devkota et al in Nepal in 2014 the age range was 16-104 years and male to female ratio was 1.23:1, still another study conducted in Iran in 2013 the age range was 15-85 years, with male to female ratio of 2.42:1.

In our study the most common age group involved was 45 to 55 years followed by 35-45 years. In a study conducted by Abumossalam et al in Egypt in 2014 the common disease age group was >50 years where is in another study conducted by Pendit et al in India in 2015 the common age group was >60 years.
In this study the the laterality of pleural effusion was 41 (55.40%) cases on right side 32 (43.24%) on left side and in 01 (1.35%) case it was bilateral. In study conducted by Abumossalam et al\(^\text{18}\) in Egypt in 2014 the laterality was 51% on right side, 44% on left side and 5% bilateral. Another study conducted by Devkota et al\(^\text{15}\) in Nepal in 2014 the laterality was 59.57% on right side 38.30% on left side and 2.13% bilateral. Still another study conducted by Shah et al\(^\text{10}\) in Peshawar in 2008 the laterality was 54% on right side 40% on left side and 6% bilateral. All these studies show almost the order of sequence about laterality.

In our study the biopsy tissue was adequate in 95.95% biopsies where it was inadequate in 4.05% cases. In a study conducted by Shah et al\(^\text{15}\) in Peshawar in 2008 the biopsy adequacy was 90% and it was inadequate in 10% cases where is in another study conducted by Solooki et al\(^\text{13}\) in Iran in 2013 the pleural biopsy adequacy was 91% and it was inadequate in 9% cases. All these study show a slightly higher inadequacy in biopsy material than the present study.

In our study of 74 pleural biopsies the histopathology show chronic granulomatous inflammation (tuberculosis) 45 (60.81%) cases was the commonest lesion followed by malignancy both primary and metastatic 22 (29.72%) cases, chronic non specific inflammation 4(5.40%) cases and in 3 (4.05%) cases the biopsy material was insufficient. In study conducted by Shah et al\(^\text{10}\) in Peshawar in 2008 histopathology show chronic granulomatos inflammation 27 (54%) cases followed by malignancy 10 (20%) cases and chronic non specific inflammation in 5 (10%) cases. Another study conducted by Maji et al\(^\text{9}\) in India in 2013 show chronic granulomatous inflammation 54.57% as the commonest lesion followed by malignancy 28.17%, empyema 10.56% and parapneumonic effusion in 5.28%. In study conducted by Pandit et al\(^\text{16}\) in India in 2015 show malignancy in 24 (33.33%) cases followed by chronic granulomatous inflammation 20 (27.77%) cases and chronic non specific inflammation in 18 (25%) cases. In study by Solooki et al\(^\text{13}\) in Iran in 2013 show malignancy in 56 (32.74%) cases followed chronic granulomatous inflammation in 52 (30.40%) cases, chronic non specific inflammation in 48 (28.07%) cases. In study by Devkota et al\(^\text{15}\) in Nepal in 2014 the commonest lesion was chronic granulomatos inflammation 21 (44.68%) cases followed chronic non specific inflammation in 16 (34.04%) cases and malignancy 10 (21.28%) cases, here chronic non specific inflammation is second in frequency where is in the present study and study by Shah et al\(^\text{10}\) malignancy is second in frequency. In study conducted by Abumossalam et al\(^\text{18}\) in Egypt in 2014 the commonest lesion was malignancy 41% followed by chronic granulomatous inflammation in 33% etc.

**CONCLUSION**

Pleural biopsy is one of the significant tool in the final diagnosis of exudative pleural effusion especially in developing countries like Pakistan where tuberculosis is very common. It will be more accurate if microbiological and immunohistochemical markers are added as adjuvant diagnostic tools.

**REFERENCES**


