

FREQUENCY OF TYPES OF MALIGNANCIES ON THORACOSCOPIC PLEURAL BIOPSY IN PATIENTS WITH MALIGNANT PLEURAL EFFUSION

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ABSTRACT

Background: Malignant pleural effusion (MPE) is defined by the presence of cancerous cells in the pleural fluid. The malignancies most commonly metastasizing to pleura are Lung cancer, Breast cancer, Lymphoma, Ovarian cancer and Gastric Cancer. Pleural biopsy is required for the diagnosis of malignant pleural disease. Medical Thoracoscopy is now increasingly used for the diagnosis of MPEs.

The current study has been designed to check the frequency of different types of malignancies on pleural biopsies taken via Medical Thoracoscopy.

Objectives: To Study the frequency of different types of malignancies on pleural biopsies taken via Medical Thoracoscopy.

Methods: This study was carried out at the Department of Pulmonology, Shaikh Zayed FPGMI, Lahore, from January 1, 2020, to December 31, 2022. Retrospective analysis of 166 medical thoracoscopy procedures performed on the patients with malignant pleural effusion.

Results: A total of 166 participants were included in this study, having a mean age of \pm SD of 56.6 ± 14.8 years (range: 15-97). Among them 70 (42.2%) were males while 96 (57.8%) were females. The most frequent malignancy diagnosed on pleural biopsy was adenocarcinoma (57.8%) followed by poorly differentiated metastatic carcinoma (22.3%). Other histological types diagnosed on pleural biopsy included lymphoma (4.8%), squamous cell carcinoma (4.8%), small cell carcinoma (4.2%), and metastatic renal cell carcinoma (3.0%). The lung (43.4%) was the most common primary site of malignancy presenting with pleural metastasis; other sites included breast (15.1%), ovary (7.2%) and kidneys (3.0%). Eight study participants had hematological malignancies while in 18.1% primary site remained unknown and further workup was advised.

Conclusion: Adenocarcinoma emerged as the most frequently diagnosed type of malignancy on thoracoscopic pleural biopsy and lung (43.4%) was the most frequent primary site of malignancy presenting with pleural metastasis.

Keywords: Biopsy, Interventions, Malignant Pleural Effusion, Medical Thoracoscopy

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INTRODUCTION

Malignant pleural effusion is characterized by the presence of cancerous cells in the pleural fluid. Primary

Pleural Malignancy (including Mesothelioma and Solitary Fibrous Tumor) accounts for 10% of malignant pleural disease while more than 90% of malignant pleural disease arises from metastatic spread. Each year, nearly 150,000 cases of malignant pleural effusion are diagnosed in the United States, and approximately 100,000 cases are identified in the United Kingdom.^{1,2} Lung cancer, breast cancer, lymphoma, ovarian cancer, and gastric cancer are the malignancies most frequently associated with pleural metastasis. Malignant pleural

effusion is a marker of advanced disease and is linked with a poor prognosis, with a median survival period between 3 to 12 months.^{3,4}

Malignant pleural effusion usually presents as large unilateral effusion; however, 10-13% cases can be bilateral. Most common symptoms associated with malignant pleural effusion include dyspnea, cough and chest pain. Diagnosis of malignant pleural effusion includes various imaging modalities including chest X-Ray, thoracic ultrasound, CT chest and PET-CT. Malignant pleural effusion is mostly exudative, lymphocytic with low pH and glucose. Pleural fluid cytology has a mean sensitivity of 40-87 % in diagnosing malignant pleural disease. Therefore, pleural biopsy is required for the diagnosis of malignant pleural disease.^{5,6}

The current study has been designed to check the frequency of different types of malignancies on pleural biopsies taken via Medical Thoracoscopy in local population. Researches have been conducted in the past on this topic in the western world but studies on this topic are lacking in Pakistan and especially in our set up.

METHODS

The study was a descriptive case series conducted in the Department of Pulmonology at Shaikh Zayed FPGMI, Lahore, between January 1, 2020, and December 31, 2022. It included all patients with malignant pleural effusion who underwent medical thoracoscopy during this period, with a total of 166 cases selected for analysis.

The data was analyzed using SPSS software, version 20.0. The descriptive statistics, which include frequencies and percentages, were calculated to summarize the data, and the results were presented using tables.

RESULTS

A total of 166 participants were included in the study. The mean age of study participants was 56.6 years with a standard deviation of 14.8 years (range: 15-97). Among them 70 (42.2%) were males while 96 (57.8%) were females. The mean age of male patients was 58 ±15.1 years and females were 55.5 ±14.6 years with no statistical significance difference (p=0.3)

The most frequent malignancy diagnosed on pleural biopsy was adenocarcinoma (57.8%) followed by poorly differentiated metastatic carcinoma (22.3%). Other histological types diagnosed on pleural biopsy included lymphoma (4.8%), squamous cell carcinoma (4.8%), small cell carcinoma (4.2%), and metastatic renal cell carcinoma (3.0%).

The lung was the most common primary site of malignancy presenting with pleural metastasis; accounting for 43.4% of cases, other sites included breast (15.1%), ovary (7.2%) and kidneys (3.0%). Eight study participants had hematological malignancies while in 18.1% primary site remained unknown and further workup was advised.

Among patients where lung was the primary site of malignancy, 41 (56.9) were males and 31 (43.1) were females. Most common type of primary lung malignancy was adenocarcinoma seen in 57 patients (79.2%), followed by squamous cell carcinoma and small cell carcinoma respectively.

Table 1: Malignancy type on Pleural Biopsy

Malignancy type	N (%)	Male	Female
Adenocarcinoma	96 (57.8%)	36 (37.5)	60 (62.5)
Metastatic Carcinoma	37 (22.3%)	11 (29.7)	26 (70.3)
Lymphoma	8 (4.8%)	7 (87.5)	1 (12.5)
Metastatic Squamous Cell Carcinoma	8 (4.8%)	6 (75)	2 (25)
Metastatic Small Cell Carcinoma	7 (4.2%)	5 (71.4)	2 (28.6)
Metastatic Renal Cell Carcinoma	5 (3.0%)	3 (60)	2 (40)
Sarcoma	3 (1.8%)	0(0)	3 (100)
Mesothelioma	2 (1.2%)	2 (100)	0 (0)
Total	166 (100%)	70 (42.2)	96 (57.8)

Table 2: Primary site of Malignancy on Pleural Biopsy

Primary Site	N (%)
Lung	72 (43.4%)
Breast	25 (15.1%)
Ovary	12 (7.2%)
Lymphoma	8 (4.8%)
Esophagus/Pancreas	6 (3.6%)
Kidney	5 (3.0%)
Thyroid	3 (1.8%)
Bones & Joints	3 (1.8%)
Pleura	2 (1.2%)
Unknown	30 (18.1%)

DISCUSSION

Malignant pleural effusion is frequently observed in cancer patients and indicates advanced-stage disease when it develops as a result of malignancy. Pleural biopsy is required to find type of malignancy responsible for malignant pleural effusion. A Blind pleural biopsy which can be performed using an Abrams needle or Cope needle has lower sensitivity due to the uneven distribution of tumors.⁷ Pleural biopsy with ultrasound guidance offers a diagnostic yield of up to 94%, while CT scan guided biopsy has a sensitivity between 76–88% and nearly 100% specificity.^{8,9,10} Medical Thoracoscopy (MT) is now increasingly used for diagnosis of MPEs. During MT one can visualize the pleural cavity, take pleural biopsies and can perform pleurodesis in MPEs to prevent recurrent accumulation of pleural effusion.¹¹ Sensitivity and specificity of Medical Thoracoscopy are 92% and 100% respectively. Other techniques to take pleural biopsies includes Video- assisted Thoracoscopic surgery (VATS).¹² The current study aimed to provide insight into the frequency of various malignancies among patients with malignant pleural effusions. Our study determined that adenocarcinoma was the most frequently identified malignancy on pleural biopsy, followed by metastatic

carcinoma, squamous cell carcinoma, and small cell carcinoma. Our study findings align with the work of Wu et al., which highlights the diagnostic value of medical thoracoscopy in patients with malignant pleural effusion.¹³

we also found that the most common site of primary malignancy was the lungs, followed by the breast, ovary, and kidneys. This pattern of results is consistent with the previous research conducted by Irani DR et al., which also showed lung as the most common primary tumor site of malignant pleural disease followed by breast, lymphoma and GI origin tumors.¹⁴ We observed that patients with adenocarcinoma of the lung had more frequent metastasis into pleura as compared to other types of lung cancer. A study by Agalioti T et al. also had similar findings.¹⁵

The findings of our study will contribute to the existing body of knowledge. One limitation of our study is that it was conducted only at a single healthcare facility, which means the results may not be representative of the broader population of our country.

CONCLUSION

Adenocarcinoma emerged as the most frequently diagnosed type of malignancy on thoracoscopic pleural biopsy, with the lung being the most common primary site of malignancy presenting with pleural metastasis, accounting for 43.4%.

ETHICAL APPROVAL

Ethical approval was granted by the Technical & Ethical Review Committee of Shaikh Zayed Federal Postgraduate Medical Institute vide reference No SZMC/TERC/322/2023 dated: 02/03/2023

CONFLICT OF INTEREST:

Authors declare no conflict of interest.

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AUTHOR'S CONTRIBUTIONS

MS: Concept design, Statical analysis, Manuscript writing

TM: Supervision Critical Review

RA: Data collection and Manuscript writing

MA: Data collection

MNA: Statical analysis

HI: Manuscript writing and critical Review

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