# To find the diagnostic accuracy of Medical Thoracoscopy in diagnosis of Malignant Pleural Effusion taking Histopathology as Gold standard

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MA ZUH AJ conceived idea, MU JK ZI drafted the study, MA ZUH IK collected data, MA AJ did statistical analysis & interpretation of data, ZI MA critical reviewed manuscript, All approved final version to be published.

**Declaration of conflicting interests**

The Authors declares that there is no conflict of interest.

## Abstract

**Background:** Malignant pleural effusion is diagnosed by the identification of malignant cells in pleural fluid or on pleural biopsy, represent an advance malignancy associated with high morbidity and mortality, precluding the possibility of curative treatment approach. Malignant pleural effusions are caused by pleural malignancy as well as metastasis in more than 75% cases e.g. lung, breast, ovary and lymphomas.

**Objective:** The objective of this study is to find the diagnostic accuracy of medical thoracoscopy in diagnosis of malignant pleural effusion taking histopathology as gold standard.

**Methodology:** This was a cross sectional study conducted at department of Pulmonology Lady Reading Hospital Peshawar from January 2016 to July 2016.Total of 150 patients were included in the study, with 95% confidence level, 7% margin of error, expected percentage of MPE i.e 70% and taking sensitivity and specificity of thoracoscopy i.e. 85% and 100% taking histopathology as gold standard. More over non-probability consecutive sampling technique was used for sample collection.

**Results:** Our study shows that mean age was 57 years with SD ± 7.11. Seventy percent patients were male and 30% patients were female. Diagnostic accuracy of medical thoracoscopy was 85.10%, Specificity and PPV was 100%, NPV was 30%, Diagnostic accuracy was 86%.

**Conclusion:** Our study concludes that diagnostic accuracy of medical thoracoscopy was 86% which shows that it is an essential tool for diagnosis of malignant pleural effusion.

**Key Words:** Diagnostic Accuracy; Medical Thoracoscopy; Malignant pleural effusion; Histopathology

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## Introduction

Malignant pleural effusion is diagnosed by the identification of malignant cells in pleural fluid or on pleural biopsy, represent an advance malignancy associated with high morbidity and mortality, precluding the possibility of curative treatment approach.[1,2] Malignant pleural effusions are caused by pleural malignancy as well as metastasis in more than 75% cases e.g lung, breast, ovary and lymphomas.

The reported frequency of MPE was 70-92% among patients of exudative Pleural effusion. Diagnosis of pleural disease in often a lengthy process starting with thoracocenthesis followed by routine examination, cytology and closed pleural biopsy / medical thoracoscopy.[3] Medical thoracoscopy permits biopsy with direct visualization and thus increases the diagnostic yield in patients with pleural disease.[4]

The rationale of this study is to find the diagnostic accuracy of medical thoracoscopy in diagnosis of malignant pleural effusion taking histopathology as

gold standard. Thoracoscopy is the gold standard method for diagnosis of malignant PE. Local data is lacking because it is expensive and expertise are less. International statistics is present showing high diagnostic accuracy but were conducted on small sample size. So we want to conduct this study on large sample size to gain the more reliable and precised results which can be implemented in future.

**Objective:** The objective of this study is to find the diagnostic accuracy of medical thoracoscopy in diagnosis of malignant pleural effusion taking histopathology as gold standard.

## Methodology

This was a cross sectional study conducted at department of Pulmonology Lady Reading Hospital Peshawar from January 2016 to July2016. Total of 150 patients were included in the study, with 95% confidence level, 7% margin of error, expected percentage of MPE i.e. 70% and taking sensitivity and specificity of thoracoscopy i.e. 85% and 100% taking histopathology as gold standard. More over non-probability consecutive sampling technique was used for sample collection.

Inclusion Criteria: Patients of age 30-70 years of either gender with suspicion of MPE (as per operational definition) with cough, chest pain, weight loss and dyspnea.

**Exclusion Criteria**

- Patient with transudative pleural effusion withs severe uncorrected hypoxemia despite continuous oxygen administration (or clinical examination)
- Patients who could not withstand the lateral decubitus for period long enough to perform the thoracoscopy ( clinical examination)
- Patients with coronary artery disease ( medical record), uncontrolled diabetes mellitus (HBA1c>10%), uncontrolled systemic hypertension (BP> 140/90mmHg) and features of malignancy ( on MRI report) like lymph node enlargement (5 cm), metastasis ( medical record) PT > 20 sec, APTT > 10 sec, platelet count < 60,000/m.3

**Data Collection Procedure**

Total 150 patients fulfilling the inclusion criteria were enrolled in the study from OPD of Department of Pulmonology, Lady Reading Hospital Peshawar. Informed written consent was taken. Their demographic detail (including name, age, gender, and contact) was noted. Then patients were under went thoracoscopy under local anesthesia. One puncture technique was the method used in the present study. An 11 mms trocar was inserted through which a 10 mm semirigid pleuroscope was inserted avoiding uncontrolled deep penetration. Then evacuation of the entire fluid collection and ipsilateral pneumothorax was induced on steps. Introduction the pleuroscope was done to explore the entire pleural cavity, semi rigid pleuroscope e allows visualization of remote or concealed lesions. Examination of pleural cavity was done systematically starting at apex and then the costal pleura, diaphragm and finally the mediastinal pleura, ending back at the apex. After that, biopsies were taken from suspicious areas over costal and diaphragmatic parietal pleura. Chest tube was placed and connected to underwater seal bottle. A plain CXR was done to confirm the tube position and correct drain function. Samples was sent to pathology laboratory of the hospital for histopathology and confirmation of malignant or TB Pleural effusion.

Data Analysis: Data was entered and analyzed through SPSS version 20. Mean and standard deviation were calculated for age. Frequency and percentages were calculated for gender, PE (on thoracoscopy and histopathology). 2X2 tabel was generated to calculate sensitivity, specificity, PPV, NPV and diagnostic accuracy of thoracoscopy and histopathology as gold standard.

## Results

Total 150 patients were observed in this study, Age and Gender distribution among patients (Table 1). Medical thoracoscopy findings shows that among 150 patients 120(80%) patients were malignant while 30(20%) patients were non- malignant (Table 2).

Histopathology findings shows that among 150 patients 141(90%) patients were malignant while 9(6%) patients were non-malignant (Table 3).

Diagnostic accuracy of medical thoracoscopy findings taking histopathology findings as gold standard was analyzed as the sensitivity of medical thoracoscopy was 85.10%, Specificity was 100%, PPV was 100%, NPV was 30%, diagnostic accuracy was 86% (Table 4).

Table 1: Age and Gender distribution (n=150)

| | | Frequency | Percentage |
|---|---|---|---|
| Age | 30-40 | 9 | 6% |
| | 41-50 | 30 | 20% |
| | 51-60 | 51 | 34% |
| | 61-70 | 60 | 40% |
| Gender | Male | 105 | 70% |
| | Female | 45 | 30% |

Mean age was 57 years with SD ± 7.11

Table 2: Thoracoscopy findings (n=150)

| Finding | Frequency | Percentage |
|---|---|---|
| Malignant | 120 | 80% |
| Non malignant | 30 | 20% |
| Total | 150 | 100% |

Table 3: Histopathology reports of study cases (n=150)

| malignancy | Frequency | Percentage |
|---|---|---|
| Malignant | 141 | 94% |
| Non-Malignant | 9 | 6% |
| Total | 150 | 100% |

Table 4: Medical Thoracoscopy VS Histopathology Report (n=150)

| | | Histopathology Report | | Total |
|---|---|---|---|---|
| | | Malignant | Non-Malignant | |
| Medical Thoracoscopy | Malignant | A120 TP | B0 FP | **120(80%)** |
| | Non- Malignant | C21 FN | 9D TN | **30(20%)** |
| | Total | 141(94%) | 9(6%) | **150(100%)** |

Sensitivity=120/120+21*100 = 120/141*100= 85.10%

Specificity = 9/9+0*100 = 9/9*100= 100%

PPV = 120/120+0*100 = 38/40*100= 100%

NPV = 9/9+21*100 =9/30*100= 30%

Diagnostic Yield=120+9/150*100 = 129/150*100=86%

## Discussion

Malignant pleural effusion is diagnosed by the identification of malignant cells in pleural fluid or on pleural biopsy, represent an advance malignancy associated with high morbidity and mortality, precluding the possibility of curative treatment approach.[5-7] Malignant pleural effusions are caused by pleural malignancy as well as metastasis in more than 75% cases e.g lung, breast, ovary and lymphomas.[8]

Our study shows that mean age was 57 years with SD ± 7.11. Seventy percent patients were male and 30% patients were female. Diagnostic accuracy of medical thoracoscopy findings taking histopathology findings as gold standard was analyzed as the sensitivity of medical thoracoscopy was 85.10%, Specificity was 100%, PPV was 100%, NPV was 30%, Diagnostic accuracy was 86%.

Similar results were found in another study conducted by Froudarakis ME et al 78 which shows that thoracoscopy is the gold standard for the diagnosis and treatment of pleural diseases.[9] Its diagnostic yield is 95% in patients with malignant pleural disease, with approximately 90% successful pleurodesis for malignant pleural effusion and 95% for pneumothorax

Similar results were found in another study conducted by Fauzi A. et al in which mean age was 60 years with SD ± 6.12.[10] Seventy five percent patients were male and 25% patients were female. Diagnostic accuracy of medical thoracoscopy findings taking histopathology findings as gold standard was analyzed as the sensitivity of medical thoracoscopy was 87%, Specificity was 97%, PPV was 97%, NPV was 35%, Diagnostic accuracy was 90%.

Similar results were found in another study conducted by Chetambath R. et al in which mean age was 58 years with SD ± 4.88.[11] Sixty percent patients were male and 40% patients were female. Diagnostic accuracy of medical thoracoscopy findings taking histo-pathology findings as gold standard was analyzed as the sensitivity of medical thoracoscopy was 90%, Specificity was 92%, PPV was 91%, NPV

was 41%, Diagnostic accuracy was 93%.

## Conclusion

Our study concludes that the sensitivity of medical thoracoscopy was 85.10%, Specificity was 100%, PPV was 100%, NPV was 30%, Diagnostic accuracy was 86% which shows that medical thoracoscopy is an essential tool for diagnosis of malignancy in malignant pleural effusion.

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