

Study of Efficacy of Pleural Biopsies in Comparison to Pleural Fluid Cytology in Diagnosis of Suspected Malignant Pleural Effusion

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ABSTRACT

Background and Aim: Medical thoracoscopy/pleuroscopy is used increasingly by chest physicians and has become, after bronchoscopy, the second most important endoscopic technique in respiratory medicine. The purpose of study was to comparatively evaluate the role of pleural fluid cytology and pleural histopathology by means of biopsy in diagnosis of suspected malignant pleural effusion.

Materials and Methods: A Hospital based prospective and observational study of inpatient and outpatient in department of Pulmonary Medicine of Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar

Results: Among 50 patients with suspected malignant pleural effusion, mean age of patients is 59.2 years. Pleural fluid cytology is positive for malignant cells in 21 cases with yield of 43% (21 of 48 cases) and cell block showed presence of atypical cells in 34 cases with yield of 70% (31 of 48 cases). Diagnostic yield of thoracoscopic biopsy is about 92% (46 of 50)

Conclusion: Our study concludes that Medical thoracoscopy is a safe and effective procedure with high diagnostic yield -92% in our study and accurate in diagnosis.

Keywords: Malignant pleural effusion, cytology, pleural biopsy

INTRODUCTION

Medical thoracoscopy/pleuroscopy is used increasingly by chest physicians and has become, after bronchoscopy, the second most important endoscopic technique in respiratory medicine.^[1] It is considered to be one of the main areas of interventional pulmonology/pneumology^[2] and an important part of a specialist pleural disease service.^[3]

Compared with "surgical" thoracoscopy, which is better termed "video-assisted thoracic surgery" (VATS) and is

performed in an operating room under general anaesthesia with selective intubation, medical thoracoscopy/pleuroscopy can be performed in an endoscopy suite under local anaesthesia or conscious sedation, using non-disposable rigid or semi-flexible (semi-rigid) instruments. Thus, medical thoracoscopy/pleuroscopy is considerably less invasive and less expensive.

Malignant pleural effusion (MPE) is frequently observed in multiple malignancies, and lung cancer is the most

common cause.^[4] The existence of MPE in patients indicates systemic dissemination of cancer and declining in life expectancy and quality. The current guideline recommended that thoracentesis and/or closed pleural biopsy can be used as the first diagnostic steps in the diagnosis of MPE.^[5]

However, these procedures usually do not work when pleural effusion with thickness less than 10 mm on chest computed tomography (CT) scans.

Instead, the more invasive approaches, such as medical thoracoscopy can be considered to identify whether pleural biopsy contains malignant cells.^[6] As a matter of fact, medical thoracoscopy is a highly sensitive and safe method for diagnosing exudative pleural effusions.^[7,8,9]

In the present study we compared the efficacy of pleural biopsies by flexi rigid thoracoscopy to the pleural fluid cytology in suspected case of malignant pleural effusions.

MATERIALS AND METHODS

A Hospital based prospective and observational study was carried out at Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar over a periods of 19 months from January 2018-July 2019.

Patients presenting with suspected malignant pleural effusion to Pulmonary Medicine outpatient department and inpatient of our hospital were included in the present study. A pre-structured proforma was used to collect the baseline data.

Bio chemical, cytology and microbiological evaluation of pleural fluid will be done in all cases; those with exudative effusion will undergo pleural biopsy, subsequently etiology of effusion will be determined.

Permission to conduct the study was obtained from institutional ethics committee (IEC), Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar. Informed oral consent was obtained from all patients.

Inclusion Criteria:

- Age >18 years
- Smokers
- People exposed to high biomass and air pollution
- Occupational history
- Accesability for treatment and follow up

Exclusion Criteria:

- Patients with active tuberculosis
- People with epitheloid granuloma positive
- Subjects with caseating granuloma of lymph node biopsy

- Malignant pleural effusion that is recurrent despite appropriate supportive care
- Subjects with prior chemo radiation

Procedure

The study was approved by the ethical committee of Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar. The selected patients were briefed about the study and a informed, written consent was obtained.

The patients were subjected to undergo routine prethoroscopic evaluation including chest radiograph, frequently supplemented with CT scan chest, Ultrasound scan of chest and abdomen. Respiratory status was evaluated with blood gas analysis and spirometry.

Complete blood picture with ESR, coagulation parameters, ECG and 2D Echo were done. Anesthesia care provider interviews the patients and evaluate the patient's health status, during which additional diagnostic or laboratory tests such as Blood grouping and typing and serum electrolytes etc were advised.

Single port technique with Olympus thoracoscope, was used for thoracoscopy. Patient was placed in the lateral decubitus with the healthy lung down. The arm on the side of the exploration is positioned above the patients head in order to widen the intercostal space.

After local anaesthesia with 2 % lidocaine and sedation with midazolam drip, a small caliber trocar (14 F) was introduced in the intercostals space (5th/6th) after incising the chest wall. After careful visualization of entire pleural cavity with thoracoscope, multiple biopsy bits were taken at multiple sites. Anaesthesia care provider frequently monitored the patients i.e. cardiac monitoring with multi channel ECG, O2 saturation with pulse oxymeter. Hemostasis was secured and ICD tube kept.

RESULTS

The present study was performed on 50 patients attending medical outpatient department or admitted in wards of Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar.

Table 1: Gender distribution of study subjects

Sex	Frequency	Percent
Male	28	56%
Female	22	44%
Total	50	100%

Out of 50 study subjects 28 are male and 22 are female (Table 1).

Table 2: Age distribution of study subjects

Age	Frequency	Percentage
20-30	2	04%
31-40	0	00%
41-50	10	20%
51-60	18	36%
61-70	14	28%
>71	06	12%

Most of the subjects were distributed between 50 to 70 years, with mean age is 59.2 years (Table 2).

Table 3: Distribution of study subjects according to their smoking history

Smoking	Frequency	Percent
Present	40	80%
Absent	10	20%
Total	50	100%

Around 80 % of the subjects in our study has history of smoking (Table 3).

Table 4 : Distribution of study subjects according to their chest X ray

Chest X-ray	Frequency	Percent
Massive Pleural Effusion	26	52%
Moderate Pleural Effusion	20	40%
Bilateral Pleural Effusion	02	04%
Right Hydropneumothorax	02	04%
Total	50	100%

Moderate to massive effusions are most frequently seen (92%) in patients with malignant pleural effusions (Table 4).

Table 5: Distribution of study subjects according to appearance of pleural fluid

Color of fluid	Frequency	Percent
Straw	20	40%
Haemorrhagic	30	60%
Total	20	100.0

Hemorrhagic fluid is most commonly seen i.e in 60% of the subjects (Table 5).

Table 6: Distribution of pleural fluid ADA levels

ADA	Frequency	Percent
<40	46	92%
>40	14	08%
Total	50	100%

92% of the subjects in our study shows low ADA (Table 6).

Table 7: Distribution of study subjects according to their thoracoscopy findings

Thoracoscopy finding	Frequency	Percent
Nodules	42	84%
Septations	34	68%
Mass	03	06%

84% of the subjects manifested nodules and 68% of the subjects showed septations on thoracoscopy (Table 7).

Table 8: Distribution of study subjects according to their biopsy results

Type	Total no	Prevalence (%)
Adenocarcinoma	35	70
Squamouscell carcinoma	08	16
Mesothelioma	02	04
Atypical Carcinoid	01	02
Nonspecific inflammation	04	08

Histopathology findings shows that among 50 patients 46 (92%) patients were malignant while most common malignancy being adenocarcinoma (Table 8).

Table 9: Yield of cytology, cell block and thoracoscopic biopsy

Procedure	Number of Subjects	Positive	Yield %
Cytology	48	21	43%
Cell block	48	34	70%
Biopsy	50	48	92%

Our study shows that yied of thoracoscopic biopsy is [92%] far better when compared to pleural fluid cytology and cellblock for diagnosing malignant pleural effusions (Table 9).

DISCUSSION

More than half of exudative effusions are due to malignancy. Closed needle biopsy may be successful in 50 % of metastatic pleural malignancies; however it is of little value for tumors confined to the diaphragmatic, visceral or mediastinal pleura. In metastatic pleural effusions, biopsies of the visceral and diaphragmatic pleura are only possible under direct vision, because the chest wall is often not involved (in approximately 30% cases) in early stages.

This prospective and observational study was conducted in Chalmeda Ananda Rao Institute of Medical Sciences, Karimnagar over a period of 18 months from February 2018 to July 2019, to know the diagnostic efficacy of thoracoscopic pleural biopsy in cases of suspected malignant pleural effusions.

In this study, we enrolled 50 subjects, of suspected cases of malignant pleural effusion. Among 50 subject males were 28 and females were 22. Most of the subjects were distributed between 50 to 70 years with mean age distribution of 59.2 years. 80% of subjects had a history of smoking, which is a risk factor for malignancy. At the time of presentation 46 patients showed moderate to massive effusions on chest xray. We had 2 cases of bilateral effusions and 2 cases of right hydro pneumothorax. For all the subjects diagnostic thoracentesis performed, in which ADA < 40 is seen in 46 subjects (92%). And upon thoracoscopy positive findings were seen in 84% of cases, among which nodules were seen in 42 subjects, septations in 34 and intraluminal mass in 3 subjects.

In the present study medical thoracoscopy revealed presence of pleural metastasis in 46 cases and most common being adenocarcinoma followed by squamous cell carcinoma. 2 cases of malignant mesothelioma and one case of atypical carcinoid are reported. For the entire cases primary is lung.

In 2006 Sakuraba et al retrospectively studied 138 patients who underwent thoracoscopy. Over all diagnostic efficacy was 97.1% (134/138). The diagnostic efficacy in the cases of carcinoma was 92.6% (25/27), in malignant pleural mesothelioma it was 100% (10/10) and in tuberculosis it was 93.8% (30/32).^[10]

In 2009 observational study was done by Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand. During 1998 to 2007, there were 142 procedures of medical pleuroscopy performed. There were 86 procedures for the indication of undiagnosed pleural effusion. The diagnostic yield was 95.2%.^[11]

Mehta et al study showed that 25 patients with pleural

effusions of unknown etiology, who underwent flexi rigid thoracoscopy from January 2009 to July 2010. Overall diagnostic yield of the series was 80%^[12]

A prospective study done by prabhu and narasimhan showed diagnostic yield of 97% and no major complications.^[13]

A retrospective study done by Mootha VK et al showed Overall diagnostic yield of thoracoscopic pleural biopsy was 74.3% in patients with undiagnosed pleural effusions. Pleural malignancy was diagnosed in 48.6% of patients and Tuberculosis was diagnosed with pleural biopsy in 22.8% of patients. And also had low complication rate after thoracoscopy.^[14]

Thoracoscopy is highly sensitive and specific for detecting the cause of pleural effusions. according to literature and review of various studies the diagnostic yield of thoracoscopy is between 90-100%. Experience of the performer is the important factor in determining the success of the procedure. The present study reveals diagnostic yield of 92% which is co-relating with many studies in the literature. Minor complication related to the thorocscopy procedure such as chest pain, fever and mild subcutaneous emphysema are reported. Major complication like severe hemorrhage and death related to the procedure were nil.

CONCLUSION

Our study concludes that Medical thorocscopy is a safe and effective procedure with high diagnostic yield -92% in our study and accurate in diagnosis. It should be indicated in proper patients where ever it is available.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

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