



Pleuroscopy – A Window For Undiagnosed Pleural Effusion

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Abstract

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Introduction

Undiagnosed pleural effusions are always a challenge for pulmonologists. Diagnosis of pleural effusions usually follows a systematic stepwise approach starting from History, and clinico-radiological examination, to serial thoracentesis, and closed pleural biopsy. Exudative effusions undiagnosed in spite of thoracentesis require further assessment with pleuroscopy.

Pleuroscopy /Thoracoscopy acts as a window into pleural space. It is a minimally invasive procedure that provides access to pleural space, Parietal pleura, Lung, and other structures in the pleural cavity. It includes passage of pleuroscope into pleural space and helps in direct visual assessment of Parietal pleura, performing Biopsy of Parietal pleura, Chest tube insertion and pleurodesis in required patients to prevent a recurrence.

Pleuroscopy involves the passage of an endoscope like tube into pleural space under local anesthesia on

a daycare basis. It can be either diagnostic or therapeutic. It helps in obtaining pleural biopsies under direct visual guidance, hence increasing the diagnostic yield, and also can monitor for complications like bleeding, Haemothorax, and pneumothorax unlike in Closed pleural biopsy. Thoracoscopy helps in suctioning large amount of fluids and also break and adhesions in the pleural cavity and pleurodesis.

Parts of thoracoscope:

1) Thoracoscope is an instrument similar to a flexible video bronchoscope. It is of two types: 1)Rigid 2) Semi-Rigid. Our institution uses Semi-rigid Pleuroscope. It has two parts: Handle with suction and working channel, Shaft with Rigid part, and flexible end.

2) Plastic Trocar



Review Of Literature:

Mohammed et al., conducted a study on 50 patients with inconclusive exudative effusions. In the current study, medical thoracoscopy gave a definitive diagnosis in 50 out of 50 patients with a diagnostic yield of 100%. The histopathological results of thoracoscopic pleural biopsy among the study population revealed that the most common diagnosis was malignancy in 46 patients (92%), followed by chronic nonspecific pleurisy in two patients (4%), then tuberculous pleurisy in one patient (2%) and fibrotic pleurisy in one patient (2%). The most common pathological malignant type was malignant pleural mesothelioma (MPM) (epithelial type) in 30 patients (60%), followed by metastatic adenocarcinoma in six patients (12%). According to the study, mesothelioma is more common due to environmental exposure to asbestos has a relationship with mesothelioma in patients working or living in the neighbourhood with asbestos factories. In this study, (62%) patients showed atypical mesothelial cells, and were proved to be malignant pleural disease with characteristic nodules in pleura, such as thoracoscopic findings.

Aim Of The Study:

To study the diagnostic yield of thoracoscopy in patients with undiagnosed Exudative pleural effusions.

Methods And Methodology:

STUDY DESIGN: Retrospective study

STUDY PERIOD: January 2021 - December 2022

SAMPLE SIZE: 25 patients

STUDY LOCATION: Aster RV hospital, Bangalore

Inclusion Criteria:

A Total of 25 patients with undiagnosed exudative pleural effusions after subjecting to thoracocentesis were included from the Department of pulmonary medicine, Aster RV hospital.

Exclusion Criteria:

1. Patients with coagulation disorders and low platelet counts
2. Patients with severe hypoxemia
3. Patients with severe cardiovascular and hemodynamic abnormalities.
4. Patients with a confirmed diagnosis with thoracocentesis.
5. Patients unable to withstand Lateral Decubitus position.
6. Patients who are not willing for the procedure.
7. Patients with thickened pleura and underlying vascular lesions demonstrated on CT.

Methodology:

All 25 patients were subjected to the following:

1. Full history taking
2. Clinical examination

3. Investigations
 1. CBC, PT, INR, LFT, RFT, HIV, coagulation profile
 2. USG guided Thoracocentesis and pleural fluid examination for cytology, chemical, and bacterial examination.
 3. Radiological investigations: Chest X-ray PA view, CT in needed, and ultrasound chest.
 4. Pleural biopsy using Abram’s needle biopsy needles sent for histopathological examination.
 5. Thoracoscopic examination of pleural space using semi-rigid thoracoscope.

Technique:

1. Patient is positioned in Lateral decubitus position with the affected side upwards.
2. Site of the incision is identified and marked with help of ultrasound. (usually in 5Th ICS mid-axillary line).
3. After conscious sedation with Midazolam and fentanyl, a 1-2cm incision is given in the identified ICS.
4. Single puncture technique is followed and the trocar is passed through the incision.
5. Pleuroscope is passed through the trocar and visualizes the pleural space.

6. Small bore ICD is inserted at the end of the procedure and removed once the lung is expanded without any air leaks.

Results:

This is a retrospective study conducted on 25 patients with 16 males and 9 females. Thoracoscopy gave diagnosis in 23 patients out of 25 patients with a diagnostic yield of 92%. The most common diagnosis in our study group is Tuberculosis followed by Malignancy. Pleural fluid examination for malignant cells was positive in 5 patients out of 25 patients. The most common HPE type of malignancy is Adenocarcinoma. Regarding the

thoracoscopic findings in this study, nodules were found the most common in 14 patients, followed by sago grain nodules in 5 patients, mass in one patient, and adhesions in 4 patients. Thoracoscopy helped at early diagnosis and initiation of treatment in the study group. 14 patients diagnosed with Tuberculosis were started on ATT. 8 patients diagnosed with malignancy were referred to oncology for further management. One patient with malignant effusion underwent chest tube insertion and pleurodesis after complete draining of fluid. A Patient with recurrent malignant effusion was placed with a pleural indwelling catheter and referred to oncology.

Table 1 : Sex distribution

SEX	N	%
MALE	16	64
FEMALES	09	36

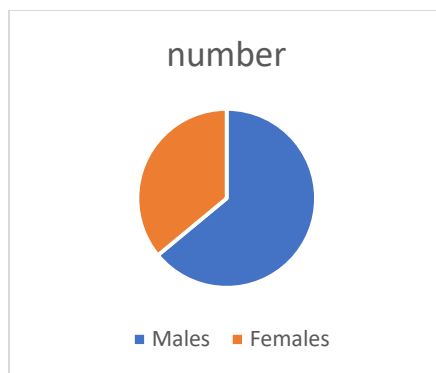


Table 2: yield of thoracoscopy

	NUMBER	PERCENTAGE
DIAGNOSED	23	92%
UNDIAGNOSED	2	8%

Table 3: percentage of malignant cells

Pleural fluid Malignant cells	Number	%
Positive	5	20
Negative	20	80

Table 4 : HPE on pleural biopsy

HPE ON PLEURAL BIOPSY	NO.	PERCENTAGE

NECROTISING GRANULOMA	14	56
MALIGNANT	8	32
EMPHYEMA	1	4
NO DEFINITIVE DIAGNOSIS	2	8

Fig : biopsy of adhesions



HPE TYPE OF MALIGNANCY	NO.
EPITHELOID SARCOMA	1

ADENOCARCINOMA	4
INVASIVE ADENOCARCINOMA	1
METASTATIC CARCINOMA	2

Fig : biopsy of mass lesion via thorascopy

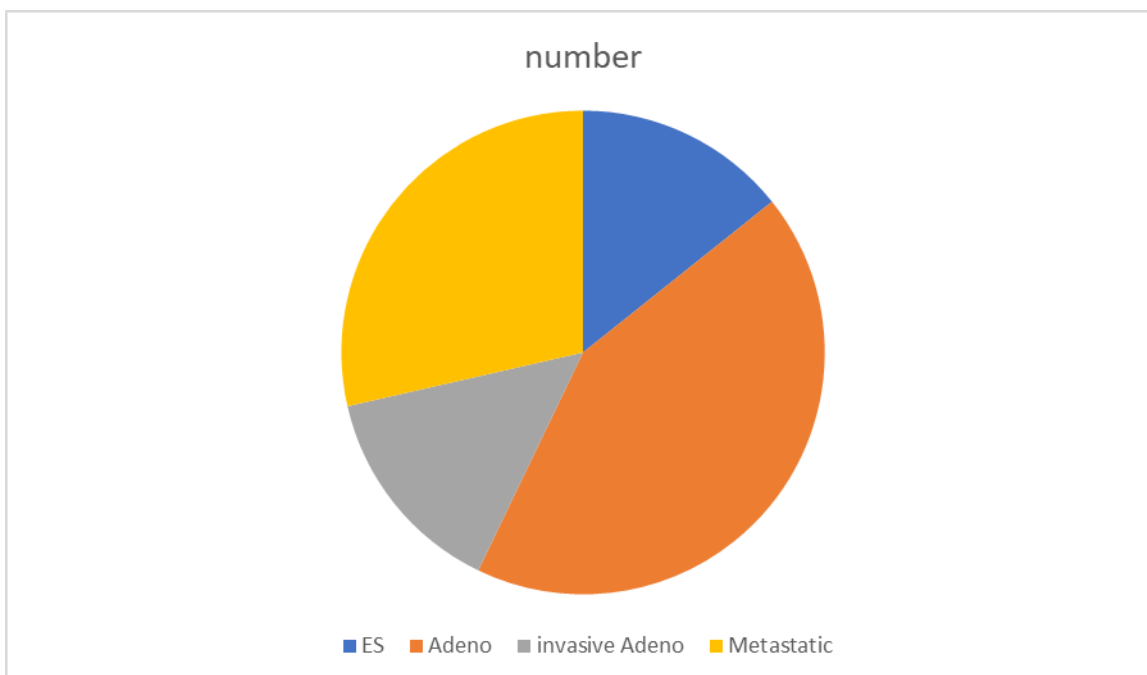
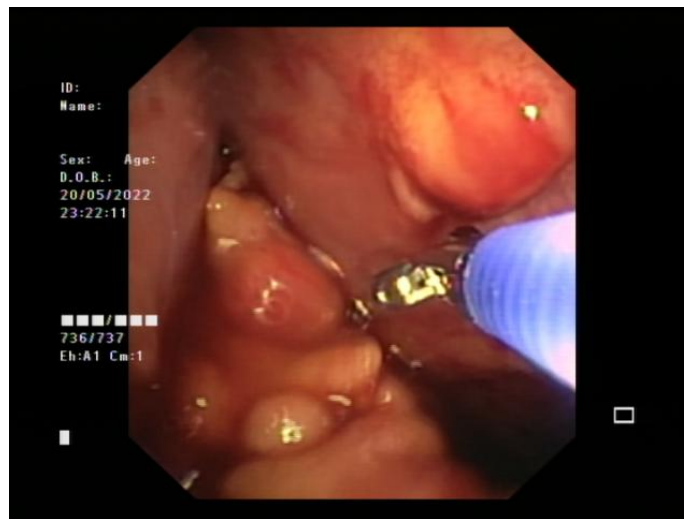
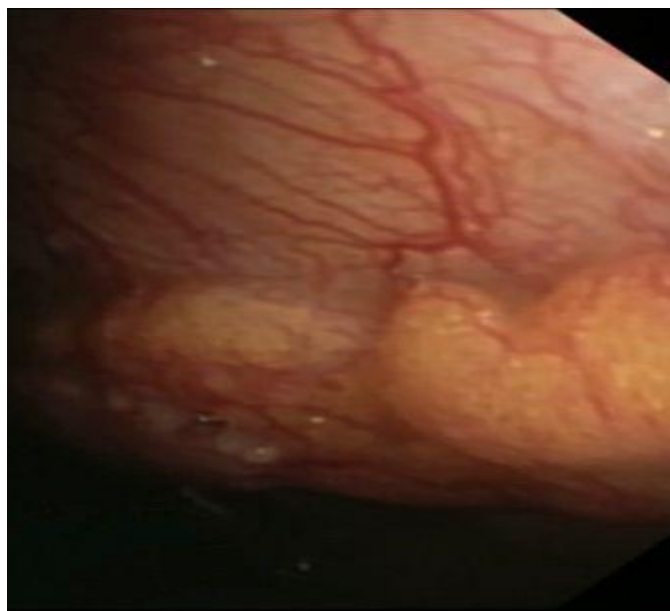


Table: 5 pleuroscopic findings of study group

PLEUROSCOPIC FINDINGS	NO.
NODULES	14
SAGO GRAIN NODULES	5
PUS	1
ADHESIONS	4
NO SPECIFIC FINDINGS	2
Mass	1

Fig 4: sago grain appearance of pleura



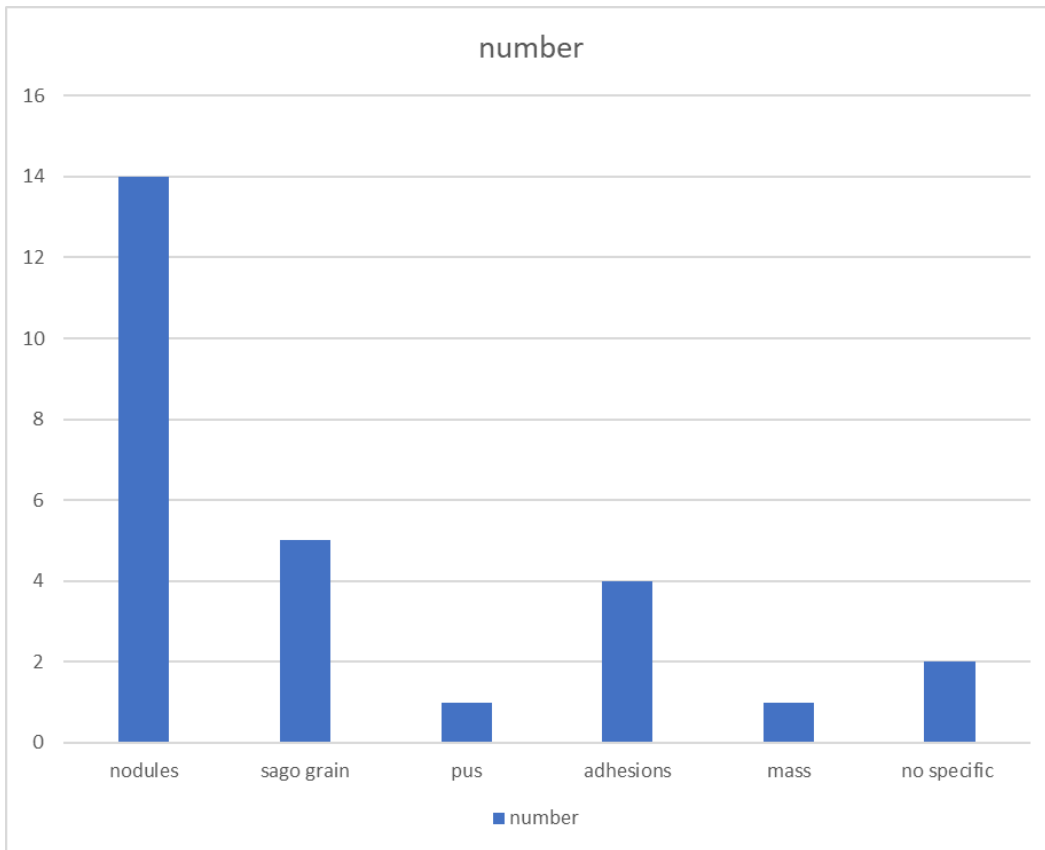
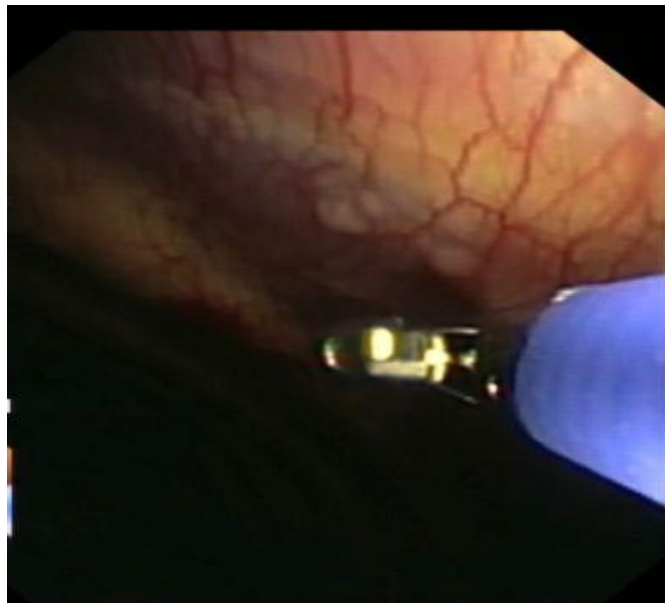


Fig 5: Biopsy of Sago grain nodule



Discussion

Pleural effusions are very common in day-to-day practice. Etiology of Pleural effusions varies from benign to malignant causes. They are always investigated in a systematic stepwise manner starting

from clinical history to Thoracentesis. In cases with exudative effusion with inconclusive cytology, a histopathology examination is required. Though HPE can be obtained with closed blind biopsy or Radiology guided, Thoracoscopy remains a better

option for diagnosis of undiagnosed exudative effusions. Thoracoscopy is preferred in view of high safety, higher yield, minimally invasive, and lesser hospital stay. It also gives direct visual guidance for performing pleural biopsies.

This study is made to detect the diagnostic yield of thoracoscopy in patients with undiagnosed exudative pleural effusions at Aster RV hospital, Bangalore. This study was conducted on 25 patients with exudative effusions undiagnosed even after serial thoracentesis. It included 16 males and 9 females.

In this study, Medical thoracoscopy gave a definite diagnosis in 23 patients out of total of 25 patients with diagnostic yield of 92%. This is in agreement with the study conducted by Helala *et al.*, which was conducted in Kobri EL Kobba Military hospital on 40 patients with undiagnosed exudative effusions. In Helalal *et al.*, study, Thoracoscopy gave a diagnosis in 38 patients out of 40 patients with a diagnostic yield of 95%. In contrast to our study, Study conducted by Zhang *et al.*, in Kulliyah of medicine, Islamic university achieved diagnosis only in 10 out of 22 patients with a 45.5% yield.

In our study, HPE results of pleural biopsy revealed that the most common diagnosis was Tuberculosis in 13 patients followed by Malignancy in 8 patients. This is, in contrast, to a study conducted by Moma M. Ahmed *et al.*, who found Malignancy is the most common diagnosis. In this study, the most common HPE type of malignancy is Adenocarcinoma.

Our study found no post-procedure complications in all patients. Hence, this procedure is considered to be safe and well-tolerated with no mortality. Regarding the thoracoscopic findings in this study, nodules were found the most common in 14 patients, followed by sago grain nodules in 5 patients, mass in one patient, and adhesions in 4 patients. This is in agreement with the study conducted by Prabhu and Narasimhan who

performed biopsies in 68 patients and found nodules in 33 patients, adhesions in 26 patients, sago grain nodules in 8 patients, and one with normal pleura.

Conclusion:

Thoracoscopy is a safe and well-tolerated procedure. It helped in the early diagnosis of patients with inconclusive pleural effusions. Being a daycare procedure using local anesthesia, the hospital stay is for less duration and also gives access to treatment at the same time. We could proceed with ICD insertion and pleurodesis in required patients.

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