

Research Article

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Efficacy of Thoracoscopic Guided Brush Cytology in Undiagnosed Pleural Effusion

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ABSTRACT

The accurate diagnosis of pleural effusion remains a challenging clinical problem. Medical thoracoscopy has an established role in achieving the aetiology of pleural effusion. Pleural biopsies provide best results, but if cytological results can be shown to give concordant results, therapy can be instituted early.

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Introduction

Medical thoracoscopy has an established role in diagnosing the etiology of pleural effusion [1].

Although Thoracoscopic-guided pleural biopsy provides good yield, it has a limitation of delayed results by 5-7 days [2].

Pleural brushings can be obtained using bronchoscopy brush through the working channel of the thoracoscope [3].

The results of cytology maybe available early and if these results are concordant with pleural biopsy, early institution of therapy may be facilitated.

Materials and Methods

The study was a prospective, single centre study and participants included patients in whom the aetiology of pleural effusion remained undiagnosed.

Medical thoracoscopy was performed through a single puncture technique using a semi-rigid thoracoscope.

The procedure was done with complete aseptic precaution under local anesthesia, conscious sedation, and potent analgesia and supplemental oxygen was given.

The patients were placed in the lateral decubitus position with the affected side nondependent.

After local anesthesia, a 2–3 cm skin incision was made in the mid-axillary line either in the fifth or sixth inter-costal space.

Skin incision was followed by the introduction of a 10-mm disposable blunt trocar with a cannula into the thoracic cavity. After the trocar was removed, pleural fluid was suctioned and thoracoscope was introduced.

Pleural brush specimens were obtained from suspected pleural lesions in parietal pleura, visceral pleura, or near vascular structure.

Brushing was done by scratching the suspected areas up and down multiple times and at least four samples out of which 2 were alcohol fixed and 2 were air dried were taken per patient.

4-6 Forceps biopsies were taken per patient from parietal pleural lesions.

The procedure was followed by the placement of a 24 Fr standard chest tube. A chest radiograph was obtained post procedure (Figure 1-4).



Figure 1: Nodule over the Parietal Pleura, Brush Revealed Suspicious of Malignancy While Biopsy Showed Adenocarcinoma

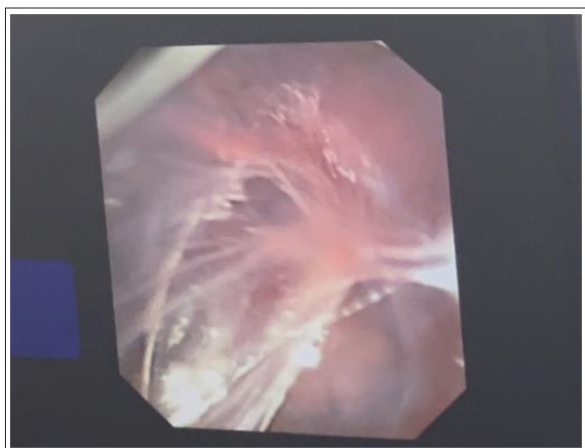


Figure 2: Multiple Adhesions over the Parietal Pleura

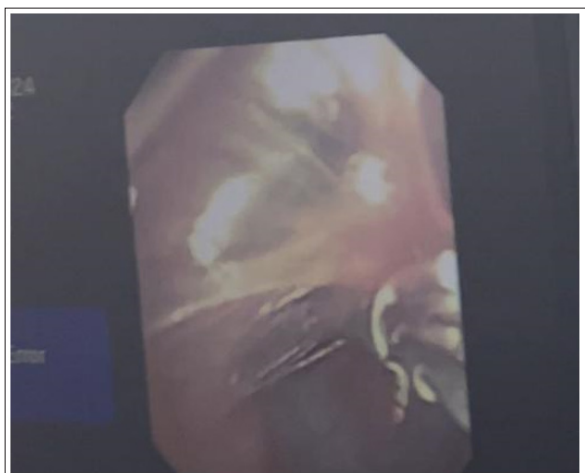


Figure 3: Multiple Adhesions Involving the Parietal Pleura

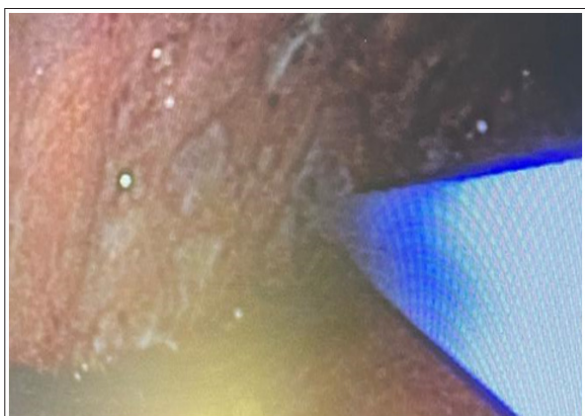


Figure 4: Irregular Parietal Pleura Surface and Brush Cytology Being Taken Using Brush Revealing Mesothelioma

Forceps biopsy and pleural brush specimens were sent for histopathological, cytological examination and for acid fast bacilli stain (AFB) and cartridge based nucleic acid amplification test (CBNAAT)

Results

This study was carried out on 22 patients having undiagnosed exudative pleural effusion who underwent medical thoracoscopy.

The mean age of the patients was 61.6 years with a range of 40–85 years, 14 males (63.6%) and 8 females (36.3%).

40.9 % were smokers. Most of the detected lesions were nodules on parietal pleura in 10 patients (45.4%), adhesions and loculations in 7 patients (31.8%) and hyper vascularity and congestion in 5 patients (22.7%) as summarized in (Table 1-2).

Table 1: Pleural Abnormalities Observed During Thoracoscopy

PLEURAL ABNORMALITIES	NUMBER OF PATIENTS
NODULES	10
ADHESIONS AND LOCULATIONS	7
HYPERVASCULARITY AND CONGESTION	5

Table 2: Findings of Brush Cytology and Forceps Biopsy

BRUSH CYTOLOGY	NUMBER OF PATIENTS	FORCEPS BIOPSY	NUMBER OF PATIENTS
POSITIVE FOR MALIGNANCY	6	ADENOCARCINOMA	8
SUSPICIOUS OF MALIGNANCY	5	SQUAMOUS CELL CARCINOMA	4
MALIGNANT MESOTHELIOMA	1	MESOTHELIAL HYPERPLASIA	4
NO EVIDENCE OF MALIGNANCY	8	ADENOSQUAMOUS CARCINOMA	1
MESOTHELIAL HYPERPLASIA	2	METASTATIC CLEAR CELL CARCINOMA	1
		NO EVIDENCE OF MALIGNANCY	4
NUMBER OF PATIENTS	22	NUMBER OF PATIENTS	22

Out of 22, brush cytology was reported as “positive for malignancy” in 6 (27.2%), “suspicious for malignancy” in 5 (22.7%), “malignant mesothelioma” in 1 (4.5%), “mesothelial hyperplasia” in 2 (9.09%) and “no evidence of malignancy” was reported in 8 patients (36.3%).

Forceps biopsy reported 8 cases as Adenocarcinoma (36.3%), 4 as Squamous cell carcinoma (18.1%), 1 as metastatic clear cell carcinoma (4.5%), 1 as adenocarcinoma (4.5%), 4 as mesothelial hyperplasia (18.1%) and 4 showed no evidence of malignancy (18.1%).

Pleural brush was the only diagnostic modality in one patient not diagnosed by forceps or lavage.

All biopsy and brush smear were negative for AFB and CBNAAT.

The procedure was well tolerated and complications were minimal after thoracoscopy with the most common being post procedure chest pain (72.7%), and subcutaneous emphysema (27.2%).

Discussion

A significant number of patients presenting with pleural effusion poses challenges in diagnosis even after diagnostic thoracocentesis with subsequent pleural fluid analysis for biochemistry, microbiology and cytology, and a closed pleural biopsy.

The diagnostic yield of Thoracoscopic pleural biopsy was 81.3% and brush cytology was positive/suspicious for malignancy in 27.2% and 22.7% respectively and only one case diagnosed as

malignant mesothelioma.

The results of the study are comparable with previous studies by Kendall et al who reported yield of Thoracoscopic pleural biopsy to be 83% in their study, which included 48 patients [4].

Among the malignancies, adenocarcinoma was the most common variant.

On inspection of the pleura with thoracoscope, most of the patients (45.4%) had nodules and adhesions (31.8%).

We could not find any case of tuberculous pleural effusions undergoing thoracoscopy as they were easily diagnosed by initial pleural fluid analysis.

Conclusion

Thoracoscopic pleural brushing is an easy, convenient and safe procedure as it can augment the diagnostic yield of thoracoscopy.

It is of significant value, especially in sampling pleural lesions close to vessels and the visceral pleura compared to pleural biopsy.

It can be used to differentiate malignancy from a granulomatous disease.

Treatment can be initiated after the cytology report without further waiting for biopsy report.

Combined Thoracoscopic pleural specimens will increase the diagnostic yield of medical thoracoscopy for patients with undiagnosed exudative pleural effusion than each procedure alone.

The role of rapid on-site evaluation by cytopathologist may help in improving the yield of brush cytology.

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