

Diagnostic thoracoscopy in undiagnosed pleural effusion: Our experience in Manmohan cardio-thoracic vascular and transplant Center

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ABSTRACT

Introduction: Diagnosis of exudative pleural effusions can often be elusive leading to delayed or misdirected treatment. Pleural biopsy remains the gold standard in the diagnosis but blind biopsy have historically low yields while thoracoscopic biopsies give $\geq 90\%$ results. We reviewed our experience with thoracoscopic pleural biopsy.

Methods: A retrospective observational study of patients with exudative pleural effusions which had Adenosinedeaminase (ADA) values ≤ 60 and \geq three cytology samples negative for malignancy was conducted. These patients were subjected to thoracoscopy and pleural biopsy. The concordance of pre and post operative diagnosis and morbidity of the procedure were studied.

Results: Seventeen such patients with mean age of 39.3 ± 19.8 years (11 to 70 years) and Male to Female ratio of 10:7 underwent thoracoscopic pleural biopsy between Jan 2012 – Jan 2013. The average duration of effusion was 11.05 ± 2.34 weeks. Seven patients had either taken or were currently on a course of anti-tubercular treatment at the time of pleural biopsy. The presumptive clinical diagnosis was tuberculosis in nine patients, malignancy in three and unsure in five. The final histopathology confirmed pleural tuberculosis in only two while metastatic adenocarcinoma was found in six patients and non-specific pleural inflammation in nine. Pleurodesis was done in six and decortication in five patients.

Conclusion: Thoracoscopy should be considered when the cause of pleural effusion is elusive. Judicious use of this diagnostic modality may avoid delayed or misdirected treatment in people with pleural effusions and also offer opportunity of therapeutic intervention when needed.

Key words: Biopsy, cytology, pleural effusion, thoracoscopy.

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INTRODUCTION

The etiology of exudative pleural effusions are often difficult to diagnose. A variety of predictive scores and models have been proposed.¹ Pleural biopsy is considered to be the gold standard.² Needle pleural biopsy has historically given low diagnostic yields.²⁻⁴ Thoracoscopic pleural biopsy has however been diagnostic in more than 90% of patients with cytology negative malignant pleural effusions⁵ and in up to 99% of patients with tubercular pleuritis.^{6,7}

Lack of diagnosis despite all routine investigations can be the cause of delayed or misdirected treatment. Thoracoscopy has the prospect of giving an accurate diagnosis and the ability to perform therapeutic procedures like decortications and pleurodesis when necessary. The potentials and morbidities of this procedure in our setting has not be studied.

The study was conducted with the objectives of determining the diagnostic rates and morbidities of thoracoscopy and also study the concordance of presumptive diagnosis of pleural effusion with the histopathological results.

METHODS

This study was conducted as a retrospective observational descriptive study of all patients who underwent thoracoscopy for undiagnosed pleural effusion at Manmohan Cardio-thoracic Vascular and Transplant Center (MCVTC) between January 2012 to January 2013. Permission was obtained from hospital authorities for use of patient data from the Thoracic Surgery database. Undiagnosed pleural effusion was defined as a lymphocyte predominant exudative effusion in which there

was failure to achieve a diagnosis by initial pleural fluid analysis including pleural fluid ADA levels (<60) and at least three pleural fluid cytology negative for malignant cells. All patients underwent detailed clinical evaluation with history and clinical examination. Computed tomography (CT) of the chest was performed to assess feasibility of thoracoscopy. Patients who were unfit for surgery under general anaesthesia and those in whom thoracoscopic surgery was deemed not feasible due to very thick pleura or dense adhesions were not included. All patients meeting the inclusion criteria were included by non-probability consecutive sampling.

We performed thoracoscopy in these patients under general anaesthesia. Two or three 12 millimeter ports were used. The pleural fluid was drained. The parietal and visceral pleurae were inspected. Large stamp biopsies of the pleura were taken from what looked to be the most obviously abnormal areas. The lung was expanded under vision and mechanical and chemical pleurodesis was done. Decortication was done if necessary to attain complete expansion. The pleural biopsy specimen was submitted for examination to the Pathology Department of Tribhuvan University Teaching Hospital.

Chest tube placed post-operatively was removed once the daily output was less than 100ml/24hrs and the Chest X –ray showed full expansion.

Demographic characteristics of the patient, results of pleural fluid analysis, presumptive clinical diagnosis and final histopathological diagnosis were recorded. Peri-operative morbidity of thoracoscopy and duration of chest tube drainage post-operatively were also recorded. Concordance of presumptive pre-operative diagnosis with final histopathology

was evaluated. Data are presented in descriptive fashion.

RESULTS

Between Jan 2012 and Jan 2013, seventeen patients underwent diagnostic thoracoscopy for undiagnosed pleural effusions at MCVTC. Their ages ranged from 11 to 70 years (mean =39.3±19.8). Male to female ratio was 10:7. Nine of these patients were from within the capital and the rest were from outside the capital. Majority of the effusions were right sided with a right to left ratio of 13:4. The duration of recognition of the effusion prior to thoracoscopy ranged from 2-32 weeks with a mean of 11.05 ± 2.34 weeks.

ADA levels had been done in the pleural fluid of all the patients and their values ranged from 17 to 59 with mean of 36.58 ± 7.68 units.

Tubercular pleural effusion was the commonest pre-operative diagnosis (n=9/17). The effusion was thought to be malignant pre-operatively in three and definite pre-operative presumptive diagnosis was not possible in the remaining five patients. Five patients with presumptive diagnosis of tubercular effusion and one patient each thought pre-operatively to have malignant effusion and effusion with uncertain etiology were already under anti-tubercular treatment (ATT) for various durations prior to thoracoscopy.

Table 1 : Comparison of pre and post operative diagnosis.

Diagnosis	Pre-operative	Post-operative
Tuberculosis	9	2
Malignancy	3	6
Uncertain/ non specific pleuritis	5	9
Total	17	17

A diagnosis of metastatic adenocarcinoma was attained in six patients. Tubercular pleuritis was confirmed only in two patients. In rest of the patients there were only features of chronic non-specific pleuritis. In our series only two of nine patients who were clinically and based on pleural fluid analysis thought to have tubercular effusions were confirmed on biopsy of pleura to be tubercular effusions. (Table 1) Only one of seven patients who were or had been on ATT had confirmed tuberculosis on pleural biopsy. Two patients who had been on ATT for various periods of time were subsequently found to have malignancy. Seven of nine patients thought to have pleural TB and four of seven patients who were already on ATT had only chronic non specific pleuritis.

Decortication was required to re-expand the lung in five patients. Post-operative chest tube drainage was required for an average of 3.14 ± 1.74 days. Complication in the form of failure of pleurodesis and recurrence of malignant effusion occurred in one patient with metastatic renal cell cancer. One patient required thoracotomy and decortication as the lung failed to expand after thoracoscopic decortication. There were no peri-operative major morbidity or mortality.

DISCUSSION

Pleural effusions that evade a diagnosis despite thorough work-up with pleural fluid analysis are common occurrences. This can often be the cause of either misdirected or delayed treatment. Tubercular infections being very common in this part of the world, it is not surprising many of these pleural effusions of uncertain origin are subjected to trial of ATT. In this study we present the data of 17 patients who underwent thoracoscopy under general anaesthesia. In our series a specific diagnosis of either malignancy (n=6) and tuberculosis (n=2) was obtained in 8/17 (47%) patients. The yield of thoracoscopic pleural biopsy was 74.3% (26/35) in the series reported from Chandigarh, India by Mootha et al⁸. Similar experience with medical thoracoscopy has been described from other centers. Kendall et al reported yield of thoracoscopic pleural biopsy to be 83% in their study which included 48 patients.⁹ Tscheikuna from Thailand reported that thoracoscopy was diagnostic in 95% of their 34 patients.¹⁰ However, like in our series Ng et al could achieve diagnosis with thoracoscopic pleural biopsy in 45.5% (10/22) patients with undiagnosed pleural effusions.¹¹ The rates of a specific diagnoses were lower than in reported literature in our series. The finding of non specific pleuritis in these patients however excluded tuberculosis and malignancy and therefore served very well our purpose of avoiding unnecessary initiation of ATT and allayed fears of malignancy in these patients.

Mootha et al found that a significant proportion of their patients, 45.7% (16/35) with undiagnosed pleural effusion had pleural malignancy.⁸ Tscheikuna et al found pleural malignancy in 45% of patients with undiagnosed pleural effusions undergoing thoracoscopy.⁹ Ng

et al found that 45.5% of patients with undiagnosed pleural effusions had pleural malignancy.¹⁰ In our series, this proportion was smaller with 6/17 (36%) patients having been confirmed with cancer. However, five of eight (62.5%) who were ≥ 40 yrs old had a malignant diagnosis while this number was much smaller (1/9= 11%) amongst patients ≤ 40 yrs.

Although thoracoscopy has been done widely in the form of “medical thoracoscopy” under local anaesthesia, we did a formal Video Assisted Thoracoscopy under general anaesthesia. This could be refuted as being unnecessary as thoracoscopy under mild sedation and without the need for intubation and single lung ventilation has been done with good success in diagnosis of undiagnosed pleural effusions.⁸⁻¹¹ Medical thoracoscopy has also been used in addition for chemical pleurodesis in malignant pleural effusions with around 90% success.¹² However, we believe the ability of examining thoroughly the entire pleura in an anaesthetised patient offers better assessment. Thoracoscopic decortication as an added procedure was found necessary and was done in five (30%) of our patients. These patients had older effusions with mean duration of 20.8 weeks. The ability to perform effectively therapeutic procedures like decortications and pleurodesis when needed (as often as 30%) justifies the use of VATS under GA especially when the effusion is old.

Thoracoscopic pleural biopsy is considered gold standard in diagnosis of malignant pleural effusion and TB pleural effusion. Diagnostic yield of thoracoscopic pleural biopsy can be as high as 99% in TB pleural effusions.⁸ Mootha et al reported that eight out of 35 (22.9%) of their patients had pleural TB on pleural biopsy.⁸ Kendall et al however did not find any case of TB in their 48 patients.⁹ We found Tuberculosis in

only 2/17 (11.76%) of our patients and only 2/9 (22.2%) who had a presumptive pre-operative diagnosis of tubercular pleural effusion. This is a smaller than expected proportion given the prevalence of tuberculosis in Nepal. This probably is due to the small number of patients studied in our series. However it does also elucidate the need for pleural biopsy in cases of undiagnosed pleural effusions even when the clinical suspicion is of tuberculosis.

A variety of complications associated with thoracoscopy have been described in the literature, such as subcutaneous emphysema (0.6%-4.9%), air leak (0.5%-8.1%), empyema (0.5%-2.7%), haemorrhage (0.3%-0.4 %), chest wall seeding by malignancy (0.5%-4.0%).¹³⁻¹⁶ We had failure of pleurodesis with recurrence of effusion in one patient and non expanding lung requiring open decortication in one patient.

CONCLUSION

Thoracoscopy should be considered routinely in patients in whom the cause of lymphocyte predominant exudative pleural effusion remains elusive despite routine fluid analysis, ADA and cytology. Judicious use of this diagnostic modality may avoid delayed or misdirected treatment and also offers the opportunity of therapeutic procedures like decortications when necessary.

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