Original Article

Semi-rigid Thoracoscopy: Initial Experience from A Tertiary Care Hospital

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ABSTRACT

Background. Thoracoscopy is usually carried out using rigid metallic instruments. Recently, video flex-rigid or semi-rigid thoracoscopes have been introduced. These have the advantage of easy maneuverability, although the biopsy samples are smaller as compared to those with rigid thoracoscopy. We have looked at the usefulness of flex rigid thoracoscope in the diagnosis and treatment of pleural diseases, remained undiagnosed after thoracentesis and closed biopsy.

Methods. Retrospective analysis of data of patients who underwent thoracoscopy for the evaluation of pleural disease.

Results. Thoracoscopy was done in 21 patients using a flex-rigid thoracoscope in our institution. The indication was pleural effusion with inconclusive or negative pleural fluid cytology and blind pleural biopsy in 18 of the 21 patients. Thoracoscopic biopsy was positive in 12 of the 18 patients (66.7%). Of the six who had a negative biopsy, the procedure indirectly helped in patient management in five. There were no significant procedure-related complications.

Conclusion. Thoracoscopy with flex-rigid thoracoscope is a useful diagnostic tool in the evaluation of pleural effusions with negative blind pleural biopsy and cytology. **[Indian J Chest Dis Allied Sci 2010;52:25-27]**

Key words: Lung cancer, Pleural disease, Tuberculosis, Thoracoscopy.

INTRODUCTION

For establishing the aetiology of pleural effusion, pleural fluid aspiration and its biochemical, microbiological and cytological analysis is the initial investigation.[1-3] The diagnostic yield of pleural fluid cytology is about 62% in malignant pleural effusions.[3] Closed pleural biopsy using a cutting needle increases the yield to 74 percent.[1-3] In tuberculous pleural effusion, pleural fluid analysis shows acid-fast bacilli (AFB) in only a small percentage of patients.[5] Pleural biopsy remains the investigation of choice for the diagnosis of pleural tuberculosis. However, blind pleural biopsy is diagnostic in only 69% to 75% of tuberculous effusions.[1,2] In a Pulmonologist's practice, 20% to 25% of pleural effusions remain undiagnosed despite repeated thoracentesis and closed needle biopsy.[2] This has lead to a growing interest in medical thoracoscopy as a tool for diagnosing pleural diseases.

Thoracoscopy is traditionally performed using rigid metallic instruments. Due to paucity of medical personnel trained in use of these instruments, thoracoscopy is not utilised to its full potential. Recently, flex-rigid or semi-rigid video-thoracoscope (Olympus LTF 160 pleuravideoscope) has been introduced. Being slim and partially flexible, it has the advantage of easy maneuverability. It has the additional advantage of being compatible with the light source and processor of the video-bronchoscope. To the best of our knowledge, there are no published reports on the experience with flex-rigid thoracoscope from India. We report our experience with this versatile instrument in the management of pleural effusion.

MATERIAL AND METHODS

We used our database to identify patients who had a thoracoscopy to investigate the aetiology of pleural effusion when the pleural cytology and blind pleural biopsy were inconclusive or negative. Approval of Institutional Ethics Committee is not required for retrospective studies. Therefore, written informed consent was obtained from all the patients. Thoracoscopy was carried out with Olympus LTF-160 pleuravideoscope in bronchoscopy suite. This procedure was done with the patient breathing spontaneously under conscious sedation, with partial or near total lung collapse. The contraindications for thoracoscopy were intolerate hypoxaemia unrelated to pleural effusion, unstable cardiovascular status,

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bleeding diathesis or refractory cough or lack of pleural space due to adhesions. Patients were pre-medicated with intramuscular pethidine 50mg and promethazine 25mg administered intramuscularly 10 minutes before the procedure. During the procedure midazolam was administered intravenously and titrated to patient comfort. Oxygen saturation was monitored continuously *via* pulse oximetry and oxygen supplementation was provided as required.

A single site of entry was selected on the mid-axillary line between the 4th and the 7th intercostal spaces of the chest wall. The site was infiltrated with lignocaine for local anesthesia. Then as done for a chest tube insertion, a tro-car was introduced into the pleural cavity and fluid was removed and to the extent possible, the lung was allowed to collapse with introduction of air. The scope was then introduced *via* the tro-car and pleural cavity was thoroughly examined. Biopsy was taken from suspicious areas over costal and diaphragmatic parietal pleura. At the end of the procedure, a chest tube was introduced and connected to an underwater seal drainage. This was removed after complete lung expansion was confirmed by repeat chest radiographs.

RESULTS

Over a period of 20 months from March 2006 to January 2008, 333 patients underwent evaluation for exudative pleural effusion by pleural aspiration and blind pleural biopsy. Medical thoracoscopy was done in 21 of these. In 18, it was done, as initial pleural fluid cytology and closed pleural biopsy were inconclusive. In the other three patients, it was done as the initial modalilty for obtaining pleural samples in two patients and for pleurodesis for a pneumothorax in one patient.

Twelve out of the 18 patients (66.7%) had a positive thoracoscopic yield on biopsy: six had adenocarcinoma, three had necrotising granulomatous inflammation suggestive of tuberculosis and one each had non-Hodgkin's lymphoma, mesothelioma and an inflammatory pseudotumour.

Computed tomography (CT), done in 15 of the 18 patients, showed pleural thickening in three patients; and thoracoscopic biopsy gave a diagnosis of mesothelioma, adenocarcinoma and granulomatous inflammation consistent with tuberculosis, respectively. The presence of pleural thickening provided no clue to histopathology.

Five of the 18 patients had a negative thoracoscopic biopsy. Thoracoscopy was useful in ruling out malignancy in three. These were finally diagnosed to have a drug-induced effusion (subsided after drug withdrawal), old haemothorax, fibrous tumour, constrictive pericardiltis and chylothorax. In the last case, thoracoscopy did not suggest any secondary cause and the patient underwent thoracic duct ligation. In one of these, a subsequent CT-guided biopsy of the lung lesion showed an adenocarcinoma.

The chest tube was removed after one to thirteen days depending on the lung expansion. All the patients tolerated the procedure well and there was no significant procedure-related complication.

DISCUSSION

A significant proportion of patients with pleural effusion remain undiagnosed after thoracentesis and pleural fluid analysis for biochemistry, microbiology and cytology, and a closed pleural biopsy. We have reported the yield of biopsy using a semi-rigid thoracoscope in such patients. In those with a malignant pleural effusion, it provided the diagnosis in 88.9% (8/9), which is comparable to other published series.[2,3] A negative pleural fluid cytology and blind pleural biopsy is not sufficient to rule out a malignant aetiology. Blind percutaneous biopsies of the costal (parietal) pleura report a diagnostic yield of 40 percent to 75 percent.[4] The relatively low yield of closed pleural biopsy is due to several factors, including minimal and non uniform pleural involvement in early disease, especially diaphragmatic and visceral pleura. These limitations can be overcome by medical thoracoscopy wherein the biopsy is taken under direct vision from the site of the abnormality. When compared to surgical thoracoscopy (which is commonly known as video-assisted thoracic surgery [VATS]); medical thoracoscopy has the advantage of being performed under local anesthesia and conscious sedation, in an endoscopy suite. Thus, it is considerably less invasive and less expensive. The technique is technically simpler resembling a chest tube insertion using a tro-car. In addition to its high diagnostic yield, thoracoscopy can be used for therapeutic procedures, such as breakage of adhesions and talc poudrage pleurodesis. A false negative thoracoscopy in a malignant pleural effusion is very rare. In our series, only one of the nine patients had a negative thoracoscopic biopsy and was subsequently found to have malignancy by CT-guided biopsy of the lung lesion. The reasons for false-negative thoracoscopy include insufficient and non-representative biopsy[6] and the presence of adhesions that prevent access to the neoplastic tissue.[7] Another possibility is that the effusion may not be due to actual malignant infiltration but may be para-malignant effusion. [8,9]

In this series, there were only three patients in whom the thoracoscopic biopsy was suggestive of tuberculosis. Although tuberculous pleural effusion is common, the small number of patients diagnosed by this procedure suggests that it is diagnosed in the majority without thoracoscopy. Direct examination of pleural fluid by Ziehl-Neelsen staining detects AFB in less than 10 percent of the cases.[5,10] Mycobacterial

culture of pleural fluid is time consuming and the majority of series show a diagnostic yield of less than 30 percent.[5,10] Although measurement of adenosine deaminase and interferon-γ in the pleural fluid and polymerase chain reaction for *Mycobacterium tuberculosis* has gained wide acceptance in the diagnosis of tubercular pleural effusions, pleural biopsy is the most specific diagnostic test. The histopathology yield from closed pleural biopsy is 69 percent to 75 percent.[2] Pleural tissue culture yields mycobacteria in 39 percent to 80 percent of patients.[5] However, the diagnostic yield of thoracoscopic biopsy is the highest (98% to 100%) in some series.[5,10,11]

Recently Lee *et al* [2] had reported that flex–rigid thoracoscopy was 96% accurate and gave a diagnosis in 49 out of 51 patients. This has led to thoracoscopy being considered as the procedure of choice to obtain a biopsy in exudative pleural effusions in developed countries. This may not be justified for a country like India because of limited availability and high costs and because tuberculosis is the commonest cause of exudative effusions (59% to 64%).[1,13,14] Yield of blind pleural biopsy in an earlier series from our centre was high; 75% for tuberculosis and 71% for malignancy.[1]

In conclusion, patients with pleural effusion require further evaluation with thoracoscopy when pleural fluid cytology and blind pleural biopsy are negative, since a significant proportion of them could have a malignancy. Thoracoscopy using semi-rigid thoracoscope provides a good diagnostic yield in such patients.

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