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ORIGINAL ARTICLE

The diagnostic role of thoracoscope in undiagnosed pleural effusion: Rigid versus flexible

Mostafa Mahmoud Abdel Mageid Shaheen [a], **Ahmad Youssef Shaaban** [a], **Mahmoud Ibrahim Mahmoud** [a], **Amal AbdElAziz Shaaban** [b], **Rania Ahmad Sweed** [a,*]

[a] *Chest Diseases Department, Alexandria Faculty of Medicine, Egypt*
[b] *Pathology Department, Alexandria Faculty of Medicine, Egypt*

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Exudative pleural effusion;
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Abstract *Objectives:* The accurate diagnosis of pleural diseases can present a considerable challenge. Conservative estimates suggest that in 25% of patients examined in a general pulmonologist's practice the pleura was involved. Of these cases, 25% are unable to be attributed to a specific diagnosis, even after thoracentesis and closed pleural biopsy. The aim of this work was to evaluate the diagnostic role of medical thoracoscope in undiagnosed exudative pleural effusion and to compare the diagnostic yield of rigid versus flexible (the fibreoptic bronchoscope used as a thoracoscope) thoracoscopy.

Patients and methods: Forty patients with exudative pleural effusion of undetermined aetiology were enrolled in this study. Ethics: the study was approved by the institutional ethics committee and each patient gave an informed consent to participate in the study. Under conscious sedation and local anaesthesia, both rigid and flexible thoracoscopy were carried out using fibreoptic bronchoscope as a flexible thoracoscope inserted through a metal trocar. The pleural cavity was carefully explored and multiple forceps biopsies were equally taken with both types of thoracoscopes and sent for both histopathological and microbiological examinations.

Results: All thoracoscopy procedures were performed safely. The diagnostic yield of flexible thoracoscope and that of rigid thoracoscope was 80% (32/40) and 95% (38/40), respectively.

* Corresponding author. Tel.: +20 1141757425.
E-mail address: raniaswd@yahoo.com (R.A. Sweed).
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Conclusions: Thoracoscopy using either fibreoptic bronchoscope or rigid thoracoscope is safe and well tolerated. Rigid thoracoscope has a higher diagnostic yield, easier handling, better orientation and is less expensive. Nevertheless, fibreoptic bronchoscope is an alternative technique if rigid thoracoscopy is not available.

Introduction

The accurate diagnosis of pleural disease can present a considerable challenge [1,2]. Conservative estimates suggest that 25% of patients seen in a general pulmonologist's practice involve the pleura. Of these cases, 25% are unable to be attributed to a specific diagnosis, even after thoracentesis and closed pleural biopsy [3–8]. As many as 50% of the patients in this undiagnosed group will eventually be diagnosed with a malignancy [9]. If the facilities for medical thoracoscopy are available, medical thoracoscopy should be performed on these undiagnosed patients because of its high sensitivity in malignant and tuberculous pleural effusions [10]. That is why the last decade witnessed an overwhelming interest in pleuroscopy as a tool for pleural diseases [11].

Medical thoracoscopy, in the trained hands of a pulmonologist is a safe and effective procedure for the diagnosis and therapy of multiple pleural diseases [12]. It is usually performed in a bronchoscopy suite, under local anaesthetic and conscious sedation, with routine cardiopulmonary monitoring and without intubation or mechanical ventilation [13].The diagnostic yield is in the order of 91–95% for malignant diseases and can be as high as 100% for pleural tuberculosis [5,14–16].

In the past, medical thoracoscopy was mostly performed with rigid instruments [17,18], that might have been considered relatively invasive in the setting of local anaesthesia and conscious sedation. Moreover, without addition of an extra entry port, the posterior and mediastinal aspects of the hemithorax are difficult to access using a rigid thoracoscope, especially when a lung was only partially collapsed [19]. Furthermore, most respiratory physicians are not familiar with rigid instruments and hence the procedure was not popular [13].

The use of a flexible fibreoptic instrument to examine the pleural space was reported by Senno et al. in the 1970s in the United States. Studies showed that flexible bronchoscope when used as thoracoscope maintains a clear optical field by allowing concurrent suctioning, which is analogous to the suction techniques used during flexible bronchoscopy [20] and better views at the apex and paravertebral gutters [21,22]. This technique, had been termed ''pleuroscopy'' as well [23].

The aim of this work was to evaluate the role of flexible bronchoscope used as a thoracoscope versus rigid thoracoscope in the diagnosis of exudative pleural effusion of unknown aetiology.

Patients and methods

Thoracoscopy was performed on 40 consecutive patients who presented to Alexandria Main University Hospital, Chest department with exudative pleural effusion of unclear aetiology. All patients underwent thoracentesis at least once. The pleural effusion was exudative by Light's criteria [24].

We included patients that were fit for the procedure with good performance status, however, breathlessness alone was not necessarily a contraindication as dyspnoea secondary to the effusion was relieved by the procedure. Patients were able to tolerate lying on their side for the duration of the procedure. International normalised ratio (INR) < 2, oxygen saturation > 90% with additional oxygen during the procedure were required. We excluded patients in whom the lung was adherent to the chest wall throughout the hemithorax, patients with severe respiratory distress, uncontrollable cough and lack of informed consent.

All patients underwent initial clinical assessment, electrocardiogram (ECG), routine blood chemistry analysis, chest X-ray, thoracocentesis, contrast enhanced computed tomography (CT) and ultrasonography. Data collected include patient demographics, clinical status, detailed medical history, including smoking habits, exposure to asbestos, and history of previous cancer.

Thoracoscopy was performed in the bronchoscopy suite, with the patient under conscious sedation and local anaesthesia. Intravenous midazolam was used and titrated according to patients' needs. All patients were subjected to examination using both a rigid thoracoscope and a fibreoptic bronchoscope. Patients were monitored regarding blood pressure, pulse rate, an electrocardiograph was attached, pulse oximeter, supplementary oxygen was provided to maintain oxygen saturation > 90%.

Equipment used included a rigid thoracoscope (Karl Storz, Germany), a straight forward telescope 0'' with angled eyepiece, 10 mm in diameter, working length at 27 cm with 6 mm working channel, fibreoptic bronchoscope, (PENTAX, fibreoptic bronchoscope), a metallic trocar 11 mm in diameter, cold (xenon) light source, an endoscopic camera attached to the eye-piece, video monitor and recorder and other accessories commonly available in a chest tube insertion tray. A single port of entry was required in all patients.

The patient was positioned in the lateral decubitus position breathing spontaneously, with the normal lung in the dependent position and the arm raised above the head. Two patients were very difficult to be operated due to difficult positioning, one was a 80 year old patient with untreated fracture neck femur, the procedure was performed in a supine semi sitting position because she could not lie on her side. Another patient had a severe burn affecting her chest wall, absent breast and extending to her arm and shoulder resulting in severe contracture and very limited abduction on the same side of effusion together with severe lymphedema of the affected arm that was lifted with difficulty and hung on a stand till the end of the procedure causing severe discomfort for both the doctor and the patient.