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ORIGINAL ARTICLE

# Medical thoracoscopic versus ultrasound guided transthoracic pleural needle biopsy in diagnosis of pleural lesions



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## KEYWORDS

Pleural effusion;  
Medical thoracoscopy;  
Ultrasound guided biopsy

**Abstract** *Background:* Medical thoracoscopy increases the diagnostic yield in patients with undiagnosed pleural effusion. Ultrasound guided pleural biopsies are safe procedures with high diagnostic yields.

*Objective:* To compare safety and efficacy of medical thoracoscopic versus ultrasound guided transthoracic needle biopsy in the diagnosis of pleural lesions.

*Patients and methods:* 40 patients with undiagnosed pleural lesions were divided into 2 groups. After clinical, radiological examination and laboratory investigations; pleural biopsies were taken by ultrasound guided needle biopsy and medical thoracoscopy in group I and II respectively.

*Results:* Complications in group I were in the form of pain in 2 patients (10%), hemoptysis in 1 (5%), while complications in group II were pain in 4 (20%), failure of the lung to expand in 5 (25%), pneumothorax in 5 (25%) and wound infection in 3 patients (15%).

Final histopathological diagnosis in group I was parapneumonic effusion in 3 patients (15%), inflammatory lung lesion in 1 (5%), pleural fibroma in 2 (10%), malignant mesothelioma in 4 (20%), sarcoma in 1 (5%), adenocarcinoma in 1 (5%), squamous cell carcinoma in 4 (20%), and metastatic adenocarcinoma in 1 (5%). Final histopathological diagnosis in group II was pleural TB in 4 patients (20%), inflammatory lung lesions in 2 (10%), malignant mesothelioma in 6 (30%), adenocarcinoma in 5 (25%), and metastatic adenocarcinoma in 2 (10%). The diagnosed cases were 17 (85%) and 19 (95%) in groups I and II respectively.

*Conclusions:* Medical thoracoscopy is an important diagnostic method for the diagnosis of undiagnosed pleural effusion while it is concluded that US guided pleural biopsy is more useful in cases of pleural lesions without effusion.

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## Introduction

Pleural effusion is defined as the abnormal collection of fluid in the pleural space resulting from excessive fluid production or decreased absorption [1]. Pleural effusion is one of the most common clinical conditions in pulmonology clinics and in hospitals. The relative annual incidence of pleural effusion is estimated to be 320 per 100,000 people in industrialized countries [2].

Ultrasound (US) has found a firm place in chest medicine as an aid for assessing pleural effusions at the bedside [3]. This development was facilitated by the advent of affordable, lightweight and mobile US units. US can also visualize solid lesions arising from the pleura, chest wall and anterior mediastinum, and even lung tumors and consolidations are detected without difficulty provided that they extend to the parietal pleura. US is an ideal tool to assist with biopsy procedures. It can frequently replace Computed Tomographic (CT) guidance at much lower cost [4].

Medical thoracoscopy is a minimally invasive procedure performed by the pneumologist in an endoscopy suite; it is much less invasive requiring only local anesthesia with conscious sedation and only one or two points of entry. It also allows for basic diagnostic (undiagnosed pleural fluid or pleural thickening) and therapeutic procedures (pleurodesis) to be performed safely [5].

## Objective

To compare safety and efficacy of medical thoracoscopic versus ultrasound guided transthoracic needle biopsy in diagnosis of pleural lesions.

## Patients and methods

This study was carried out in Chest and Radiology Departments, Faculty of Medicine, Tanta University Hospitals from April 2013 to October 2014. This study was approved by Research Ethics Committee, Faculty of Medicine, Tanta University; an informed written consent was taken from each patient. Forty patients with undiagnosed pleural lesions were enrolled in this study; the patients were divided into two groups: group I included 20 patients in whom Tru-cut needle biopsy was carried out guided by ultrasonography for the diagnosis of pleural lesions. Group II included 20 patients in whom medical thoracoscopy was performed for the diagnosis of pleural lesions by biopsy taking.

### Inclusion criteria

- Patients with evidence of exudative pleural effusion (according to Light's criteria) [6] for which a specific diagnosis could not be determined by cytological, chemical and bacteriological methods. Also, patients with peripheral pleural lesion that was accessible by ultrasound guided needle biopsy was eligible for this study.
- Lesions involving or abutting the pleura equal to or more than 20 mm in diameter on US were sampled.

### Exclusion criteria

- Cardiovascular instability.
- Lack of patient cooperation, e.g. intractable cough, inability to remain motionless or altered consciousness.
- Bleeding diathesis (international normalized ratio (INR) < 1.3 or platelet count of < 50,000 per mm<sup>3</sup>), patients on anticoagulant therapy (oral anticoagulants should be stopped before the procedure for at least 72 h).
- Contralateral pneumonectomy.
- Borderline respiratory failure and patients on mechanical ventilation.
- Severe chronic obstructive pulmonary disease (FEV1 < 1 liter or < 35% predicted).
- Pyogenic cutaneous lesion.
- Empyema.
- Liver failure or renal failure.
- A relative contraindication in cases of extensive pleural adhesions to do medical thoracoscopy [7].

### All patients were subjected to the following

- (1) Thorough history taking and clinical examination.
- (2) Chest X-ray (postero-anterior and lateral views) before and after the procedure.
- (3) Recent Computed Tomography (CT) of the chest with contrast.
- (4) Laboratory studies including coagulation profile (including bleeding and clotting times, prothrombin time and activity)
- (5) Preoperative evaluation: arterial blood gases (ABG), electrocardiogram (ECG), and pulmonary function tests if clinically indicated.
- (6) Color Doppler ultrasound in suspected vascular lesions.
- (7) Clinical and radiological follow up of patients over 1 week after the procedure to detect the occurrence of any complications.
- (8) The biopsy guided by ultrasonography in group I was carried out using Tru-cut needle biopsy in different calibers.
- (9) The biopsy samples were sent for histopathological examination. Ultrasound guided transthoracic pleural biopsy was performed under local anesthesia and was performed without sedation as much as possible.

### Procedure of ultrasound guided pleural needle biopsy in group I

The procedure was done using ultrasound (Mindray DT 20 Italy), patient was kept fasting at least 6 h before biopsy, a sterile field was created. The same transducers used for diagnostic ultrasonography (Logic GA 400) could be used for biopsy: convex array or sector scanning transducers with a frequency of 2–5 MHz which allows scanning through intercostal spaces. The presence of an ultrasound window with the absence of bone or air overlying the lesion and the absence of any vital organs along the needle path was necessary for biopsy. The angle of needle entry and the depth of the lesion could be determined.

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