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ORIGINAL ARTICLE

Spectrum of diffuse parenchymal lung diseases using medical thoracoscopic lung biopsy: An experience with 55 patients during 2013–2015

Sabah Ahmed [a,*], **Ali El Hindawi** [b], **Shady Mashhour** [c]

[a] *Chest Department, Faculty of Medicine, Cairo University, Egypt*
[b] *Pathology Department, Faculty of Medicine, Cairo University, Egypt*
[c] *Radiology Department, Faculty of Medicine, Cairo University, Egypt*

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KEYWORDS

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Abstract *Background:* Diffuse parenchymal lung diseases (DPLD) constitute a heterogeneous group of lung diseases characterized by varying degrees of inflammation and fibrosis. In some DPLD, significant morbidity and unfavorable evolution, comparable to those of neoplastic diseases, are seen. Therefore, an efficient and safe method for the diagnostic confirmation of DPLD is needed. Currently, thoracoscopic lung biopsy is widely used for this purpose.

Aim of work: The objective of the present study was to analyze the role of medical thoracoscopic lung biopsy, in the diagnosis of different types of diffuse parenchymal lung diseases.

Patients and methods: This study included 55 patients with undiagnosed DPLD who were selected from Chest Department inpatients, Kasr Alaini Hospital during the period from June 2013 to August 2015. All patients were subjected to written informed consent, full medical history, detailed clinical examination, coagulation profile, echocardiography, immune and collagen profile, arterial blood gases analysis, spirometry, high resolution computed tomography (HRCT) of the chest and medical thoracoscopic lung biopsy.

Results: Out of the 55 patients included in the study, 32 (58.2%) were females, 23 (41.8%) were males, 14 (25.5%) were smokers, 12 (21.8%) had history of raising birds and 12 (21.8%) had positive collagen profile. The mean age was 39.96 years (range, 10–67). HRCT showed different patterns of parenchymal affection in addition to mediastinal lymph node enlargement in 8 (14.5%) patients, and pleural effusion in 11 (20%) patients. Definitive diagnosis was made in 54 patients (98.18%) and idiopathic interstitial pneumonia was the predominant diagnosis (43.64%) followed by DPLD of known cause (36.36%) then granulomatous DPLD (12.7%) and lastly other rare forms of DPLD (5.45%). The most common diagnoses were the usual interstitial pneumonia in 9 (16.4%), metastatic adenocarcinoma in 8 (14.8%), desquamative interstitial pneumonia in 7 (12.7%), hypersensitivity pneumonitis in 5 (9.1%), non specific interstitial pneumonia, sarcoidosis and pneumoconiosis each in 4 (7.3%) cases. The mean duration of intercostal tube insertion was 3.4 days. No reported mortality and complications included prolonged air leak in 4 patients, residual pneumothorax after removal of intercostal tube in 1 patient, and subcutaneous emphysema in 2 patients.

* Corresponding author. Mobile: +20 01000938175.
E-mail address: samohamedoctober@yahoo.com (S. Ahmed).
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Conclusions: Lung biopsy through medical thoracoscopy is a safe, effective and viable procedure for the diagnosis of diffuse parenchymal lung diseases.

Introduction

Diffuse parenchymal lung diseases constitute a heterogeneous group of lung diseases, including more than two hundred different interstitial diseases and characterized by varying degrees of inflammation and fibrosis. These non-neoplastic disorders primarily affect the lung interstitium, although the alveolar space, bronchioles and pulmonary vessels can also be affected [1].

The process of diagnosing a DPLD is dynamic. The diagnostic reasoning is based on the joint analysis of clinical, radiological and pathological aspects [1]. Frequently, the definitive diagnosis of DPLD can be established only through pathological examination of the material obtained by lung biopsy. In addition to diagnostic confirmation, this procedure provides information regarding disease activity, disease progression and response to therapy [2].

The options for lung biopsy include bronchoscopy with transbronchial biopsy, open lung biopsy and lung biopsy through video-assisted thoracoscopy. Bronchoscopy with transbronchial biopsy is useful in cases in which the disease presents peribronchial or peribronchiolar distribution. One limitation of this procedure is the small quantity of lung tissue obtained in the biopsy, which is why it is not recommended for the investigation of idiopathic interstitial pneumonia. In addition, its accuracy in the diagnosis of DPLD in immunocompetent patients is only 7–37% [3].

The gold standard for the diagnosis of DPLD is surgical lung biopsy, which should be used whenever it is not possible to establish a definitive diagnosis based on the available clinical and radiological data [4]. It can be performed as an open procedure or through video-assisted thoracoscopy. Open lung biopsy has a high diagnostic yield (92%), as well as low rates of morbidity and mortality (2.5% and 0.3%, respectively) [5]. Video-assisted thoracoscopy is considered a minimally invasive technique. It provides excellent visualization of the intra-thoracic structures and allows the collection of a greater number of lung samples, when necessary. Since it is a less invasive procedure, video-assisted thoracoscopy has come to be used as the principal mean of diagnosing DPLD. However, its use must be evaluated in terms of safety and diagnostic resolution [5].

While thoracoscopic surgery is rapidly replacing standard thoracotomy in the evaluation and management of many pleuropulmonary diseases, thoracoscopic lung biopsy is becoming the procedure of first choice for the diagnosis of many localized and diffuse lung diseases and an adjunct to conventional bronchoscopic evaluation [6,7].

Forceps lung biopsy during thoracoscopy under local anesthesia has been used for many years by pulmonologists and has been frequently described as an integral technique of the method defined today as medical thoracoscopy [8]. Therefore, the objective of the present study was to analyze the role of this currently widely used method, which is medical thoracoscopic lung biopsy, in the diagnosis of different types of diffuse parenchymal lung diseases.

Patients and methods

The present study was conducted on 55 patients with diffuse parenchymal lung disease admitted in Chest Department, Kasr El-Aini Hospital, Cairo University during the period from June 2013 to August 2015. All patients of DPLD on HRCT chest with unproved diagnosis and of different ages, regardless the gender, were included in the study. Patients with severe hypoxia, Type II respiratory failure, severe pulmonary hypertension, coagulopathy (prothrombin concentration $\leqslant$ 50% or platelet count $\leqslant$ 7000/ml), cardiac disorders (arrhythmia, MI, unstable angina) or end stage systemic disease were excluded from the study.

All patients were subjected to written informed consent, full medical history, including smoking and occupational history, history of raising birds, detailed clinical examination, coagulation profile (prothrombin concentration and platelet count), echocardiography, immune and collagen profile, arterial blood gas analysis, spirometry, high resolution computed tomography of the chest and medical thoracoscopic lung biopsy.

Medical thoracoscopic lung biopsy

Equipment

Rigid thoracoscope with a cold light source was used using KARL-STORZ rigid thoracoscope, coagulation diathermy forceps and diathermy apparatus.

Technique

The patients were fasting for at least 6 h before the procedure with the explanation of the procedure to each patient. The procedure was performed in the endoscopy suit. Pre-medications in the form of atropine 1 mg IM injection to control vasovagal tone and Pethidine 100 mg (50 mg IM, 50 mg IV injection) to ensure proper control of pain and good analgesia were given. The vital signs of the patients were monitored (blood pressure, heart rate respiratory rate) during the procedure; also oxygen saturation was measured by pulse oximetry with spontaneous ventilation during the procedure. Supplementary oxygen was provided to the patient to maintain oxygen saturation above 90%.

The patient was placed in the lateral decubitus position with side that will be operated upon up and the arms above the head. The lateral chest wall at the side of entry (4th or 5th intercostals space, midaxillary line) was sterilized with iodo-povidone antiseptic solution. The skin, subcutaneous tissues, periosteum of the ribs and parietal pleura at site of entry were infiltrated by lidocaine 2% as local anesthesia.

Skin incision about 1 cm was made at the planned thoracoscopic insertion point. Blunt dissection with round ended