Egyptian Journal of Chest Diseases and Tuberculosis (2015) 64, 953–958

HOSTED BY

The Egyptian Society of Chest Diseases and Tuberculosis

Egyptian Journal of Chest Diseases and Tuberculosis

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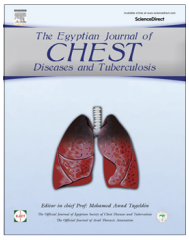

ORIGINAL ARTICLE

The right get with the proper git: Precision of diagnosing pulmonary tuberculous cavities by means of various biopsies

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Received 12 April 2015; accepted 17 May 2015
Available online 3 June 2015

KEYWORDS

Tuberculosis;
Granuloma;
CT guided;
US guided;
BAL;
TBLB

Abstract *Background:* Diagnostic rationale of tuberculosis as a specific epidemiological endemic disease depends mainly on clinical signs over and above microbiological and histopathological findings.

Purpose: The aim of this study is to differentiate between histopathological features of pulmonary parenchymal cavitary tuberculosis in accordance with different biopsy techniques; fiberoptic bronchoscopic bronchoalveolar lavage, transbronchial lung biopsy, percutaneous guided biopsy (CT computed tomographic/ultrasound).

Patients and methods: Forty-one patients with pulmonary parenchymal cavitary lesions confirmed to be tuberculous by sputum Ziehl Neelsen staining undertook antituberculous therapy without improvement. Tissue biopsy samples were obtained from radiological shadows by different methods and studied regarding histopathological findings.

Results: Caseating granuloma showed higher diagnostic accuracy in percutaneous biopsy and in open biopsy followed by BAL/TBLB (100% and 80% respectively) while noncaseating granuloma was detected in 20% of broncheoalveolar lavage and transbronchial lung biopsy BAL/TBLB only. Inflammatory smear prevailed in 86.66% of patients who performed BAL/TBLB but was absent in open and percutaneous guided biopsy, on the one hand, smear cellularity of moderate quantity showed higher percentage in percutaneous guided biopsy (88.24%) followed by BAL/TBLB

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Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

http://dx.doi.org/10.1016/j.ejcdt.2015.05.013

(80%) lastly open biopsy (66.66%). Other pathological findings predominated in patients who had undertaken open biopsy as tuberculous lymphadenitis (55.55%) and interstitial fibrosis (55.55%). Significant statistical differences were found in all pathological lesions ($p = 0.00$).

Conclusion: Differentiation between histopathological patterns of parenchymal cavitations symbolizes an important clue about the accuracy of diagnosis between the biopsy methods.

Introduction

Tuberculosis is the prototypical granulomatous inflammatory pulmonary specific infection down to an intracellular infection. Its morbid structure has been studied for over a century and was ably summarized in 1951 by Arnold Rich [1]. Yet for variety in the models of its interaction with individual tissues and convoluted chronology, tuberculosis has few microbiological classmates. The fundamental inflammatory response to infection by *Mycobacterium tuberculosis* (MTB) is the formation of a granuloma. A granuloma is a focal aggregate of activated macrophages. The term 'TB activation' describes the phenotypic, morphological and metabolic alterations of macrophages into epithelioid cells, usually under the stimulus of cytokines. The infected macrophage lesion expands through recruitment from the blood monocytes. A few weeks later, the T cell-mediated immune responses start and caseation necrosis develops in the center of the lesion [2,3].

Most immunocompetent people develop an effective immune response that contains the primary MTB infection and results in a small fibrotic parenchymal scar (Ghon's complex) as illustrated in Fig. 1 [4]. People who fail to develop specific adaptive immune responses following primary MTB infection may develop progressive primary TB. This form of disease is most common in young children, immunocompromised individuals and the elderly. In young adults, progressive primary disease is manifested by typical symptoms of TB and upper lobe cavitary lesions [5]. Bronchoalveolar cells obtained by bronchoalveolar lavage permit the study of localized immunoregulatory functions during TB disease and in MTB-exposed healthy household contacts. The procedure generally samples approximately 1 million alveoli, the walls of which contain the granulomas. Bronchoalveolar cells provide insight into immunologic compartmentalization and are thought to reflect processes in the granulomatous tissue that is adjacent to the bronchoalveolar spaces. The most prominent finding of bronchoalveolar lavage studies in TB patients is a partitioned pulmonary immune response [6,7].

A pulmonary cavity is defined radiologically as a lucency surrounded by a variable thickened wall within a pulmonary consolidation, mass or nodule. The term generally implies that the central portion of the lesion has gone through necrosis and been expelled via the bronchi, with a gas-containing space remaining [8]. The aim of this study to is differentiate between histopathological features of pulmonary parenchymal cavitary tuberculosis in accordance with different biopsy techniques.

Patients and methods

A prospective interventional study on 41 patients with pulmonary cavitary lesions proved to be positive for MTB (*M. tuberculosis*) with sputum Ziehl Neelsen stain. Patients undertook antituberculous medications for two months without significant improvement. Patients were assembled from general ward of chest department and pulmonary critical care unit of the Mansoura University Hospital during the period between April 2014 and April 2015. Cases with tuberculous pulmonary cavities of peripheral locations were biopsied using fine and true-cut needles guided by CT chest. Cases unwilling for CT chest were analysed by ultrasound guided needle biopsy. Cases with tuberculous pulmonary cavities of central locations were accessed with a fiberoptic bronchoscope with bronchoalveolar lavage and transbronchial lung biopsy from the side and segment of the lesion maximal tissue retrieval. Failed cases were sent for open surgical lung biopsy.

Procedure

Cases which underwent percutaneous guided lung biopsy (ultrasound; US or CT chest) were conducted in semi setting position for US guided ones and recumbent position for CT chest guided ones and others with sterilization of the area were identified for biopsy with povidone iodine 5% followed by local anesthesia with lidocaine 5%, simple puncture using gray cannula 18 gauge for aspiration in FNA (fine needle aspiration) after frequent tissue fragmentation. Followed snips were obtained in at least 6 directions aiming to gain sufficient amount of parenchymal tissue. True cut biopsy was taken by the same method with three seizing of tissue samples. The skin was pressed for 2 min for local hemostasis followed by gauze packing. No recorded cases required haemostatics or surgical intervention.

Cases which underwent fiberoptic bronchoscopy conducted broncheoalveolar lavage and transbronchial lung biopsy BAL/TBLB after CT chest localization of the segment affected. BAL/TBLB was carried out using fiberoptic bronchoscopy (Pentax FB 19 TV; Tokyo, Japan) under local anesthesia. Topical anesthesia was induced using lidocaine 5% spray and nebulized form 5 ml distilled in 3 ml normal saline in addition to conscious sedation using propofol (1–2 mg/kg). Anesthesia was maintained with intravenous propofol (4–6 mg/kg/h) according to the hemodynamic parameters. The FOB shaft then moved forward till it reached the site of pulmonary cavitary lesion then actual simultaneous forceps (Mako biopsy forceps with diameter; 2.4 mm and length;