Ultrasound Guided Closed Pleural Biopsy versus Medical Thoracoscopic Pleural Biopsy in Diagnosis of Pleural Diseases

Thesis

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Chest Diseases

By

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Abstract

The diagnostic approach to pleural disease remains an underappreciated aspect of modern thoracic medicine, despite the fact that pleural disease affects approximately 300 subjects per 100 000 population per year worldwide. *(Du Rand, Maskell; 2010)*, tissue biopsies required for diagnosis can be obtained by various methods; blind pleural biopsy, guided biopsy, Medical Thoracoscopic or surgical.

Aim of the work, to compare the diagnostic efficiency, reliability, complications and advantages of Transthoracic ultrasound guided (TUS) pleural biopsies with that of medical Thoracoscopic pleural biopsies in patients with pleural diseases.

The study was conducted in Chest Department, Kasr El-Aini hospital, Cairo University, in collaboration with Pathology Department, Kasr El-Aini hospital, Cairo University in the period from February 2013 to July 2014, It was carried on 71 patients, The patients included in the study were classified according to the procedure by which pleural biopsy taken into Group 1 (included 39 cases underwent Medical Thoracoscopic pleural biopsies alone), Group 2 (included 10 cases underwent TUS pleural biopsies alone), Group 3 (included 22 cases underwent both pleurl biopsies). The patients included in the study were classified according to the pathology of the lesions into Group A (included 51 cases with malignant lesions) and Group B (included 20 cases with non-malignant lesions), The malignant patients included in the study were classified according to the pathology of the lesions into Group A1 (included 24 cases with primary malignant lesions) and Group A2 (included 27 cases with secondary malignant lesions). All patients were subjected to complete history taking, full clinical examination, chest X-rays PA and lateral, CT chest, TUS examination; TUS guided biopsies for legible cases and Medical Thoracoscopic biopsies for legible cases. The results of the study revealed that TUS guided biopsies had sensitivity of 77.78% and diagnostic accuracy of 81.25%; while Medical Thoracoscopic biopsies had sensitivity of 94 % and diagnostic accuracy of 95.08%

Conclusion: TUS examination before Medical Thoracoscope will allow proper selection of patients reduces incidence of complications and reduce time of procedure and raises diagnostic yield of Medical Thoracoscope. Both TUS guided biopsy and Medical Thoracoscopic Biopsy are available to have biopsies from different pleural lesions and each of which had its advantages and disadvantages, with the proper selection of the patients -for each modality- will result in rising the diagnostic yield of both modalities.

Key words: Pleural diseases, Transthoracic Ultrasound, Medical Thoracoscope.

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Abbreviations

ADA	Adenosine deaminase
AIDS	Acquired Immunodeficiency Syndrome
ANA	Antinuclear antibody
BAL	Bronchoalveolar lavage
BTS	British Thoracic Society
CHF	Congestive heart failure
CHOP	Cyclophosphamide, Hydroxydaunorubicin , Oncovin, and Prednisone
COPD	Chronic obstructive pulmonary disease
CSF	Cerebrospinal fluid
CT	Computed tomography
EBV	Epstein-Barr virus
ECG	Electrocardiogram
EGF	Epidermal growth factor
H&E	Haematoxylin and Eosin stain
HHV8	Human herpes virus 8
HIV	Human immunodeficiency virus
ICT	Intercostal chest tube
IFN-γ	Interferon-γ
IGF-II	Insulin like growth factor II
IMIG	International Mesothelioma Interest Group
INR	International normalized ratio
LDH	Lactate Dehydrogenase
$Mg_3Si_4O10(OH)_2$	Hydrated magnesium silicate
NF2 gene	Neurofibromatosis type 2 gene
NT-BNP	N-terminal brain natriuretic peptide
PEL	Primary effusion lymphoma
PET	Positron emission tomography
SC	Subcutaneous
SLE	Systemic lupus erythematosus
SVC syndrome	Superior vena cava syndrome
TBB	Transbronchial biopsy
TUS	Transthoracic Ultrasound
US	Ultrasonography
VATS	Video-assisted thoracic surgery
VEGF	Vascular endothelial growth factor

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INTRODUCTION

The diagnostic approach to pleural disease remains an underappreciated aspect of modern thoracic medicine, despite the fact that pleural disease affects approximately 300 subjects per 100 000 population per year worldwide***. (Du Rand, Maskell; 2010)***

Yet, the most efficient and cost-effective approach to pleural diseases remains uncertain and even controversial, particularly if acquisition of pleural tissue is required.

Medical thoracoscopy can be done under general or local anesthesia and is generally indicated to diagnose suspected malignant or benign pleural disease, to drain pleural effusion and for pleurodesis. ***(Leung, et al; 2013)***.

Medical thoracoscopy allows for the direct inspection of the pleura and biopsies taken under direct vision, has a diagnostic yield superior to that of blind closed pleural biopsy and thoracocentesis. The diagnostic yield is in the order of 91–95% for malignant disease and can be as high as 100% for pleural TB. ***(Sakuraba, et al ;2006)***

Medical thoracoscopy remains an invasive procedure, but complications are infrequently seen. Haemorrhage, secondary empyema and other major complications are only seen in 2–3% of cases, and death is exceedingly rare (0.4%)***. (Hooper, et al; 2010)***

In fact, 2010 British Thoracic Society (BTS) pleural disease guideline state that thoracoscopy is the investigation of choice in exudative

pleural effusion where a diagnostic pleural aspiration is inconclusive and malignancy is suspected***. (Hooper, et al; 2010)***

Recent studies have proposed that image guided pleural biopsies may significantly increase the diagnostic yield over blind pleural biopsies while decreasing the risk for complications. Both TUS and CT scanning have been utilized.

Transthoracic US is an ideal aid to the clinician, given its mobility, lack of irradiation and short examination time. US is superior to chest radiography for the visualization of pleural effusions and for sampling small pleural fluid collections ***(Diacon, et al; 2003)***

Transthoracic US can locate the best pleural access point and also detect thick fibrous septation. , it improves the accuracy of pleural puncture sites by 26%. ***(Diacon, et al; 2003)*** and is increasingly used to guide interventional procedures of the chest, such as biopsy and placement of intercostal chest drains. Pathological modifications can be detected, if they are situated in the chest wall, the diaphragm or the upper chest aperture ***(Ghaye & Donediliner, 2001).***

TUS also allows access in 88% of patients after unsuccessful clinically guided thoracocentesis and reduces complications. ***(Weingardt, et al; 1994)***

Moreover, the volume of fluid, the presence of septations, pleural thickening, nodules and pleural based tumors can be accurately assessed. ***(Diacon, et al; 2003)***