

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

Thesis

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Chest Diseases**

By

Hassan Gamal Abd El Nasser Yamamah

[M.B.B.ch. (M.Sc) Cairo University]

Supervisors

Dr. Khaled Eid Sobhy

Professor of Chest Diseases,
Faculty of Medicine, Cairo University

Dr. Khaled Mahmoud Kamel

Professor of Chest Diseases,
Faculty of Medicine, Cairo University

Dr. Sabah Ahmed Mohammed

Lecturer of Chest Diseases,
Faculty of Medicine, Cairo University

Dr. Aml Ahmed Hareedy

Lecturer of pathology,
Faculty of Medicine, Cairo University

Faculty of Medicine
Cairo University
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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 pleural 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 ₃ Si ₄ O ₁₀ (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

List of Figures

Figure No.	Description	Page
1	Effusion from congestive heart failure. A , CXR in a patient with pulmonary edema B , HRCT scan in a patient with pulmonary edema	19
2	CXR-PA shows left lower lobe consolidation and left pleural effusion, Tuberculous in origin	24
3	Posteroanterior chest radiograph from a patient with multiple injuries in an automobile accident. The patient had a hemopneumothorax	36
4	Metastatic adenocarcinoma	40
5	Mesothelioma	42
6	Solitary fibrous tumor of the pleura	47
7	Primary effusion lymphoma	49
8	Chest wall with normal smooth visceral pleura	52
9	Subpleural infiltration in a patient with a pulmonary embolism and pleural effusion; hence, the visceral pleura is distinguishable from the total reflection of the air in the lung	53
10	Numerous comet-trail artifacts on the diaphragmatic pleura.	54
11	Large, almost echo-free pleural effusion.	55
12	Small dorsal pleural effusion between spine and diaphragm in a transhepatic view	55
13	Small effusion in the costophrenic angle.	56
14	An estimation of the volume of pleural effusions in the supine patient	58
15	An example of effusion planimetry	58
16	Pleural effusion volumetry in sitting patients	60
17	A simple estimation of effusion volume by measuring the height of the subpulmonary effusion and the maximum height	60
18	Echogenic protein-rich effusion in a patient with an IgA plasmocytoma	62
19	Homogenous echogenic pleural effusion with pointed atelectasis	62
20	Malignant pleural effusion in connection with metastatic	63
21	Honeycomb-like appearance of a postinflammatory effusion	64
22	Pleural empyema with several cavities (<i>K</i>)	64
23	An encysted pleural effusion detached on all sides, after previous pancreatitis	65
24	Pleuritic empyema with an extension over many intercostal areas.	66
25	Pleural empyema with a thick, but nevertheless smooth wall and clearly visible split pleura	66
26	Clearly visible regular and well delineated thickening of the parietal and visceral pleura in an already drained empyema	67
27	The patient has undergone successful pleurodesis	69

Figure No.	Description	Page
28	Large fibrin clot after attempted pleural fixation in the basal (but not the lateral) direction toward the diaphragm to the chest wall	69
29	Acute pleuritis with medium echogenic, thickened pleurae; the line of the parietal pleura is thus very irregularly edgy	71
30	uberculous pleurisy without thickening of the parietal	71
31	a) A small, round, well-delineated tumor in the parietal pleura, the lung shifted along the tumor during respiration b) On CT, a well-delineated, fat-isodense tumor was seen, consistent with a pleural lipoma	72 73
32	Lentil-shaped pleural metastases on the diaphragm	74
33	Metastasis of breast cancer, sitting on the otherwise unchanged parietal pleura	74
34	Hemispheric hypoechogenic pleural metastasis with poorly delineated lateral processes and chest wall infiltration. Absent pleural effusion	76
35	Small metastasis on the diaphragm (<i>arrow</i>), initially only recognizable as an irregularity	76
36	a Echo-poor asbestos plaque with typical mesa-shape contour (dorsolateral right). b Lung and visceral pleurae move with breathing in relation to the plaque	78
37	Initial diagnosis of a pleuritic mesothelioma, covering, in a wallpaper-like fashion: almost the entire pleura of the right hemithorax, with some single knotted thicker parts (between the crosshairs, metering <i>crosses</i> , gage <i>crosses</i>)	78
38	Mesothelioma. Widespread infiltration of the thoracic wall with spread around the ribs (<i>arrow heads</i>), as well infiltration of the lung (<i>arrow</i>)	79
39	Advanced mesothelioma with breakthrough of the diaphragm (<i>open arrow</i>) and infiltration into cardiac wall (<i>lower arrows</i>). L liver, TU tumor, Cor heart	81
40	Extended moderate echogenic masses in the pleura with irregularly angular contours are ambiguous and need histological confirmation by biopsy	84
41	Pneumothorax. The left healthy side (a) shows a respiratory shifting pleural reflex and clearly less reverberations	85
42	Brachial plexus (<i>arrows</i>). Tumor masses (<i>TU</i>) in the region of the upper thoracic aperture	89
43	Computed tomography assisted biopsy	90
44	a) Automatic single-hand needle. b) Surecut needle (<i>top</i>) the cutting process happens through a quick forward movement of the needle	93
45	Various puncture methods.	94
46	a) The needle shaft can be depicted at a great angle (45–90°) as an echogenous, straight-line reflex (<i>arrows</i>). b) Echogenic double reflex of the needle tip: double reflex is indicated by the <i>arrow far from the sound head</i>	96

Figure No.	Description	Page
47	a) Color-Doppler sonography allows liquid movements in the needle to be detected. a) Color-Doppler sonography allows liquid movements in the needle to be detected	96
48	Performing local anesthesia for thoracentesis.	99
49	Different types of needles used for pleural biopsy	101
50	Pleural biopsy with Abrams needle	102
51	Standard equipment for thoracoscopy in pleural effusions	111
52	Thoracoscopy instruments (Storz Company)	111
53	Semi-rigid videothoracoscope (Olympus)	112
54	Thoracoscope with angled optic and a flexible suction catheter, which is connected to a small bottle containing talc, and to a pneumatic atomizer, is introduced through the working channel of the thoracoscope	112
55	a) Preferred trocar for thoracoscopy with conical tip. b) The triangular tip can provoke damage to the intercostal vessels. c) Introduction of the trocar in the pleural cavity.	116
56	“Bayonet” thoracoscope (a) and in use (b), which allows large biopsies to be taken with a single port of entry	117
57	Biopsy forceps combined with a small scope for single-entry Thoracoscope	118
58	Double-entry thoracoscope	118
59	a) Talc poudrage, b) versus talc slurry (c). Talc appears as a bright clump in the centre of the picture under polarised light on the microscope	125
60	Talc poudrage	128
61	Typical empyema loculations	131
62	Neoplastic nodule (arrow) on parietal pleura in empyema	132
63	Foreign body (gauze, shown by arrow) in a patient with chronic empyema	132
64	Fibrin membranes in the pleural cavity	133
65	Removal of membranes with forceps	133
66	Scar on lung surface (arrow) after biopsy with coagulating forceps	136
67	Coagulating forceps grasping lung tissue, mesothelioma nodules on parietal pleura are visible in the background	137
68	Thoracoscopic view of the posterior chest wall; the sympathetic chain (indicated by forceps) runs caudally over the rib heads	141
69	The sympathetic chain can be visualised more effectively using blue light during thoracoscopy	142
70	Medical thoracoscopy set	158
71	Ultrasound set Hitachi 7000	162
R1	Sex distribution of the study patients	167
R2	Comparison between CT chest and Medical Thoracoscope in	169

Figure No.	Description	Page
	detection of pleural masses	
R3	Comparison between TUS and Medical Thoracoscope in detection of pleural masses	170
R4	Comparison between CT chest and TUS in detection of pleural masses	171
R5	Ability of TUS to detect pleural nodules	172
R6	Ability of Medical Thoracoscope to detect pleural nodules	173
R7	Comparison between CT chest and Medical Thoracoscope in detection of pleural nodules	174
R8	Comparison between TUS and Medical Thoracoscope in detection of pleural nodules	175
R9	Comparison between CT chest and TUS in ability to detect pleural nodules	176
R10	Ability of TUS to detect pleural thickening	177
R11	Comparison between CT chest and Medical Thoracoscope in detection of pleural Thickening	178
R12	comparison between TUS and Medical Thoracoscope in detection of pleural Thickening	179
R13	Comparison between CT chest and TUS in detection of pleural Thickening	180
R14	Comparison between CT chest and Medical Thoracoscope regarding the character of the pleural thickening	181
R15	Comparison between TUS and Medical Thoracoscope regarding the character of the pleural thickening	182
R16	Comparison between CT chest and TUS regarding the character of pleural thickening	183
R17	Grade of pleural thickening detected By TUS	184
R18	Comparison between TUS and Medical Thoracoscope in detecting Grade of pleural thickening	185
R19	Comparison between CT chest and TUS in detecting Grade of pleural thickening	186
R20	Comparison between CT chest and Medical Thoracoscope in detecting Grade of pleural thickening	187
R21	Chest wall invasion as detected by TUS	188
R22	Comparison between CT chest and Medical Thoracoscope in detection character of collapsed lung	189
R23	Comparison between TUS and Medical Thoracoscope in detection character of collapsed lung	190
R24	Comparison between CT and TUS in detection character of collapsed lung	191

Figure No.	Description	Page
R25	Comparison between primary and secondary malignant cases regarding character of collapsed lung detected by TUS	192
R26	Comparison between the ability of CT to detect lung mass in malignant subgroups	193
R27	Comparison between the ability of TUS to detect lung mass in among malignant subgroups	194
R28	Comparison between CT chest and Medical Thoracoscope in detecting pattern of pleural effusion	195
R29	Comparison between TUS and Medical Thoracoscope in detecting pattern of pleural effusion	196
R30	Comparison between CT chest and TUS in detecting pattern of pleural effusion	197
R31	Texture of the visceral pleura detected by TUS	198
R32	Texture of visceral pleura detected by Medical Thoracoscope	199
R33	Comparison between TUS and Medical Thoracoscope in detection texture of visceral pleura	200
R34	Comparison between diagnostic yield of TUS and Medical Thoracoscope	201
R35	Comparison between TUS biopsy and Medical Thoracoscopic biopsies regarding duration of the procedure	202
R36	Diagnostic yield of pleural fluid cytology	203
R37	A case of metastatic adenocarcinoma underwent both TUS guided pleural biopsy and Medical Thoracoscopic pleural biopsy.	206,7
R38	A case of metastatic adenocarcinoma underwent both TUS guided pleural biopsy and Medical Thoracoscopic pleural biopsy.	208,9
R39	A case of metastatic adenocarcinoma underwent Medical Thoracoscopic pleural biopsy , TUS guided pleural biopsy & TUS guided lung biopsy	210,11
R40	A case of metastatic adenocarcinoma underwent Medical Thoracoscopic pleural biopsy and Medical Thoracoscopic lung biopsy.	212,13
R41	A case of tuberculosis underwent Medical Thoracoscopic pleural biopsy	214,15
R42	A case of mesothelioma underwent TUS guided pleural biopsy.	216,17

List of Tables

<i>Table No.</i>	<i>Description</i>	<i>Page</i>
1	Differential diagnosis for causes of pleural effusion.	12
2	International Mesothelioma interest group staging system for malignant pleural Mesothelioma.	44
3	Formula to estimate the volume of pleural effusion.	59
4	Indications for thoracoscopy and preferred anesthesia for different indications.	109
5	Comparison of techniques to obtain pleural biopsy	154
R1	Sex distribution of the study patients	167
R2	Site of lesions according to CT chest and TUS	168
R3	Comparison between CT chest and Medical Thoracoscope in detection of pleural masses	169
R4	Comparison between TUS and Medical Thoracoscope in detection of pleural masses	170
R5	Comparison between CT chest and TUS in detection of pleural masses	171
R6	Ability of TUS to detect pleural nodules	172
R7	Ability of Medical Thoracoscope to detect pleural nodules	173
R8	Comparison between CT chest and Medical Thoracoscope in detection of pleural nodules	174
R9	Comparison between TUS and Medical Thoracoscope in detection of pleural nodules	175
R10	Comparison between CT chest and TUS in ability to detect pleural nodules	176
R11	Ability of TUS to detect pleural thickening	177
R12	Comparison between CT chest and Medical Thoracoscope in detection of pleural Thickening	178
R13	Comparison between TUS and Medical Thoracoscope in detection of pleural Thickening	179
R14	Comparison between CT chest and TUS in detection of pleural Thickening	180
R15	Comparison between CT chest and Medical Thoracoscope regarding the character of the pleural thickening	181
R16	Comparison between TUS and Medical Thoracoscope regarding the character of the pleural thickening	182
R17	Comparison between CT chest and TUS regarding the character of pleural thickening	183
R18	Grade of pleural thickening detected By TUS	184
R19	Comparison between TUS and Medical Thoracoscope in detecting Grade of pleural thickening	185
R20	Comparison between CT chest and TUS in detecting Grade of pleural thickening	186
R21	Comparison between CT chest and Medical Thoracoscope in detecting Grade of pleural thickening	187
R22	Chest wall invasion as detected by TUS	188
R23	Comparison between CT chest and Medical Thoracoscope in detection character of collapsed lung	189

<i>Table No.</i>	<i>Description</i>	<i>Page</i>
R24	Comparison between TUS and Medical Thoracoscope in detection character of collapsed lung	190
R25	Comparison between CT and TUS in detection character of collapsed lung	191
R26	Comparison between primary and secondary malignant cases regarding character of collapsed lung detected by TUS	192
R27	Comparison between the ability of CT to detect lung mass in malignant subgroups	193
R28	Comparison between the ability of TUS to detect lung mass in among malignant subgroups	194
R29	Comparison between CT chest and Medical Thoracoscope in detecting pattern of pleural effusion	195
R30	Comparison between TUS and Medical Thoracoscope in detecting pattern of pleural effusion	196
R31	Comparison between CT chest and TUS in detecting pattern of pleural effusion	197
R32	Texture of the visceral pleura detected by TUS	198
R33	Texture of visceral pleura detected by Medical Thoracoscope	199
R34	Comparison between TUS and Medical Thoracoscope in detection texture of visceral pleura	200
R35	Comparison between diagnostic yield of TUS and Medical Thoracoscope	201
R36	Comparison between TUS biopsy and Medical Thoracoscopic biopsies regarding duration of the procedure	202
R37	Diagnostic yield of pleural fluid cytology	203
R38	Complications of both procedures	204
R39	The sensitivity and Diagnostic accuracy of both procedures	205

CONTENTS

INTRODUCTION	1
AIM OF THE WORK	4
REVIEW OF LITERATURE	
▪ CHAPTER I: Pleura	5
▪ CHAPTER II: Transthoracic Ultrasound of the Pleura ...	50
▪ CHAPTER III: US Guided Closed Pleural Biopsy	86
▪ CHAPTER IV: Medical Thoracoscopy	108
▪ CHAPTER V: US Guided Closed Pleural Biopsy VS Medical Thoracoscopic Pleural Biopsy in Diagnosis of Pleural Diseases	143
PATIENTS AND METHODS	155
RESULTS	167
CASE PRESENTATIONS	206
DISCUSSION	218
SUMMARY	237
CONCLUSION	241
RECOMMENDATIONS	243
REFERENCES	244
APPENDIX	266
ARABIC SUMMARY	

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*)