The Role of Chest Ultrasonography in Pleural Diseases

Thesis

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By

Alyaa Awf Abdulrahman
(M.B.,B.Ch, M.Sc. Ain Shams University)

Supervised by

Dr. Hanan Mohamed Hanafy AbuZeid
Professor of Radiology
Faculty of medicine, Ain Shams University

Dr. Mohamed Shaker Ghazy
Assistant Professor of Radiology
Faculty of Medicine, Ain Shams University

Dr. Ahmed Hassan Soliman
Lecturer of Radiology
Faculty of Medicine - Ain Shams University.

Faculty of Medicine
Ain Shams University
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Dr.Alyaa Awf

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List of Abbreviations

AP	Antero- posterior
ARDS	Acute respiratory distress syndrome
ARF	Acute respiratory failure
BLUS	Bedside lung ultrasonography
CDUS	Color Doppler ultrasound
Cm	Centimeter
CT	Computed tomography
CXR	Chest X- ray
F	French gauge
Fig.	Figure
FU	Fluorouracil
G	Gauge
H	Hour
HCV	Hepatitis C virus
ICU	Intensive care unite
IL-8	Interleukin -8
INR	International normalized ratio
IPCs	Indwelling pleural catheters
IPFT	Intrapleural fibrinolyitic therapy
IU	International unit
IV	Intravenous
KHz	Kilo Hertz
L	Litter
MHz	Millie Hertz
Min	Minutes
Ml	Milliliter
Mm	Millimetre
MPE	Malignant pleural effusion
MPEs	Malignant pleural effusions

MRI	Magnetic resonance imaging
NTM	Needle tract metastasis
PC	Prothrombin concentration
PE	Pleural effusion
PPS	Pleuroperitoneal shunting
PT	Prothrombin time
PTX	Pneumothorax
PU	Pleural ultrasonography
RICU	Respiratory intensive care unite
Sec	Second
TB	Tuberculosis
US	Ultrasonography
VS	Versus

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Introduction

Lung ultrasound has become part of the diagnostic armamentarium in Resuscitation and Recovery Units with an enormous potential due to its many advantages: capacity to diagnose more precisely than conventional radiology, earlier diagnosis, convenience due to being able to performed at the bedside, possibility of being performed by one person, absence of ionising radiation, and, due to its dynamic character, is capable of transforming into physiological processes that were once static images **(Gordon & Alcorta , 2015).**

Pleural effusions and haematomas can be visualised. Despite the physical laws of ultrasound, approximately 70% of the pleural surface can be accessed by sonography **(Mathis, 2004).**

Ultrasound has a higher accuracy in detecting pleural effusion in comparison with bedside chest X-rays (93% vs. 47%). In fact, chest X-rays can detect the presence of pleural effusion in patients in the orthostatic position only if the volume of the effusion is at least 200 mL, whereas ultrasound can detect effusions as small as 20 mL **(Prina, Torres &Carvalho, 2014)**.

Pleural aspiration, biopsy and drainage are all proven to be safer and more efficacious using image guidance **(Matin &Gleeson, 2011).**

Although small, freely flowing parapneumonic effusions can be drained by therapeutic thoracentesis, complicated parapneumonic effusions or empyemas require image guided drainage (**Rubins et al, 2014).**

Pleural ultrasonography (PU) is more sensitive than chest radiograph (CXR) for diagnosing pneumothorax and could be useful for detecting resolution of pneumothorax after drainage **(Galbois et al, 2010).**

In ultrasound, pleural tumors are well-defined, hypoechoic or echogenic solid nodular lesions located in the parietal or visceral pleura. Primary neoplasms of the pleura are rare except for benign and malignant mesothelioma.

Metastatic pleural tumors or Mesothelioma can appear as polypoid pleural nodules or sheet like pleural thickening combined with pleural effusion sometimes, differentiation between pleural fibrosis and pleural tumor is difficult by US. A US-guided core needle biopsy is very helpful for pathologic diagnosis of pleural tumors **(Tsai& Yang, 2003).**

In addition, ultrasound allows the identification of adjacent structures: chest wall, hemidiaphragm (over the liver or spleen), and visceral pleural surface. This is important, especially in the case of an invasive procedure, in order to avoid organ injury **(Prina, Torres & Carvalho 2014)**.