

*Research Article***Ultrasonography In Ricu From Minia University Hospitals****Elham A. Abdelghany^a, Heba M. Abdelhamid^a, Ahmed H. kasem^a ,**^aDepartment of chest diseases, Faculty of medicine , Minia university, Egypt**Abstract**

Background: Ultrasound examinations in the critical care setting have been recognized as a noninvasive, readily available imaging modality that can complement physical examination and clinical evaluation in cases admitted to ICU. **Patients and methods:** this study is designed to be across sectional a study , done on 85 adult patients were admitted to RICU presenting by respiratory failure . ultrasonography has been used in two directions firstly as a transthoracic BUS to detect lung disorders . The main advantage of transthoracic BUS is its immediate application to the diagnosis of pathology. Other advantages include delaying or even avoiding the need for patient transportation to the radiology unit, radiation exposure and guiding life-saving therapies in extreme emergency. The other direction was assessing the hemodynamic status through IVC and evaluate cardiac function by FOCUS as anon cardiologist. Lung ultrasonography has been used to examine 3 regions at each hemithorax to detect lung pathology and counting B –lines. **Results** our study show significant difference between final diagnosis detected by the clinician and that proved by ultrasound . Also proved that Focused cardiac ultrasound can be used by non-cardiologist for detection of pericardial effusion. **Conclusion:** ultrasonography is a useful tool in detection of lung pathology and to detect pericardial effusion and to assess hemodynamics.

Keywords: lung ultrasonography, lung pathology, FOCUS, pericardial effusion, hemodynamics.

Introduction

Critical care ultrasound examinations (CCUS) in the critical care setting have been adopted widely and becoming an extension of the clinical critical care hemodynamic monitoring ,lung pathology diagnosis and other organ function assessment because of their rapid, precise detection capabilities¹. Previous studies have demonstrated that the ultrasonic evaluation at ICU admission could elevated the diagnostic accuracy and potentially improved healthcare quality². Moreover, the highlight of critical care ultrasound examinations have the ability to visualize the pathological changes of the organs systematically, guiding the critical care physicians realize more details of the pathological pattern which could improve the supportive management accurately from several complicate underlying diseases³.

Ultra sonographic examination in pulmonology provides a revolutionary advance because it is very helpful in the diagnosis and management of various pleural and peripheral pulmonary defects. Lung ultrasonography allows the clinicians to diagnose some pulmonary abnormalities more rapidly, including the diagnosis assistance for the clinicians to perform

invasive techniques in the field of pulmonology, which may increase the success rate and reduce the likelihood of complications⁴.

Chest ultrasonography has many uses, both diagnostic and interventional. It is used in the diagnosis of diseases of the pleural space such as pleural effusion, pleural thickening, pleural masses and pneumothorax. It is used also in the diagnosis of diseases of the lung parenchyma such as pneumonia and lung abscesses, neoplasms, pulmonary embolism and arterio-venous malformations. It can also be used in the diagnosis of diseases of the chest wall such as enlarged lymph nodes, rib abnormalities and also diaphragmatic abnormalities like diaphragmatic paralysis⁵.

Chest ultrasonography can also be used in interventional procedures of the pleural space such as thoracentesis and pleural biopsy. In lung cancer, the peripheral lung tumors that are in contact with or near the pleural surface can be safely biopsied under ultrasound guidance⁶.

Patients and methods

This study will be conducted on 85 adult patients admitted to RICU present by respi-ratory failure. lung ultrasonography done for each patient

within 30 minutes through dividing the chest wall into 3 zones on each side .focused cardiac ultrasound FOCUS done by subxiphoid view to assess presence of pericardial effusion ,to assess left ventricle function and to assess right ventricle size in relation to left ventricle.

Inclusion criteria: All patients which will be admitted to respiratory ICU of Minia university hospital.

Exclusion criteria:

- 1.trauma patient.
2. children.
3. Extensive burn

Aim of the work:

1- To evaluate the diagnostic performance of a rapid bedside chest ultrasonography (LUS) performed by an intensive care unit (ICU) physician for detection of common pathological conditions of the lung, such as alveolar consolidation, pleural effusion, interstitial syndrome and pneumothorax . counting B-lines by using LUS to evaluate pulmonary extra-vascular water and is it helpful in detecting volume status ?

2- to assess hemodynamic status for icu patients on admission through assessing the IVC COLLAPSABILITY AND DISTENSABILITY AND CAVAL INDEX.

3-using focused cardiac ultrasound (FOCUS) as a tool for non cardiologist to evaluate cardiac function and existence of pericardial effusion.

Table (1):): Distribution of the studied patients according to the final diagnosis

		Descriptive statistics N=85
Final diagnosis	<i>COPD</i>	23(27.1%)
	<i>ILD</i>	19(22.4%)
	<i>OHS</i>	6(7.1%)
	<i>Pneumonia</i>	29(34.1%)
	<i>Malignant effusion</i>	8(9.4%)

Table (1) shows that most of studied patients were diagnosed as pneumonia (34.1%), COPD (27.1%), ILD(22.4

Table (2): CT chest and conventional lung ultrasound (LUS) in detect diagnoses

		CT findings		Kappa test	
		+Ve	-Ve	K	P value
		N=80	N=5		
LUS findings	+Ve	68(85%)	0(0%)	0.4	<0.001*
	-Ve	12(15%)	5(100%)		

Table (2) show significant difference in ability of LUS to detect diagnoses (85%) as regard ct chest (p=<0.001*)

Table (3): Correlation between Caval index and Collapsability index, distinsability index and volume status

	Caval index	
	R	P value
Scores of B lines	-0.028	0.800
Collapsability index	0.671	0.001*
Distinsability index	0.770	<0.001*
Volume status	-0.905	<0.001*

Table (3): show significant difference between ability of caval index to predict volume status P value (<0.001*)

Discussion

Lung ultrasound at bed side is relatively easy to perform, cost effective and reproducible. Analysis of various sign and profile, alone or in combination is as accurate as gold standard test like Computed Tomography scan of the chest in detection of etiology of acute respiratory failure.

In the present study, there was significant correlation ability of LUS to detect diagnoses (85%) as regard ct chest diagnoses. ($p = <0.001^*$) which prove that Lung ultrasound (LUS) provided a useful diagnostic workup of respiratory disease, either by directly identifying pathological findings or by detecting indirect signs of illness, as in lung cancer. Overall, LUS was not inferior to chest CT and routine use in medical wards or in emergency department settings is beneficial.

In our study, table we found that there were significant difference towards FOCUS as can detect pericardial effusion in (100%) ($p = <0.001$), and there were significant difference toward assessment of LEFT VENTRICLE dysfunction in 75% ($p = <0.001$), there were significant difference towards detection of RIGHT VENTRICLE dysfunction in (91.4) ($p = <0.001$) (BUT can detect dilatation in RV as a sign of pulmonary hypertension (65.4%) ($p = 0.008$). In a study done by Riera, Antonio MD In pediatric care center show agreement with our study as FOCUS can detect pericardial effusion, sensitivity was 100%, and specificity was 99% (.While For depressed function, sensitivity was 100% and specificity was 99%) and For chamber size abnormalities, sensitivity was 100% and specificity was 95%⁷.

Conclusion

This study concluded that lung ultrasound is equally useful tool in assessment of etiology of respiratory symptoms, it has a diagnostic accuracy of 85.6%. Since lung ultrasound is quick, reproducible and even can be done at bed side it has to be incorporated in diagnosing etiology of ARF in critical care settings. Also concluded that FOCUS is of value in detection of multiple cardiac conditions. FOCUS can be done by non-cardiologist as a rapid investigation for detection of some cardiac conditions for example pericardial effusion, visual assessment of left ventricle function and detect right ventricle dilatation in relation to Left ventricle size.

Recommendation:

It is known that our study had limited numbers of patients so, we recommend making studies on larger scale.

References

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