Presentation Abstracts

016

Lung ultrasound in the management of acute respiratory distress syndrome: a comprehensive systematic review

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Introduction: Acute Respiratory Distress Syndrome (ARDS) remains a significant challenge in intensive care, with an incidence rate of approximately 10% among hospital admissions and a mortality rate reaching up to 35%. Effective management of ARDS critically depends on early diagnosis and the timely initiation of appropriate treatment strategies. Traditional diagnostic criteria, particularly imaging techniques, are often criticized for their low sensitivity and specificity, which impede early detection. The advent of lung ultrasound (LUS) offers a promising alternative, recognized in the "New global definition of ARDS (2023)" for its potential to enhance diagnostic accessibility.[1-3] However, the operator-dependent nature of LUS underscores the need for thorough evaluation to ensure its standardization and reliability. **Objectives**: This systematic review and meta-analysis aims to explore the efficacy of LUS in the diagnosis, monitoring, and therapeutic decision-making for ARDS patients in intensive care units, compared to conventional diagnostic modalities. **Methods**: This review includes randomized controlled trials (RCTs), quasi-randomized studies, and cohort studies, both prospective and retrospective, focusing on adult patients diagnosed with ARDS in intensive care settings. The intervention of interest is the application of LUS in the management of ARDS, compared to traditional diagnostic methods such as chest X-rays and CT scans. Exclusion criteria were applied to studies not explicitly evaluating LUS for ARDS, pediatric populations, non-critical care settings, or those with a high risk of bias. A comprehensive literature search was conducted across PubMed/MEDLINE, Cochrane Library, and Scopus databases up to February 2024, using specified descriptors. The quality of included studies was assessed using the Cochrane Risk of Bias Tool and ROBINS-I Tool. This systematic review is registered with PROSPERO (CRD42019115185), ensuring transparency and methodological rigor. Data extraction included study characteristics, participant demographics, ultrasound standardization, outcomes, and etiology. **Results**: The primary analysis assessed the diagnostic accuracy of LUS compared to traditional diagnostic standards and its influence on clinical decision-making, including mechanical ventilation and fluid management strategies. Secondary analyses examined mortality rates, duration of ICU stay, duration of mechanical ventilation, and incidence of ventilation-associated complications. A total of 21 studies were included, and 1 study was excluded during the analysis. **Conclusion**: By rigorously evaluating the role of LUS in the management of ARDS, this systematic review and meta-analysis, substantiates the utility of LUS, potentially revolutionizing diagnostic and therapeutic paradigms in critical care. The findings indicate that LUS offers higher diagnostic accuracy, improves clinical decision-making, and is associated with better patient outcomes, including lower mortality rates, shorter ICU stays, and reduced incidence of ventilation-associated complications. These results underscore the importance of integrating LUS into standard ARDS management protocols in intensive care settings.

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Table 1. Basic data of the included studies

		Period 2008-2023
Type of study (nº study)	Cohort	18
	RCT	3
Purpose (nº study)	Diagnosis	16
	Prognosis	5
Number of patients (nº)	Total	1538
	Men	838
	Women	638
Etiology (nº study)	Pulmonary	17
	Extrapulmonary	6
	Not reported	3
ARDS Criteria (nº study)	AECC 1994	1
	Berlim 2012	11
	Non-standard	3
	Not informed	5
Patients with ARDS (nº)	Mild	61
	Moderate	179
	Severe	247
	Not identified	266
Evaluation method (nº study)	LUS score	16
	BLUE protocol	3
	Non-standard/other	1
Qualification (nº study)	Quantitative	10
	Qualitative	10
Deaths (nº)		227