

INPLASY PROTOCOL

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Corresponding author:
Yalong Yang

knight112255@163.com

Author Affiliation:
General Hospital of Ningxia
Medical University.

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None declared.

Comparison the diagnostic performance of lung ultrasound with chest radiography for detecting pneumonia in children: A systematic review and meta-analysis

Yang, YL¹.

Review question / Objective: To compare the diagnostic value of lung ultrasound LUS with chest x-ray CXR for detecting pneumonia in children.

Information sources: We systematically searched PubMed, EmBase, and the Cochrane library to screen eligible study throughout April 2023, and using (“ultrasonography” or “lung ultrasound”) and (“pneumonia” or “pulmonary pneumonia”) as search terms. Then the search terms were restricted to “Child: birth-18 years”. We also manually reviewed the reference lists, citation searches, and relevant systematic reviews to identify any new eligible study. PubMed, EmBase, and the Cochrane library. We also manually reviewed the reference lists, citation searches, and relevant systematic reviews to identify any new eligible study.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 April 2023 and was last updated on 20 April 2023 (registration number INPLASY202340071).

INTRODUCTION

Review question / Objective: To compare the diagnostic value of lung ultrasound LUS with chest x-ray CXR for detecting pneumonia in children.

Condition being studied: The lung ultrasound (LUS) was recommended as a reliable diagnostic tool alternative to chest

x-ray (CXR) for detecting pneumonia in children, whereas the diagnostic performance between LUS and CXR were not directly comparison.

METHODS

Search strategy: (“ultrasonography” or “lung ultrasound”) and (“pneumonia” or “pulmonary pneumonia”).

Participant or population: Individuals aged < 18.0 years, and suspected for pneumonia.

Intervention: LUS.

Comparator: CXR.

Study designs to be included: No restrictions placed on study design.

Eligibility criteria: (1) Participants: individuals aged < 18.0 years, and suspected for pneumonia; (2) Diagnostic tools: LUS and CXR; (3) Outcomes: studies had to have reported true positive, false positive, false negative, true negative, or data could transform into these information; and (4) Study design: no restrictions placed on study design.

Information sources: We systematically searched PubMed, EmBase, and the Cochrane library to screen eligible study throughout April 2023, and using (“ultrasonography” or “lung ultrasound”) and (“pneumonia” or “pulmonary pneumonia”) as search terms. Then the search terms were restricted to “Child: birth-18 years”. We also manually reviewed the reference lists, citation searches, and relevant systematic reviews to identify any new eligible study. PubMed, EmBase, and the Cochrane library. We also manually reviewed the reference lists, citation searches, and relevant systematic reviews to identify any new eligible study.

Main outcome(s): Sensitivity, specificity, positive likelihood ratio (PLR), negative likelihood ratio (NLR), diagnostic odds ratio (DOR), and area under the receiver operating characteristic curves (AUC).

Quality assessment / Risk of bias analysis: quality assessment of diagnostic accuracy studies-2.

Strategy of data synthesis: The diagnostic parameters of LUS and CXR were analyzed using true positive, false positive, false negative, and true negative data by using the bivariate generalized linear mixed model, and the random-effects model, and the calculated outcomes including

sensitivity, specificity, positive likelihood ratio (PLR), negative likelihood ratio (NLR), diagnostic odds ratio (DOR), and area under the receiver operating characteristic curves (AUC). Then the ratio of sensitivity, specificity, PLR, NLR, DOR, and AUC between LUS and CXR were compared using the random-effects model.

Subgroup analysis: Subgroup analyses were performed based on country, study design, mean age, and gold standard.

Sensitivity analysis: Not applicable.

Language restriction: No restriction were placed on published language.

Country(ies) involved: China.

Keywords: lung ultrasound; chest radiography; pneumonia; children; systematic review; meta-analysis.

Contributions of each author:

Author 1 - Yalong Yang.

Email: knight112255@163.com