

Lung Ultrasound Findings in Children with Asthma Exacerbations

Robert M. Hoffmann¹, Mark Neuman¹, Michelle Du¹, Michael Monuteaux¹, Andrew F. Miller¹, Jeffrey Neal¹, Kyle Nelson¹, and Cynthia Gravel¹

¹Boston Children's Hospital Division of Emergency Medicine

November 9, 2023

Abstract

Objective: We sought to characterize point-of-care lung ultrasound (LUS) findings in children with asthma exacerbations and to determine whether the presence and magnitude of findings were associated with asthma severity. **Methods:** We enrolled a convenience sample of patients aged 5-18 years presenting with acute asthma exacerbation to a tertiary care pediatric emergency department. Severity of an asthma exacerbation (mild, moderate, severe) was assessed within 1-hour of the LUS using the Hospital Asthma Severity Score, a validated asthma assessment tool. LUS was performed by trained pediatric emergency providers. The presence of LUS findings (any B-lines, ≥ 3 B-lines per view, consolidations, pleural effusion and pleural line abnormalities) was assessed using a standardized criterion. **Results:** A total of 111 patients with a median age of 8 years (IQR 6, 12) were enrolled. LUS was positive in 57% of patients. Pleural line abnormalities were observed in 34%, B-lines in 29%, consolidations <1 cm in 24%, and consolidations ≥ 1 cm in 7 %. Patients with moderate and severe asthma exacerbations were more likely to have any B-lines (31% and 43%, respectively) than patients with mild exacerbations (12%; $p=0.021$), however the presence of ≥ 3 B-lines did not differ across severity groups. The presence of other findings did not differ based upon asthma severity. **Conclusions:** LUS findings are commonly observed in patients presenting with asthma exacerbations. While B-lines were more likely to be found in exacerbations of higher severity, LUS findings associated with pediatric pneumonia did not correlate with severity. These findings provide valuable information for the diagnostic use of LUS.

Hosted file

LUSAsthmanuscriptPedPulm.docx available at <https://authorea.com/users/697776/articles/685819-lung-ultrasound-findings-in-children-with-asthma-exacerbations>

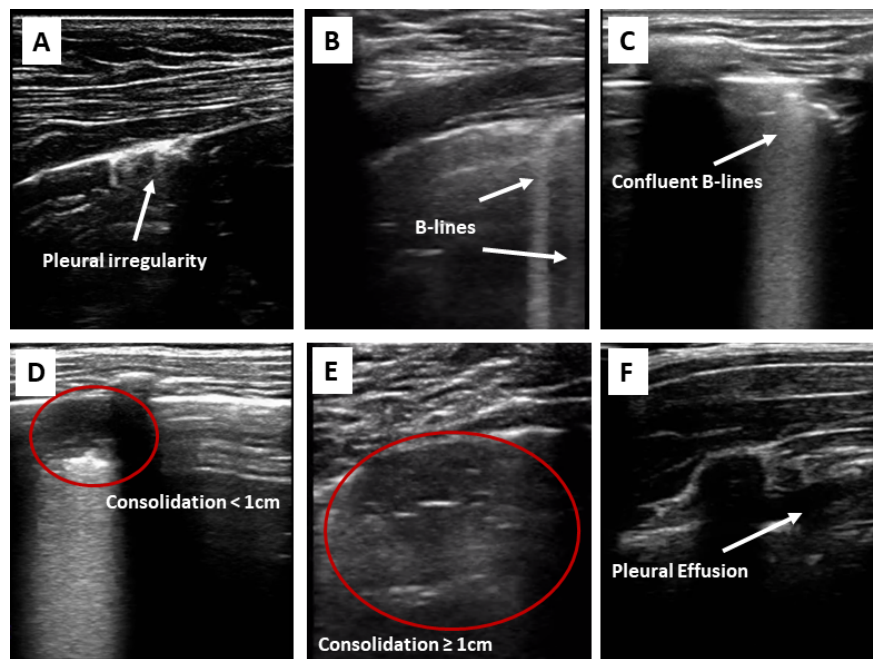


Figure 1: Examples of lung ultrasound findings in children with asthma exacerbation. A,B,C,F, representative LUS finding indicated with white arrow. D,E consolidation marked with red oval.

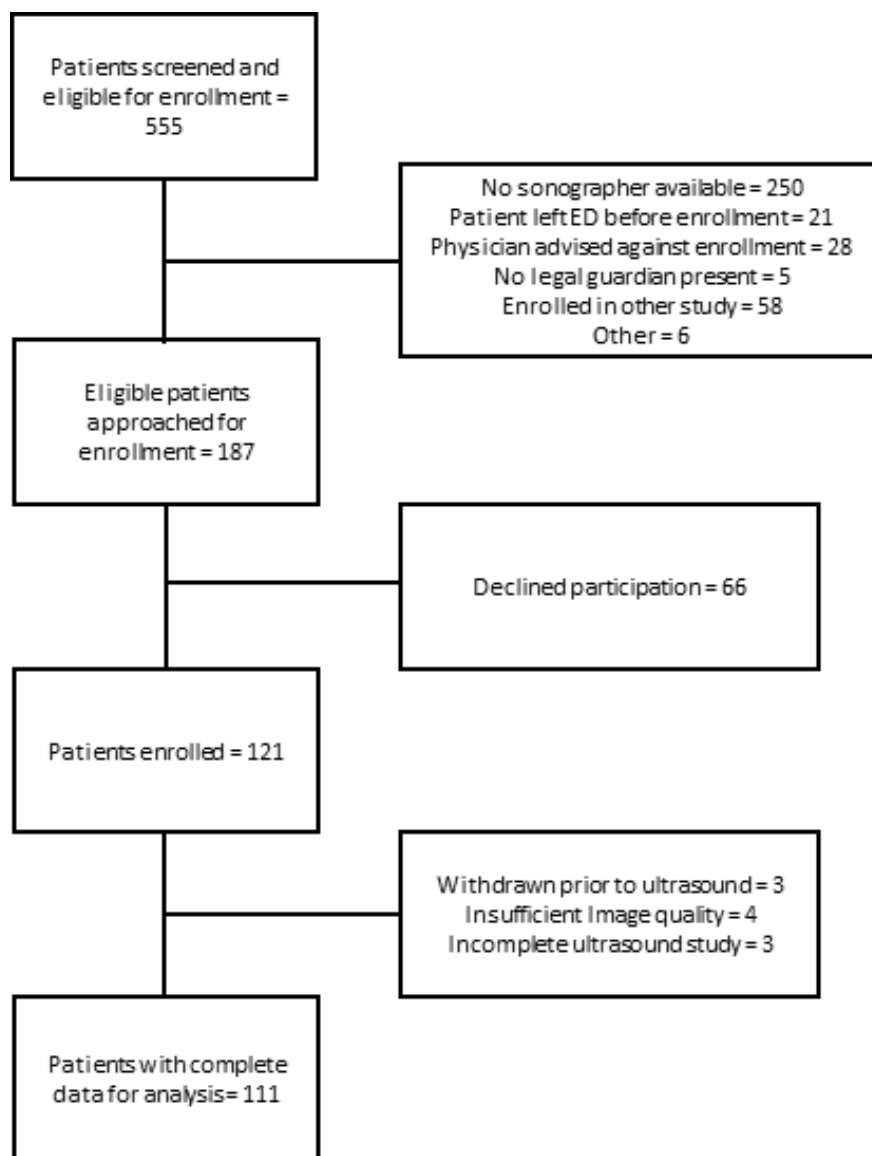


Figure 2.: Patient enrollment flow diagram

Hosted file

TablesPedPulm.docx available at <https://authorea.com/users/697776/articles/685819-lung-ultrasound-findings-in-children-with-asthma-exacerbations>