MACEP Pediatric Committee
Fall/Winter 2025 Newsletter

Welcome to the 2025 edition of the MACEP Pediatric Committee Fall/ Winter newsletter!

We hope you enjoy learning about utilizing ultrasound in a novel way and approaching appendicitis treatment considerations with the same care as the evaluation of abdominal pain itself. Don't forget to check out the educational resource links.

Thank you for all that you do to care for pediatric patients and their families every day.

Enjoy!
-Co-Chairs: Lauren Rice, MD and Joyce Li, MD, MPH

Soundwaves for Stridor?

by Raquel A. Marroquin, MS4, Tufts University School of Medicine

Abnormal breathing sounds can be one of the most distressing symptoms for parents to hear coming from their child. Stridor is a common cause for abnormal breathing sounds in children and is often described as harsh, vibratory, and may have variable pitch [1,2]. Stridor results from upper airway obstruction, and the etiology can lead to acute, subacute, or chronic presentations [3]. Typically, the most common cause for stridor is croup infection [1]. However, the differential for stridor is broad, and includes craniofacial malformations, trauma to the neck, laryngomalacia, epiglottitis, foreign body aspiration, vocal cord paralysis, external compression, and bacterial tracheitis [2,3]. In the emergency department, it is critical for providers to assess stridor efficiently and effectively as determining the cause of the stridor can aid in identifying the underlying diagnosis.

Recent research has demonstrated the usefulness of point-of-care ultrasound (POCUS) to help emergency department (ED) providers quickly and accurately evaluate stridor in pediatric patients [1,3,4]. This article aims to further illuminate the promising potential of POCUS in pediatric stridor evaluation in the emergency department.

Initial evaluation begins with establishing the severity of the presenting symptom. If the patient is unstable and there is significant concern for possible airway complications, then the most appropriate course of action would be to manage the emergent airway compromise. In children presenting to the ED

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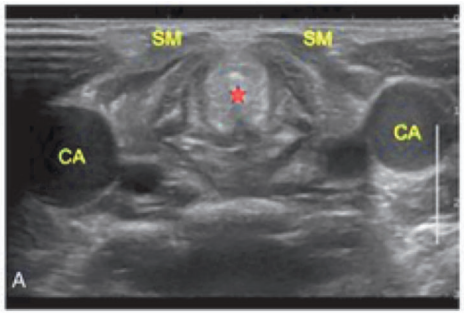
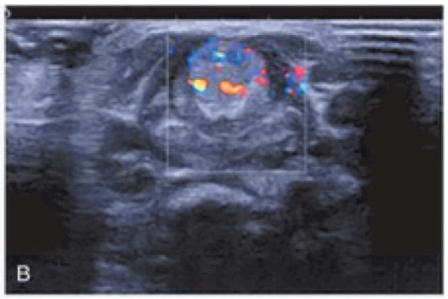
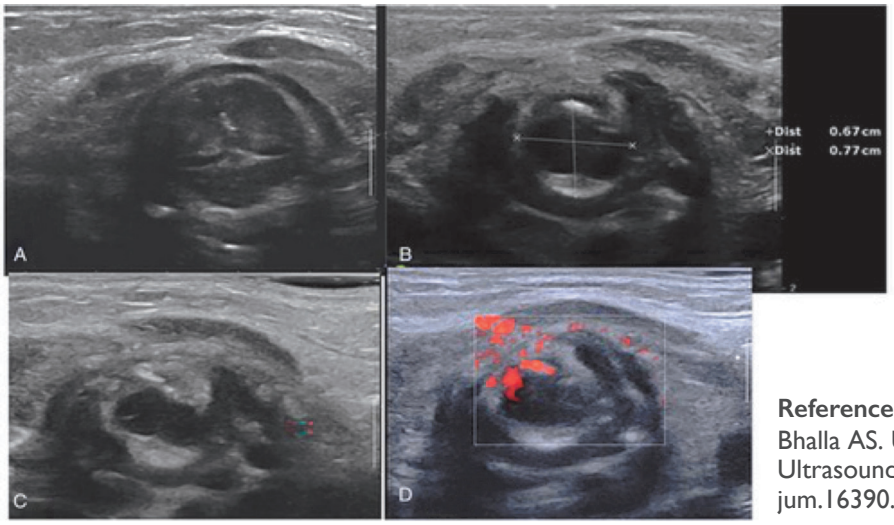




Case 1: 10 month old presenting with tachypnea and stridor.

Diagnosis: Subglottic hemangioma
Axial grayscale US image (A) shows an echogenic mass (star) in the subglottic location. Color Doppler image (B) shows increased vascularity within. CA, common carotid artery; SM, strap muscles.



Case 2: 4 month old presenting with noisy breathing since birth, intermittent stridor

Diagnosis: Subglottic cyst
(A–C) Axial grayscale US images show an anechoic cyst (B) in the subglottic location, with no internal vascularity (D).

Reference: Kaur T, Baijal N, Jana M, Manchanda S, Naranje P, Bhalla AS. Ultrasound in Causes of Stridor in Children. J Ultrasound Med. 2024 Apr;43(4):801-806. doi: 10.1002/jum.16390. Epub 2024 Jan 11. PMID: 38205904.

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who are stable and present with stridor, the traditional method of evaluation involves: a thorough clinical history, focused physical exam, and often accompanying lateral and A/P neck X-rays [2]. Imaging studies often carry the risk of adding to the lifetime radiation exposure these patients will have, albeit marginal [5,6].

In children with recurrent presentations of stridor, these marginal risks can accumulate and may cause hesitation in providers who are evaluating the patient for another bout of stridor [6]. Aside from imaging studies, flexible laryngoscopy or other means of direct visualization of the airway are alternatives available to ED providers. However, these procedures are more invasive and require additional measures and planning so that children can tolerate them. Thus, finding a way to better visualize the larynx while avoiding ionizing imaging studies and invasive procedures becomes a priority.

POCUS is useful in a range of diagnostic and procedural events. Additionally, it is a cost effective, relatively easy to use tool that poses no radiation risk to the patient or the user [7]. Despite its many great benefits, one of the largest drawbacks of ultrasound is variability in operator reliability [8]. While this tool has an easy learning curve and can be utilized by various individuals in the emergency department, technique and years of experience can make a difference on the images obtained [8]. Inter-user reliability aside, POCUS remains a favorite go-to tool in the emergency department.

With this in mind, researchers have studied the utility of ultrasound for pediatric stridor evaluation in the emergency department [3]. One such study analyzed three pediatric emergency medicine cases where POCUS was used as the main modality for stridor evaluation. The research found that POCUS was a simple yet effective tool to accurately diagnose each child's condition. The images obtained in this study (see next page) clearly depict how powerful POCUS can be for visualizing soft-tissue structures of the neck. The researchers concluded that ultrasound is a powerful triaging tool that "can prove instrumental in planning further management" [3].

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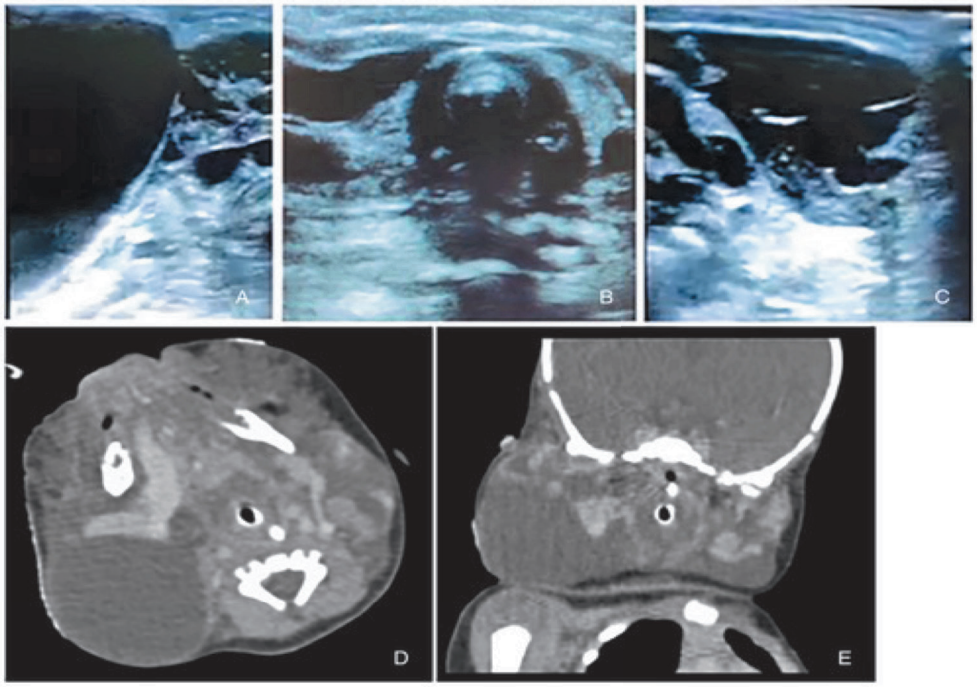
Reference: Kaur T, Baijal N, Jana M, Manchanda S, Naranje P, Bhalla AS. Ultrasound in Causes of Stridor in Children. J Ultrasound Med. 2024 Apr;43(4):801-806. doi: 10.1002/jum.16390. Epub 2024 Jan 11. PMID: 38205904. Available at: https://pubmed.ncbi.nlm.nih.gov/38205904/#:~:text=Abstract,ultrasound;%20pediatric%20radiology;%20stridor.



Case 3: Newborn with immediate stridor after birth and soft tissue swelling of neck

Diagnosis: Vascular malformation
Grayscale US (A–C) images showing multiple anechoic cystic spaces with thin septations in anterior part of neck and bilateral carotid spaces, insinuating between the vessels and causing airway compression. Contrast-enhanced CT images in the axial (D) and coronal (E) plane show a non-enhancing fluid attenuation lesion corresponding to the cystic spaces on US

Overall, POCUS is an available yet surprisingly underutilized tool for stridor evaluation [3]. While some children may present with noisy breathing due to relatively benign conditions, some more serious and life-threatening conditions can also present in a similar fashion. Ultrasound has already proven to be a reliable, efficient, and portable tool for the evaluation of various clinical symptoms in the ED [9,10]. Research has shown that ultrasound can be of benefit in evaluating the pediatric airway, therefore, adding ultrasound as a tool for stridor is an appropriate next step for ED providers to take with the proper awareness and education [11-14].

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Save the Date!

MACEP ANNUAL MEETING

Wednesday, May 6, 2026

Pediatric Emergency Medicine Assembly

Join your fellow pediatric emergency medicine enthusiasts for the latest updates in clinical skills, evidence based strategies, and keeping your cool when the next pediatric patient shows up in your Emergency Department.

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For more information and to register, check out acep.org/pem here

ACEP ACCELERATE

Appendicitis Arguments:
Does it need cold steel to heal?

by Lauren Rice, MD

Abdominal pain is a very common complaint in the pediatric emergency department and appendicitis is the most common surgical emergency in children. Once a diagnosis of appendicitis has been made, the course may seem clear to call your pediatric surgeon and/or transfer to a hospital with such expertise. While this is the correct clinical pathway for a pediatric patient with acute appendicitis, in recent years, there has been more of a discussion surrounding the option for use of oral antibiotics to avoid immediate operative intervention.

In the Comparison of Outcomes of Antibiotic Drugs and Appendectomy (CODA) trial, which included 1552 adult patients randomized to treatment with oral antibiotics vs. operative intervention, the conclusion was that treatment with antibiotics was non-inferior to treatment with appendectomy based on a 30-day overall health status follow-up and while the study does note that 29% of patients treated initially with antibiotics alone required appendectomy by 90 days, the researchers also highlighted that 71% of these patients avoided an operative intervention, an outcome that was deemed particularly favorable during the COVID-19 pandemic when this trial was ending [1].

In the APPY trial, 936 patients from 11 international children's hospitals were enrolled in a randomized non-interiority trial from 2016-2021 with exclusions from the trial if a patient had confirmed or suspected perforated appendicitis and included patients were randomized to non-operative management (NOM)/antibiotic (459) or operative (477) groups [2]. Treatment failure was considered clinical worsening/no improvement within 2 days on antibiotics requiring surgery or recurrence and subsequent appendectomy within 1 year for the NOM group and normal appendix on pathology or complication requiring return to the OR/general anesthesia for the operative group [2]. Treatment failure was found in 34% of the NOM group and 7% of the operative group [2]. Additional considerations such as impact on returning to regular activities, pain control and ED visits after treatment were considered and it was noted that the number of ED visits in the follow-up period was not statistically significant, most patients in the NOM group did not require pain medication and returned to school sooner than the operative group [2].

The APPY trial and other similar studies have spurred additional research, such as a recent meta-analysis which reviewed 7 randomized control trials, with a total of 1480 patients, comparing NOM with operative intervention [3]. The definitions of treatment failure again were identified as need for surgical intervention or recurrence of appendicitis in the NOM group and negative pathology/normal appendix in the operative group with complications requiring general anesthesia intervention for both groups [3]. This analysis found that treatment failures and major complications (requiring intervention under general anesthesia) within one year were "significantly higher" in the NOM groups suggesting that operative

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intervention is the superior treatment option for acute uncomplicated appendicitis [3].

Since the findings of the APPY trial have been published, the debate about which treatment is "superior" and how to define "failure" has continued. One such editorial by Boston-based pediatric surgeon, Dr. Rangel, identified that limitations of the APPY trial include a relatively brief 1-year follow-up period which may underestimate the true "failure" rate of needing an appendectomy after initial NOM and highlighted that the use of broad-spectrum antibiotics in the NOM group may underestimate risks and complications associated with antibiotic use [4]. In fact, the APPY trial did note that while there were no deaths or serious adverse events in either treatment group, 4 of the patients required re-hospitalization due to a gastrointestinal complication from antibiotics in the NOM group, including Clostridium difficile infection and hematemesis [2]. Dr. Rangel underscores a major point, that while both NOM and surgical intervention may be appropriate treatment options the goal of future research may not be to determine which treatment group is superior but rather which is most appropriate for each individual patient emphasizing informed, shared decision-making with families on a case-by-case basis [4].

As the debate continues, consider how you measure success in the management of acute uncomplicated appendicitis the next time you are evaluating a child with abdominal pain (it may likely be on your next shift).

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Respiratory Refresher Modules

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The goal of the **MA EMSC Pediatric Respiratory Illness Refresher Course for Community ED Providers** is to improve recognition, triage, and evidence-based management of common and emergent pediatric respiratory illnesses in community ED settings by reviewing common pediatric respiratory illnesses that often present during the fall/winter season. The focus is on early identification of respiratory distress, airway and breathing management and respiratory illness diagnosis and management in children in a community ED setting for general ED providers.
This course assumes you have either previous knowledge and/or clinical experience with pediatric respiratory illnesses and is meant as a quick refresher course. Therefore, videos are 13 minutes or less and focus on high yield clinically relevant content and are not meant to be an exhaustive review of the epidemiology, pathophysiology and current research on each topic.

Learning Objectives:

- Recognize early signs of respiratory distress in infants vs. older children.
- Differentiate between common pediatric respiratory conditions (e.g., croup, bronchiolitis, asthma, pneumonia).
- Apply evidence-based treatments in the ED (e.g., when to use nebulizers, steroids, high-flow oxygen, NIPPV).
- Know when to escalate care including intubation and considerations for transfer.

Target Audience:

- General ED physicians, Physician Assistants, Nurse Practitioners and Nurses
- Pre-hospital providers

Vaccine Education

AAP Special Feature:

Recognizing Vaccine Preventable Disease

AAP has released a review of the clinical presentation, diagnosis and treatment of vaccine preventable diseases to help providers become more familiar with illnesses, such as measles, that are occurring in more frequent and widesdpread outbreaks due to growing vaccine hesitancy.
Pediatrics in Review Article Link

Open Access Podcasts

Pediatric Emergency Playbook

with Dr. Tim Horeczko
Inspired by Soundwaves for Stridor? and want to expand your differential diganosis for noisy breathing? Check out the July 2023 podcast "Stridor, Stertor, and Noisy Breathing" or just want to learn on topics from eczema to sepsis, consider listening at https://pemplaybook.org/

PEM Currents/PEMBlog

with Dr. Brad Sobolewski
Recent Fall 2025 topics include podcasts on Night Terrors and BRUE as well as an article on managing Fracture Pain at home
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MACEP

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ACEP

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"If we had no winter, the spring would not be so pleasant; if we did not sometimes taste of adversity, prosperity would not be so welcome." — Anne Bradstreet