Point of Care Ultrasound: Applications in Paediatric Anaesthesia

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KEY POINTS

- Focused cardiac ultrasound can help the paediatric anaesthesiologist quickly evaluate cardiac function, intravascular volume, and the presence of a pericardial effusion.
- Lung ultrasound is more sensitive than chest radiograph for the evaluation of a pneumothorax, and it can also identify pleural effusions and interstitial lung disease.
- Airway ultrasound is an excellent tool to visual airway structures, and it can confirm endotracheal intubation, help predict endotracheal tube size, and identify surgical airway landmarks.
- Gastric ultrasound visualizes gastric antrum contents to help assess aspiration risk.
- Training, competency, and quality assurance remain obstacles to widespread use of point-of-care ultrasound (POCUS) in paediatric anaesthesia.

INTRODUCTION

Point-of-care ultrasound (POCUS) is an invaluable tool in paediatric anaesthesiology. It is portable, radiation free, and can aid in making immediate bedside diagnoses. This tutorial will review the indications for diagnostic POCUS (cardiac, lung, airway, and abdomen) most relevant to paediatric anaesthesiology and discuss POCUS training and credentialing.

INDICATIONS

The goal of POCUS is to answer a focused question with a quick, targeted ultrasound exam. POCUS can be used during the preoperative, intraoperative, or postoperative periods. The core cardiac POCUS exam evaluates for cardiac function, intravascular volume, and evidence of pericardial effusion/tamponade. Lung exam is used to assess for ventilation, pneumothorax, pleural effusions, and interstitial disease. Airway ultrasound is used to guide surgical airway approach, estimate appropriate

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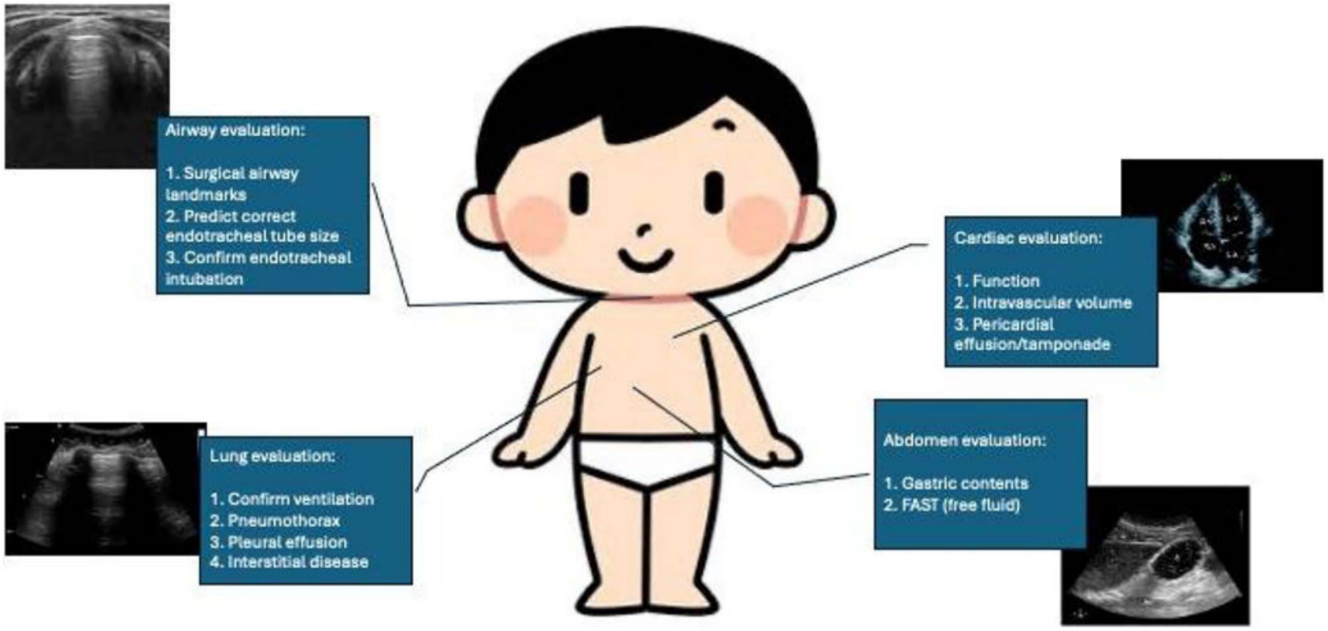

Figure 1. Core uses of point-of-care ultrasound (POCUS) for the paediatric anaesthesiologist (figure originally produced).

endotracheal tube size, and confirm endotracheal intubation. Abdominal exam evaluates gastric contents to assess aspiration risk and identifies free fluid and free air in the abdomen (Figure 1).

CARDIAC

Focused cardiac ultrasound (FOCUS) is a powerful diagnostic tool that provides anaesthesiologists with real-time, noninvasive insights into cardiac function. Commonly, FOCUS is used to assess global cardiac function, volume status, identify pericardial effusions, and guide decision-making during perioperative management or critical events.[1]

Key clinical questions quickly answered with FOCUS:

1. Is global cardiac function and contractility adequate?
   - Evaluate left ventricular systolic function to identify global function and areas of regional wall motion abnormalities.
2. Is volume status sufficient?
   - Assess left ventricular size (e.g., are the papillary muscles "kissing"?), and assess inferior vena cava (IVC) size and collapsibility to determine fluid responsiveness.
3. Is there pericardial effusion or tamponade?
   - Identify fluid around the heart. A dilated IVC and systolic collapse of the right atrium (RA) and/or diastolic collapse of the right ventricle (RV) are some indications that tamponade physiology may also be present.
4. Is there cardiac activity during arrest?
   - Distinguish between true asystole and pulseless electrical activity.
5. Is there evidence of pulmonary embolism or right heart strain?
   - Detect acute dilation and dysfunction of the RV.
6. Verify intravenous access and central line wire placement.
   - Inject agitated saline while visualizing the RA and looking for microbubbles to confirm venous placement of line.
   - Visualize the central line wire to the RA or superior vena cava (SVC)-RA or IVC-RA junction prior to advancing catheter.

Equipment

An ultrasound machine with a phased-array probe is essential for paediatric FOCUS. For neonates and infants, a higher frequency probe, such as an 8-12 MHz transducer, is ideal for optimal image resolution. Further, the smaller footprint allows you to get in between the ribspaces of small patients. Older patients often require a lower frequency probe (2-5 MHz), depending on their size and the structure being interrogated. Advanced Doppler features are not required (Figure 2).[2]

Figure 2. High-frequency phased array probes used in focused cardiac ultrasound (FOCUS; figure courtesy of Vrushali Ponde).

Basic Views in Paediatric FOCUS[2]

1. Parasternal long-axis (PLAX):
   - Patient position: Supine.
   - Probe position: Left of the sternum at the third to fifth intercostal space (Figure 3).
   - Orientation marker: Toward the right shoulder.
   - Sonoanatomy: Shows the RV, left atrium (LA), mitral valve (MV), basal and midsegments of the LV, and ascending aorta (Figure 4).
   - Clinical relevance: Assesses global LV function, pericardial effusion, and qualitative valvular pathology.
     - Qualitative measures of LV function.
       - Difference in ventricle size between systole and diastole, all walls thickening to a central point.
       - The E-point septal separation (distance between anterior mitral leaflet and the intraventricular septum in early diastole) is commonly used as a rapid objective surrogate for LV ejection fraction. Distance >7 mm in adults suggests decreased ejection fraction. Although most studies have been performed in adults, paediatric studies have confirmed its utility as a qualitative measure of ventricular function.

Figure 3. Position of the probe and the direction of the orientation marker (toward the right shoulder of the patient; figure courtesy of Dr. Maky Fraga, CHOP).

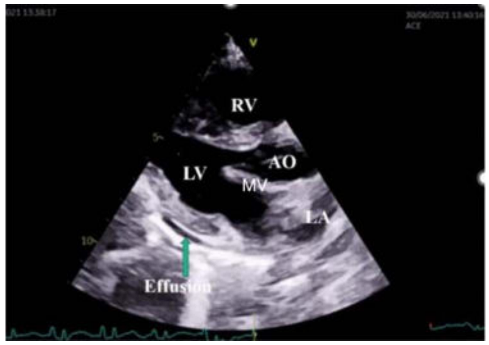

Figure 4. Parasternal long-axis (PLAX) ultrasound view. Note the effusion seen as the anechoic fluid accumulation in the pericardium. LV, left ventricle; RV, right ventricle; LA, left atrium; AO, aorta; MV, mitral valve (figure courtesy of Vrushali Ponde).

- Pericardial effusion appears as hypoechoic (dark) region between the hyperechoic (bright) pericardium and walls of the heart.
- Presence of aortic or mitral stenosis can be suggested by reduced opening or heavy calcifications, and valvular regurgitation can be assessed with colour jet area. However, quantitative assessment of severity of valvular pathology is beyond the scope of POCUS.

2. Parasternal short-axis (PSAX):
   - Patient position: Supine.
   - Probe position: Rotated 90° clockwise from PLAX.
   - Orientation marker: Toward left shoulder.
   - Sonoanatomy: Transverse view of the LV and RV at the papillary muscle level (Figure 5).
   - Clinical relevance: Evaluates global and regional ventricular function and filling. Qualitative assessment of RV pressure by evaluating intraventricular septum position (Figure 6).

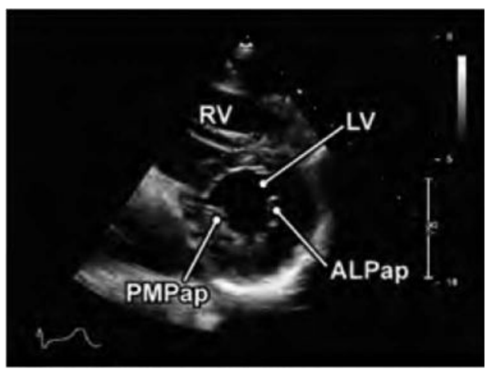

Figure 5. The parasternal short-axis (PSAX) view of the focused cardiac ultrasound (FOCUS) examination. LV, left ventricle; RV, right ventricle; PMPap, posteromedial papillary muscle; ALPap, anterolateral papillary muscle (figure courtesy of Elaina Lin).

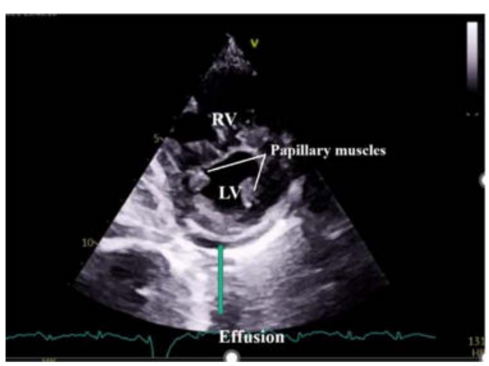

Figure 6. The parasternal short-axis (PSAX) view of the focused cardiac ultrasound (FOCUS) examination. Note the pericardial effusion in parasternal short axis. LV, left ventricle; RV, right ventricle (figure courtesy of Vrushali Ponde).

3. Apical 4-chamber (A4C):
   - Patient position: Left lateral decubitus (if possible).
   - Probe position: Over the cardiac apex, with the indicator at 5 o'clock (Figure 7).
   - Orientation marker: Directed toward the left hip.
   - Sonoanatomy: LV and RV, atria, MV, and tricuspid valve (Figure 8).
   - Clinical relevance: Assesses ventricular size, regional function, and right heart enlargement.
4. Subcostal 4-chamber (SC4C):
   - Patient position: Supine.
   - Probe position: Below the xiphoid process (Figure 9).
   - Orientation marker: Left of patient.
   - Sonoanatomy: Includes inferior walls of the LV and RV (Figure 10).
   - Clinical relevance: Useful during cardiopulmonary resuscitation (CPR) for assessing cardiac activity and identifying pericardial effusion. Avoids compression area and does not interfere with CPR.

Figure 7. Probe and orientation marker position for apical four-chamber view of the focused cardiac ultrasound (FOCUS) examination (figure courtesy of Vrushali Ponde).

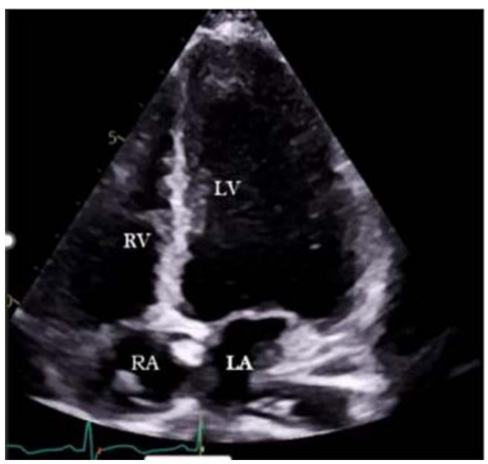

Figure 8. Ultrasound image of the apical four-chamber view of the focused cardiac ultrasound (FOCUS) examination. LA, left atrium; RV, right ventricle; RA, right atrium; RV, right ventricle (figure courtesy of Vrushali Ponde).

Figure 9. Position of the patient and probe for subcostal four-chamber view (figure courtesy of Vrushali Ponde).

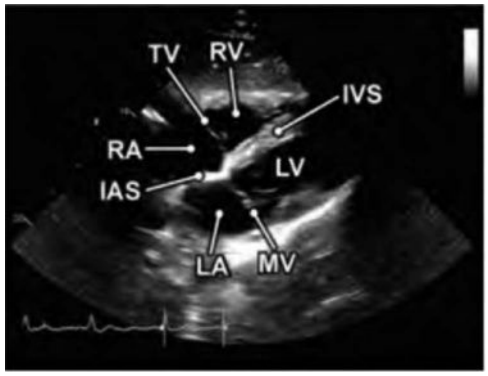

Figure 10. Ultrasound image of the subcostal four-chamber view of the focused cardiac ultrasound (FOCUS) examination. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle; IAS, interatrial septum; IVS, intraventricular septum; TV, tricuspid valve; MV, mitral valve (figure courtesy of Elaina Lin).

5. Subcostal IVC view:
   - Patient position: Supine.
   - Probe position: Below the xiphoid, angled cranially (Figure 11).
   - Orientation marker: Toward the head.
   - Sonoanatomy: Visualizes the IVC entering the RA (Figure 12).

Figure 11. Position of the patient and patient for subcostal inferior vena cava (IVC) view of the focused cardiac ultrasound (FOCUS) examination (figure courtesy of Vrushali Ponde).

Figure 12. Ultrasound image of the subcostal view of the IVC in the focused cardiac ultrasound (FOCUS) examination. IVC, inferior vena cava; RA, right atrium.

- Clinical relevance: Determines volume status and fluid responsiveness by evaluating IVC collapsibility with respiratory variation.

Limitations

FOCUS is not designed to diagnose complex congenital heart defects or replace comprehensive echocardiography. Its value lies in rapid, actionable assessments for perioperative and emergency management.

LUNG

Lung ultrasound offers clinicians real-time bedside imaging to evaluate respiratory function and inform management strategies. The real-time visualization is particularly advantageous in paediatrics, where respiratory aetiologies often underly emergent presentations.

The following are key clinical questions answered by lung ultrasound:

1. Is there ventilation bilaterally (or unilaterally, if lung isolation required)? Can assist in detecting oesophageal intubation or inadvertent endobronchial intubation (see airway exam below).
2. Is there a pneumothorax? Identify the presence or absence of lung sliding, lung pulse, B lines, or a lung point.
3. Is there a pleural effusion? Evaluate for hypoechoic fluid collections.
4. Is there evidence of interstitial disease? Assess for B lines and evidence of consolidation.

Equipment

- Linear array probes (4-12 MHz) best for superficial structures like pleura.
- Curvilinear probes (3-5 MHz) or phased array (1-8 MHz) better for deeper structures.
- Probe choice depends on the child's size and the depth of the structures being imaged.

Patient position: Supine (for anterior or lateral lung fields); lateral decubitus or prone (for posterior lung fields).

Probe orientation: Longitudinal: perpendicular to the ribs, with the probe marker oriented toward the patient's head. Allows for quick visualization of multiple rib spaces.

Transverse: probe marker placed transversely/obliquely, parallel to the ribs in the intercostal spaces, marker oriented toward the patient's right. Enables increased visualization of pleura and lung parenchyma without rib interruption.

When evaluating for pleural effusions, or consolidation, use a curvilinear probe in the midaxillary line. Find either the liver (right) or spleen (left) and locate the diaphragm. Place the spine in the image. A negative scan lacks a "spine sign" (no spine seen above the diaphragm). Lungs (air) do not transmit ultrasound, so the spine will not be seen above the diaphragm. Fluid is usually black and consolidation typically has a starry sky appearance. A normal exam will also have a curtain sign produced by the lungs and only a small portion of the diaphragm will be visible.

Sonographic Findings[3]

Pleural line: Appears as a bright, shiny line under the ribs.

Lung sliding: Shimmering motion artifact representing normal movement of the opposing visceral and parietal pleura during the respiratory cycle; the presence of either lung sliding, a lung pulse or B lines rules out a pneumothorax.

Seashore sign: Obtained using M mode (motion mode), which shows motion over time along a single vertical line in the B mode (brightness mode) image. You will see a thick bright line, which is the pleura. The chest wall superficial to the pleura is not moving, so it appears as linear horizontal lines indicating lack of motion. Deep to the pleura is the lung parenchyma, which appears grainy because of lung movement. This indicates no pneumothorax. The name implies that the horizontal lines representing the chest wall look like waves that are approaching a sandy shore (the moving lung parenchyma; Figure 13). The advantage of M mode over two-dimensional (2D) imaging is that the frame rate is over 50 times that of 2D. Sometimes it is difficult to see movement on 2D, i.e., lung sliding in a patient with restrictive lung disease or pneumonia. M mode may help clarify because of its improved temporal resolution.

Barcode sign: Also obtained in M mode, the entire image will consist of linear horizontal lines (i.e., no "shore" or lung parenchyma movement), indicating lack of motion in chest wall and lung. This may indicate a pneumothorax, but it can also be seen in any aetiology causing lack of lung tidaling (mainstem intubation, mucous plug, etc; Figure 13).

Lung point: Distinct transitional area between normal lung (lung sliding) and absent lung (no lung sliding). Pathognomonic for pneumothorax.

Lung pulse: Intermittent pulsation of the pleural line (without lung sliding) synchronous with the heartbeat. Rules out pneumothorax.

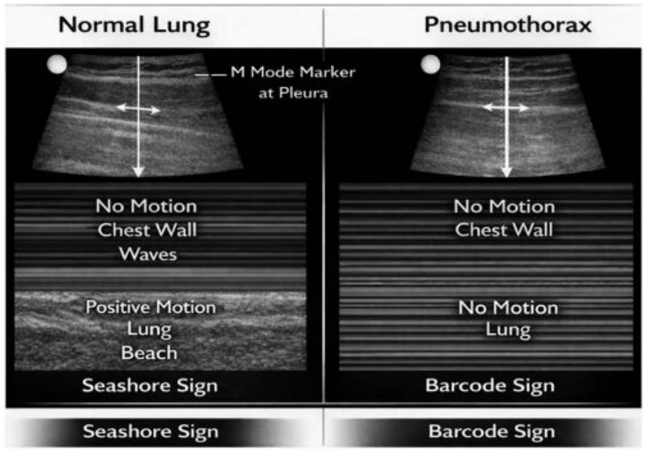

Figure 13. Ultrasound image of the lung for point-of-care ultrasound (POCUS) examination using a linear probe. On the left, the "seashore sign" is demonstrated, in which the chest wall is represented by horizontal lines, and the lung parenchyma is grainy, indicating movement of the lung parenchyma. On the right, the image consists entirely of horizontal lines, indicating no movement of the lung parenchyma (figure courtesy of Serpil Ozgen).

A lines: Appear as bright horizontal lines that appear at regular intervals below the pleural line. They are a reverberation artifact, created when the ultrasound beam bounces between the pleural line and the air-filled alveoli. A normal finding, suggesting normal air-filled alveoli and no significant consolidation. Visible in the presence of a pneumothorax (Figure 14).

B lines: Vertical lines starting from the pleural line and extending to the bottom of the screen, often referred to as "comet tails." This is an artifact caused by thickened interlobar septa due to fluid, commonly associated with conditions like pulmonary oedema, pneumonia, or interstitial disease. One or two B lines per rib space are a normal finding, especially in dependent regions of lung. Numerous B lines or coalescing B lines indicate pulmonary oedema, with more B lines correlating with more oedema. Serial ultrasound exams can be performed during diuresis or fluid administration to guide management (Figure 15).

Pleural effusion: Hypoechoic area (fluid collection) between visceral and parietal pleura. Effusions usually collect in dependent regions (Figure 16).

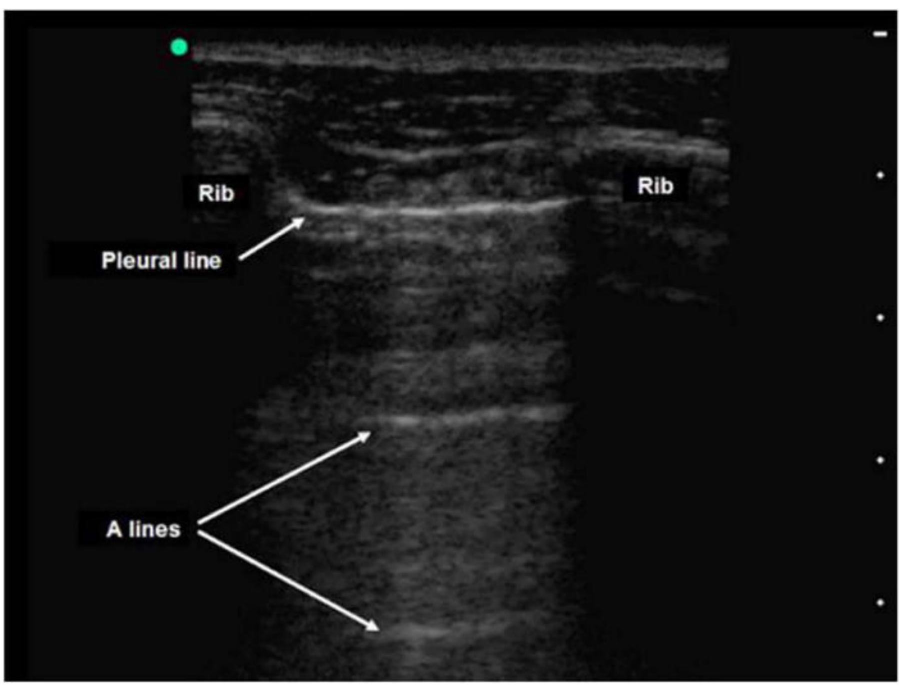

Figure 14. An ultrasound image of the thorax using a linear probe. The pleural line below ribs. Note the shadowing directly under the ribs as ultrasound beams do not penetrate bone. A lines: Horizontal bright lines at equidistant intervals below the pleural line. This is a normal finding in lung ultrasound (figure courtesy of Elaina Lin).

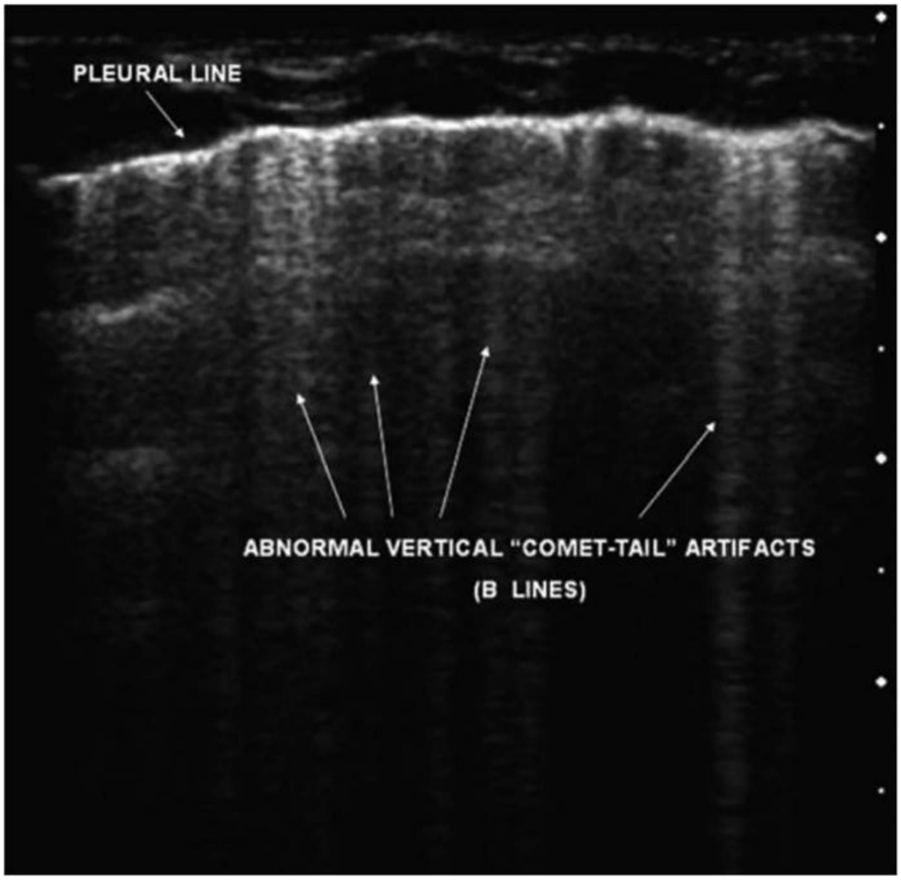

Figure 15. An ultrasound image of the thorax using a linear probe. The B lines are vertical bright lines that extend from the pleural line down to the bottom of the screen, indicating interstitial fluid in the lung (figure courtesy of Serpil Ozgen).

Spine sign: Visualization of the thoracic vertebral bodies during anterior thoracic ultrasound with the probe oriented longitudinally in the dependent region of the thorax. The thoracic bodies are obscured in the absence of pathology because the ultrasound beam does not penetrate the air-filled lung. Seeing the thoracic bodies is indicative of fluid (effusion, haemothorax, consolidation) enhancing the ultrasound waves, allowing for deeper penetration to visualize the spine.

The comprehensive lung ultrasound exam involves scanning following a systematic approach: bilaterally in the anterior, lateral, posterior lung fields, and costophrenic angles, with the lung divided into zones (upper, middle, and lower lobes). An abbreviated exam is often used in the perioperative period, focusing on the clinician's biggest concern (for example, to rule out pneumothorax in the right lung after right-sided central line placement; Figures 17 and 18). Lung ultrasound is more sensitive than chest x-ray for

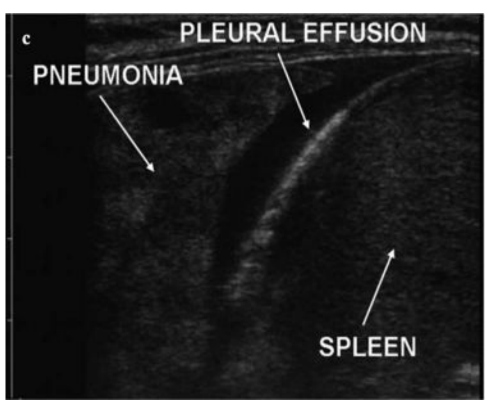

Figure 16. An ultrasound image of the thorax using a linear probe. A hypoechoic collection indicates pleural effusion at the left costophrenic angle. Consolidation is also seen in the lung parenchyma (figure courtesy of Serpil Ozgen).

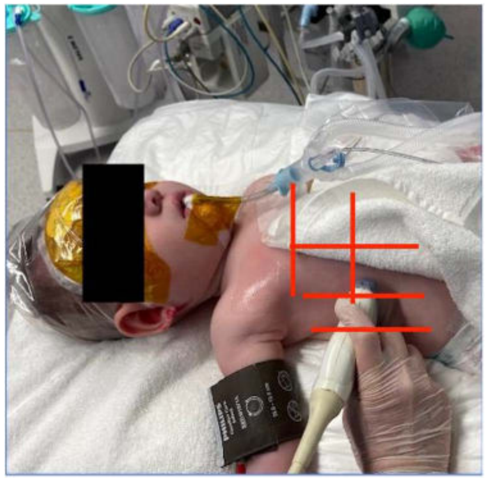

Figure 17. An ultrasound examination of the lateral lung field with a linear probe oriented transversely (figure courtesy of Serpil Ozgen).

Figure 18. An ultrasound examination of the posterior long field with a linear probe oriented transversely (figure courtesy of Serpil Ozgen).

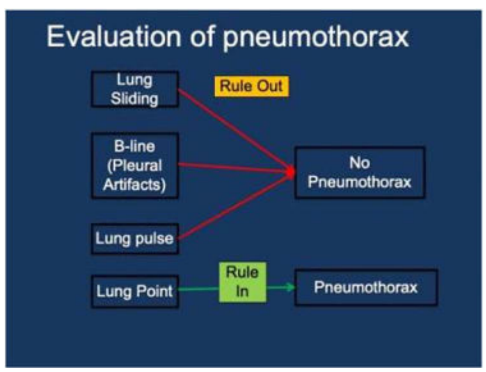

Figure 19. Particular sonographic findings during a lung ultrasound can help to diagnose or rule out a pneumothorax (figure originally created).

identification of pneumothorax[4] and is generally quicker to obtain than x-ray or computed tomography (CT) in the operating room (Figure 19). It is easier to rule out a pneumothorax than to rule it in.

AIRWAY

Airway ultrasound remains underused in children. It is an excellent tool for confirming tracheal intubation and bilateral pulmonary ventilation, reducing the need for a chest radiograph and decreasing radiation exposure. It also serves as a tool for predicting the correct endotracheal tube size, locating the cricothyroid membrane for potential surgical airway access, and predicting a difficult airway through submental and subglottic evaluations.[5]

Equipment: High frequency linear probe.

Patient position: Supine.

Probe orientation: Transverse or longitudinal at midneck (Figures 20 and 21).

Sonoanatomy: Scanning in transverse view offers a good cross-section of the airway. At the level of the glottis, the thyroid cartilage (hypoechoic inverted V-shaped structure), true vocal cords (hyperechoic), false vocal cords (hyperechoic), and arytenoid cartilage (hypoechoic) are seen (Figure 22). In the subglottic region, cricoid cartilage (hyperechoic), tracheal rings (hyperechoic rim), and oesophagus (may be difficult to visualize if collapsed but easily seen if tube occupying the space) are visualized (Figures 23 and 24). Longitudinal view of the airway is helpful for identifying cricothyroid membrane (hyperechoic line between cricoid cartilage and thyroid cartilage) and intertracheal ring spaces (Figure 25).

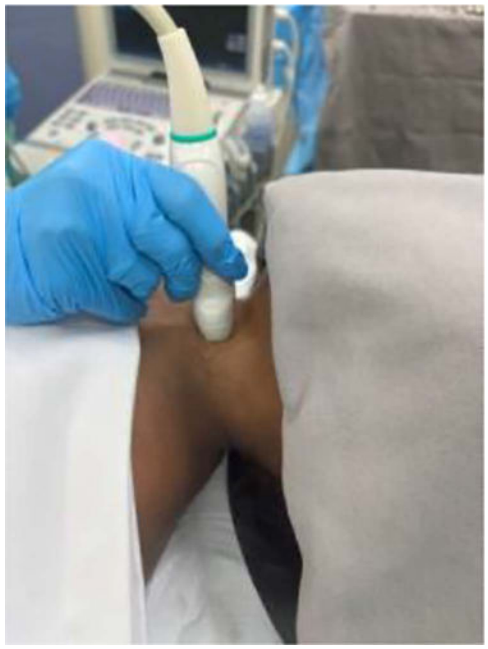

Figure 20. An airway ultrasound examination in the transverse position. The linear probe is positioned over the extended neck, aligned at the top of the thyroid cartilage (figure courtesy of Vinícius Quintao).

Figure 21. An airway ultrasound examination in the longitudinal view. After identifying the thyroid and cricoid cartilages, rotate the ultrasound probe 90° (probe oriented cranial-caudal) to obtain a longitudinal view of the airway anatomy (figure courtesy of Vinícius Quintao).

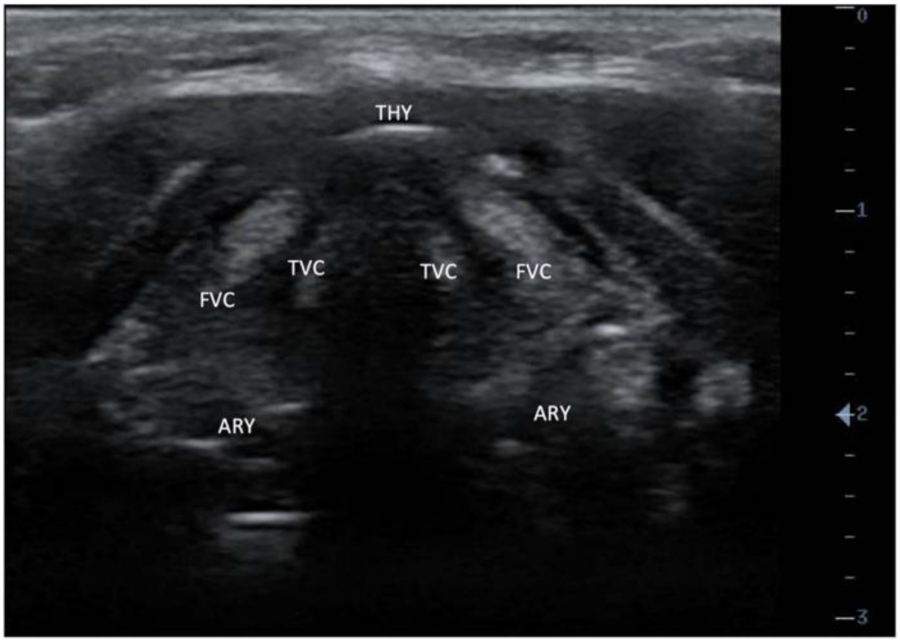

Figure 22. Ultrasound anatomy of the glottis in a transverse view. THY, thyroid cartilage; FVC, false vocal cords; TVC, true vocal cords; ARY, arytenoid cartilage (figure courtesy of Vinícius Quintao).

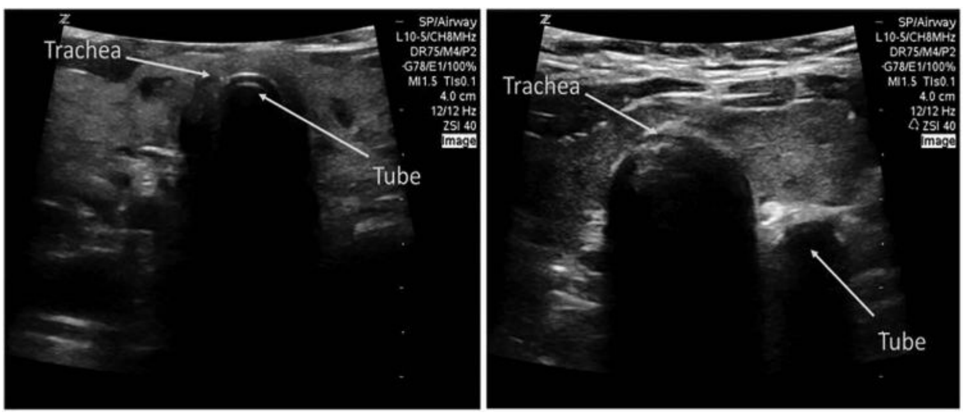

Figure 23. Ultrasound image of an airway using a linear probe to confirm proper placement of an endotracheal tube. The left panel shows the tracheal wall, and the rim of the endotracheal tube is the hyperechoic line just posterior to the tracheal wall. On the right, the wall of the trachea is shown, and another air-filled structure is next to it (note the shadowing), which is an endotracheal tube in the oesophagus; this is referred to as the "double-tract" sign (figure courtesy of Elaina Lin).

Confirmation of Tracheal Intubation and Bilateral Pulmonary Ventilation

Ultrasound can rapidly confirm endotracheal versus oesophageal intubation and is especially helpful in low cardiac output states where end-tidal carbon dioxide detection may not be reliable. With endotracheal intubation, there is 1 air-filled structure in the neck. With oesophageal intubation, there are 2 air-filled structures in the neck ("double-tract" sign; Figure 23). Bilateral lung ventilation can be confirmed by the presence of lung slide bilaterally.

Prediction of correct endotracheal tube size: The correct size can be predicted by measuring the diameter at the narrowest part of the subglottic region (Figure 24).[6] Ensure the outer diameter of the endotracheal tube is smaller than the smallest measured airway diameter.

Locating the cricothyroid membrane: Ultrasound can be used to identify the cricothyroid membrane for external airway access when palpation is challenging. Ultrasound can also visualize tracheal rings, aiding surgeons during tracheostomy.[5] Cricothyroidotomy is generally considered in children over 5 years old, as the smaller membrane size in younger children precludes airway placement. To locate the cricothyroid membrane, the probe is placed longitudinally (Figure 21), identifying the thyroid cartilage and cricoid cartilage. The cricothyroid membrane appears as a hyperechoic horizontal line between these cartilages (Figure 25).

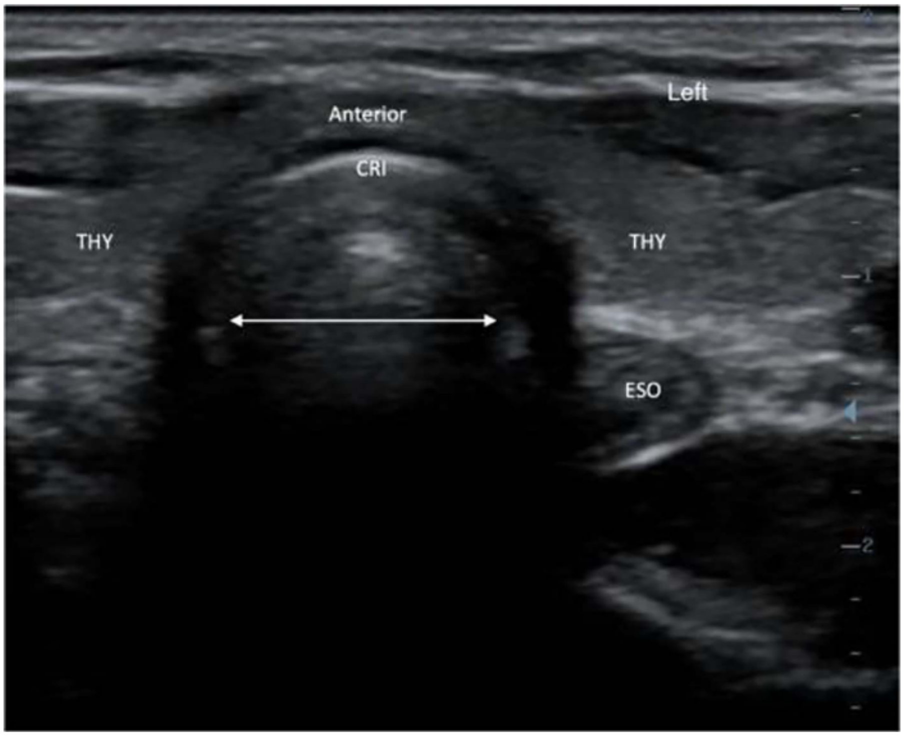

Figure 24. Ultrasound image of the airway using a linear probe showing the anatomy of the subglottic region. The arrows indicate the diameter of the subglottic area, which can be used to estimate the external diameter of the appropriate tube size. CRI, cricoid cartilage; THY, thyroid; ESO, oesophagus (figure courtesy of Vinícius Quintao).

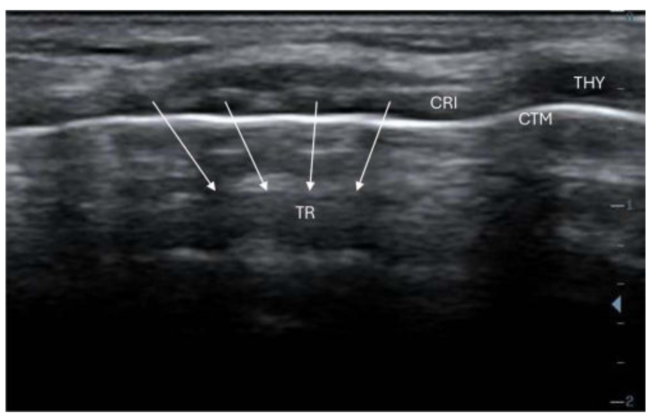

Figure 25. Ultrasound anatomy of the longitudinal view of the airway. TR, tracheal rings; CRI, cricoid cartilage; CTM, cricothyroid membrane; THY, thyroid cartilage (figure courtesy of Vinícius Quintao).

Prediction of difficult airway: In contrast with adults, evidence for using ultrasound to predict difficult airways in children is scarce. In children, difficulty visualizing the submental region and distance from skin to epiglottis >1.5 cm may indicate a higher likelihood of difficult airway, but further studies are needed.[5,7]

ABDOMEN

Gastric Ultrasound

Gastric ultrasound allows clinicians to identify gastric contents and is especially useful in patients with unknown or questionable fasting times or known delayed emptying. Antral cross-sectional area has been validated to predict gastric volume and content in both adult and paediatric populations. The use of gastric POCUS should not supersede standard fasting guidelines.

Grade	Characteristics	Gastric Volume
0	Empty antrum in supine and RLD position	Negligible
1	Clear fluid in RLD but not in supine position	<1.5 mL/kg
2	Visible clear fluid in both supine and RLD positions.	>1.5 mL/kg

Table. Qualitative Grading System of Gastric Contents During Abdominal Point-of-Care Ultrasound Exam[a]. RLD, right lateral decubitus; [a] A higher number indicates an increased risk of aspiration during general anaesthesia

A 3-point grading system can be used to qualitatively assess aspiration risk (Table).[8] To determine if a clear liquid volume is high risk, measure the cross-sectional area of the antrum to estimate the volume. A volume >1.5 cc/kg is considered high risk for aspiration. Gastric ultrasound has also been used for confirmation of gastric tube placement. It has 98% sensitivity in detecting proper placement.[9] This may be beneficial in reducing x-ray exposure.

Equipment: Low-frequency curvilinear probe in most patients, high-frequency linear probe may be used in smaller children (<20 kg).

Patient position: Most accurate in right lateral decubitus (causes gastric contents to collect in antrum by gravity, increasing the sensitivity of gastric ultrasound).

Probe orientation: Parasagittal plane with probe indicator to head.

Sonoanatomy: Antrum is located to the left of the liver. Initial assessment is qualitative. Empty stomach (low aspiration risk) will have small antrum with nothing appreciable inside. Clear liquids appear hypoechoic inside antrum. Solids or particulate liquids (high aspiration risk) will appear as hyperechoic or mixed echogenicity (Figure 26).

FAST Exam

The Focused Assessment with Sonography for Trauma (FAST) exam was developed initially in adults to evaluate for pleural effusions, free fluid in the right upper quadrant, left upper quadrant, pelvic, and subxiphoid (pericardiac) regions and guide surgical decision making. However, in children, the test characteristics of the FAST exam have variable reliability and accuracy for identifying intraabdominal injury compared with CT,[10] and its use remains controversial.

Feeding Tolerance and Necrotizing Enterocolitis

Abdominal POCUS can help guide management and monitoring of enteral feeding, by using ultrasound meal accommodation tests to predict feeding intolerance and by evaluating treatment response through analysis of gastrointestinal dynamics such as gastrointestinal diameter, mucosal thickness, peristalsis, gastric residual volume, and blood flow.[11] It can help guide peritoneal drainage or aspiration of peritoneal fluid. Ultrasound may also be a useful adjunct in detecting changes consistent with necrotizing enterocolitis when radiographic evidence is inconclusive by identifying portal venous gas or pneumatosis intestinalis.[12]

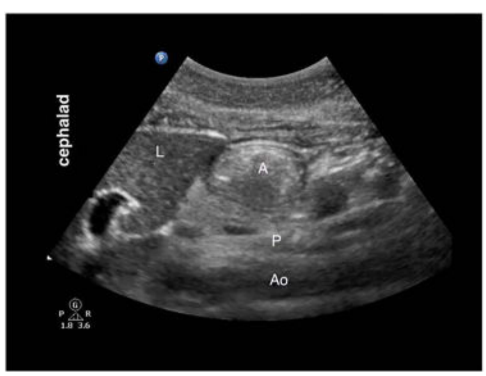

Figure 26. Ultrasound image of an abdominal examination evaluating gastric contents. L, liver; A, antrum; P, pancreas; Ao, aorta; note hyperechoic contents inside antrum, indicating solid contents (figure courtesy of Elaina Lin).

TRAINING AND COMPETENCY

POCUS training in many anaesthesia residency programs has become nearly ubiquitous. The American Board of Anaesthesiology has recognized POCUS's importance and incorporated transthoracic echocardiography, lung ultrasound, and gastric ultrasound into the board certification exam. However, robust training in residency has not correlated with continued training in paediatric anaesthesia fellowships and routine use by practicing paediatric anaesthesiologists. A recent survey of Accreditation Council for Graduate Medical Education accredited paediatric anaesthesia fellowship programs showed that less than half have established POCUS training.[13]

In the United States, no formal system for credentialing in paediatric anaesthesia for POCUS exists, though several individual institutions developed pathways to do so.[14] One of the limiting factors to developing wide-sweeping credentialing programs is a lack of consensus guidelines for use in paediatric anaesthesia. Future research is needed to identify and advise use of paediatric POCUS in the operating room with systematic image review, quality assurance, and credentialing as top priorities.[14]

BENEFITS AND CHALLENGES

POCUS in paediatric anaesthesia is highly valuable and allows for dynamic, repeated exams in the operating room to help guide evolving clinical diagnoses. In paediatrics, however, some of this ability to perform exams may be limited due to small patient size and available surface area for probe contact during surgery. Paediatric patients also have a higher likelihood of having congenital pathology not previously identified, have different procedural considerations when using ultrasound, and have important anatomical differences sonographically in small children compared to adults.

SUMMARY

POCUS allows practitioners to quickly visualize cardiac, lung, airway, and abdomen at the bedside and make a diagnosis that will guide clinical management in the perioperative period.

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