

Point-of-Care Cardiac Ultrasound on a Very Small Infant

Karen R. Boretsky, M.D., Prabhakar Devavaram, M.D.



Transthoracic focused cardiac ultrasound imaging in the operating room is typically performed using phased array transducers.^{1,2} We present the portable ultrasound imaging of a 1.1-kg neonate in a short-axis parasternal view to demonstrate curvilinear transducer use for parasternal imaging, which provided clear structure resolution (*left*) and excessive artifact in near-field targets using a typical phased array transducer (*right*). The heart structure including the right (RV) and left ventricle (LV) is clear on the left (54 × 10 mm curvilinear transducer [2 to 9 MHz]), whereas the speckle artifact rendered the right image (26 × 20 mm phased array transducer [1 to 5 MHz]) uninterpretable.³

Focused cardiac ultrasound imaging provides information for the management of critical situations in children and adults.^{1,2} In most operating rooms, a single phased array transducer is available for focused cardiac ultrasound imaging.^{1,2} Phased array transducers are small-footprint (2.0 to 2.6 cm), low-frequency (1 to 5 MHz) transducers for deep imaging (greater than 6 cm) through narrow rib spaces. Low-frequency curvilinear transducers (1 to 9 MHz) have large footprints (5.4 to 8 cm) and are not considered suitable for imaging between ribs.²

The infant's superficial targets and small size create imaging challenges owing to interference of returning wave scatter noise (speckle artifact) prominent in the near field³ and narrow rib spaces. Curvilinear transducer for imaging

infants in subcostal windows when a phased array is unavailable is reported.² In this case, the phased array was available but produced poor images. The lack of infant rib ossification creates an acoustic window for curvilinear imaging. Although both the convex and phased array transducers are considered low frequency, this convex transducer oscillates at slightly higher frequencies and provided better near-field resolution in this infant.

Competing Interests

The authors declare no competing interests.

Correspondence

Address correspondence to Dr. Boretsky: Karen.boretsky@childrens.harvard.edu

References

1. Zimmerman JM, Coker BJ: The nuts and bolts of performing focused cardiovascular ultrasound (FoCUS). *Anesth Analg* 2017; 124:753–60
2. Boretsky KR, Kantor DB, DiNardo JA, Oren-Grinberg A: Focused cardiac ultrasound in the pediatric perioperative setting. *Anesth Analg* 2019; 129:925–32
3. Kremkau FW, Taylor KJ: Artifacts in ultrasound imaging. *J Ultrasound Med* 1986; 5:227–37

Published online first on March 31, 2021. From the Department of Anesthesiology, Critical Care and Pain Medicine, Boston Children's Hospital, Boston, Massachusetts.

Copyright © 2021, the American Society of Anesthesiologists. All Rights Reserved. *Anesthesiology* 2021; 135:151. DOI: 10.1097/ALN.0000000000003769