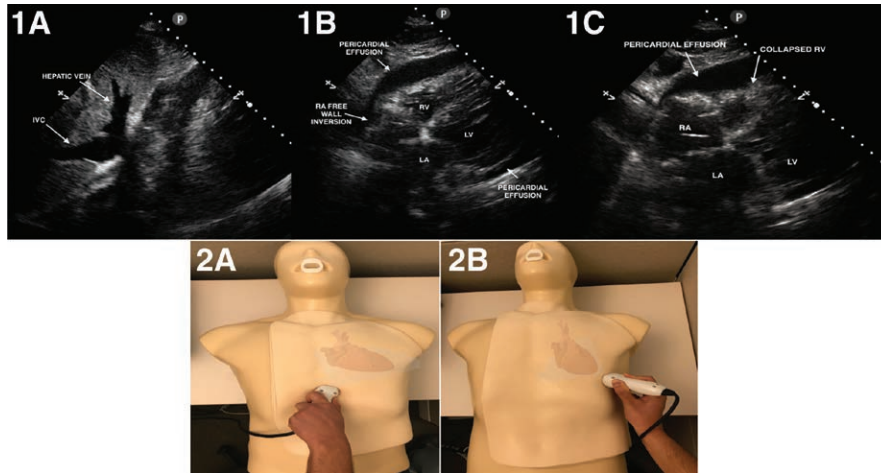


Images in Anesthesiology: Early Identification of Tamponade Using Focused Cardiac Ultrasound

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CARDIAC tamponade can be difficult to diagnose because clinical and electrocardiogram findings have low sensitivity and specificity. Intubation and positive pressure ventilation during unrecognized tamponade can lead to hemodynamic instability from decreased venous return and increased right ventricular afterload, compromising right ventricular stroke volume. Focused cardiac ultrasound can rapidly demonstrate sensitive and specific findings of tamponade.¹ The increased availability, nonin-

vasiveness, portability, and rapid acquisition of images have made focused cardiac ultrasound an indispensable perioperative tool.^{2,3}

These focused cardiac ultrasound images demonstrate pericardial tamponade in an adult patient with progressive respiratory distress one week after cardiac surgery. The subcostal four-chamber view revealed a pleothoric inferior vena cava (IVC; fig. 1A), circumferential fluid (fig. 1, B and C), late diastolic inversion of the right atrial (RA) free wall (fig. 1B), right ventricular (RV) diastolic collapse (fig. 1C), and a “swinging heart,” which describes cardiac chambers floating within the pericardial space in a phasic manner (LA = left atrium; LV = left ventricle; x = probe orientation marker), (Supplemental Digital Content, <http://links.lww.com/ALN/B730>). Given echocardiographic evidence, it is often prudent to perform emergent pericardiocentesis before induction of anesthesia, tracheal intubation, and positive pressure ventilation to avoid cardiorespiratory morbidity.

Echocardiographic findings consistent with tamponade can be quickly obtained in the subcostal four-chamber view, which is achieved by placing the phased array probe under the xyphoid process, orienting toward the sternum (fig. 2A). The apical four-chamber view, with the phased array probe located at the apex of the left ventricle (apical impulse), orienting toward the right shoulder, may also show these findings but cannot visualize the inferior vena cava (fig. 2B).

Competing Interests

The authors declare no competing interests.

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References

1. Spencer KT, Kimura BJ, Korcarz CE, Pellikka PA, Rahko PS, Siegel RJ: Focused cardiac ultrasound: Recommendations from the American Society of Echocardiography. *J Am Soc Echocardiogr* 2013; 26:567–81
2. Canty DJ, Roysse CF, Kilpatrick D, Bowman L, Roysse AG: The impact of focused transthoracic echocardiography in the pre-operative clinic. *Anaesthesia* 2012; 67:618–25
3. Kratz T, Steinfeldt T, Exner M, Dell Orto MC, Timmesfeld N, Kratz C, Skrodzki M, Wulf H, Zoremba M: Impact of focused intraoperative transthoracic echocardiography by anesthesiologists on management in hemodynamically unstable high-risk noncardiac surgery patients. *J Cardiothorac Vasc Anesth* 2017; 31:602–9

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