

Well-designed trials on TEE monitoring in the ICU: The time has arrived

Sir,

The use of echocardiography has become an important tool in critical care. For critically ill patients, several reports have shown that transesophageal echocardiography (TEE) is a useful and safe procedure.^[1,2] Using a case example, we illustrate the need for the design of clinical trials to assess clinical outcomes of TEE monitoring in the intensive care unit (ICU).

We present a case of a 27 year-old female, who was transferred to our institution with acute hepatic failure and circulatory shock, requiring vasopressor support. Workup at our institution was negative for common causes of liver failure, such as acetaminophen toxicity. Over the next day, her clinical status worsened, she required tracheal intubation, and she was urgently listed for liver transplantation. Because the etiology of her shock was not clear, a TEE examination was performed, and poor right ventricular function was confirmed; additionally, a large 3 cm clot was observed at the junction of the superior vena cava and right atrium [Figure 1]. A heparin infusion was initiated, vasopressor therapy was adjusted (milrinone, epinephrine, and nitric oxide were added), and the probe was left in place (with the machine disconnected during exams) to monitor hemodynamic improvement. At 48 h after initiation of therapy, the patient's hemodynamics improved, vasopressors were weaned off, liver function improved, the cardiac thrombus had decreased in size, and the patient was taken off of the transplant list. At this

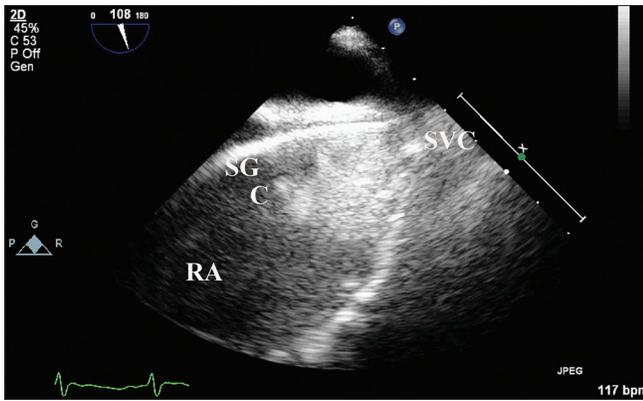


Figure 1: Transesophageal echocardiography (TEE) image (midesophageal bicaval view), demonstrating a thrombus adherent to the superior vena cava and entering the right atrium. SG = Swan-Ganz catheter, C = clot, RA = right atrium, SVC = superior vena cava

point, the TEE probe was removed, and the patient's trachea was extubated 2 days later, with intact mental status and improving organ parameters. Based on laboratory testing for antiphospholipid antibodies during admission, her case was likely due to catastrophic antiphospholipid antibody syndrome and complicated by congestive hepatopathy; she was subsequently placed on lifelong anticoagulation.

Our case represents only one of the variety of possible clinical situations where TEE in the ICU may be of benefit. With the advent of smaller, and sometimes disposable, TEE probes, the use of continuous TEE monitoring may increase in the ICU.^[3] While the safety of TEE monitoring has been established, demonstrating minimal complications in a large case series,^[4] the effectiveness of TEE is also being demonstrated, emphasizing superior diagnostic capability, and improved management of hemodynamics.^[3,5] Thus, TEE has emerged as both a diagnostic and therapeutic aid in the ICU.^[6,7]

While improved diagnostic capability and altered therapeutic management have been established, improved patient outcomes with a TEE-guided approach have not been studied. Further research at this point should shift away from assessing surrogate outcomes (i.e., change in therapeutic management) to assessing true patient outcomes (i.e., mortality). The time is now to perform high-quality clinical trials of TEE monitoring to assess the next important step: improvement in patient outcomes on a large scale.

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