



FIGURE 1. Should surgeons toe the line and place central lines in pediatric heart surgery?

be less expensive and associated with fewer complications, this would prove its superiority to a PICC and suggest that it is time for surgeons to toe the line (Figure 1) and place more central lines at the time of surgery.

We cannot forget the importance of PICC lines in the group of patients who require central access before surgery. The comparison of the safety profiles of the TBC and PICC would be useful in determining whether an already existing PICC should be traded out for a TBC if and when the patient goes to the operating room. Regardless, providers will appreciate the effort by surgeons to seek alternative methods of safe, reliable access for a high-risk patient population to improve the ability to deliver efficient, optimal care throughout the hospital stay.

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Commentary:
Transdiaphragmatic tunneled Broviac catheters: How small ripples can make big waves

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Ghani and colleagues¹ describe a retrospective cost analysis comparing a novel technique of transdiaphragmatic tunneled Broviac catheter (TBC) placement into the right atrium (RA) compared with traditional percutaneous indwelling central catheter (PICC) placement in infants undergoing congenital



The ripple effect.

CENTRAL MESSAGE

Transdiaphragmatic tunneled Broviac catheters provide a cost-effective, reliable, and durable method for perioperative central venous access during pediatric cardiac surgery.

heart surgery. In their study, they propensity matched the patients with and without TBCs to compare the costs of the TBC and non-TBC perioperative line strategies. Eighty-three patients received TBC and 137 did not receive TBC, and the final propensity-matched cohort included 82 patients in each group. Their primary outcome was that use of the TBC led to approximately \$1000 in cost savings as a result of decreased use of PICC lines in this group. What they fail

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to highlight or mention are the other, more significant benefits observed with the implementation of tunneled right atrial catheters.

In addition to cost savings, the utilization of right atrial TBCs can be instrumental in minimizing morbidity whenever the anticipated need for intravenous access is prolonged and where the risk of venous thrombosis from PICC lines has drastic long-term consequences; for example, limiting or compromising stage 2 single ventricle palliation.² Further, reliable central venous access is invaluable during the management of postoperative complications following stage 1 single ventricle palliation. Postoperative chylothorax or necrotizing enterocolitis requires access for blood drawing and total parenteral nutrition. When managing unanticipated adverse events, reliable access can reduce the incidence of in-hospital failure to rescue of postoperative cardiorespiratory arrest, shunt-related complications, sepsis, and arrhythmias.

Unlike the Ghani and colleagues,¹ other centers (including ours) insert dual lumen TBCs directly into the right atrial appendage. Typically, they are inserted selectively following complex neonatal repair in patients who have an anticipated prolonged hospital length of stay. In comparison, Ghani and colleagues¹ use the TBC in a more routine-risk patient population younger than age 1 year who predictably have shorter hospital stays and typically do as well with standard central venous lines. Although the authors clearly demonstrate a cost benefit, the comparison groups have varied diagnoses and the

heterogeneity of the study population makes meaningful comparisons difficult. Another drawback to their approach is the constraint observed with a single lumen central line that limits the use of certain medications due to drug compatibility issues.

Despite these shortcomings, the novel transdiaphragmatic technique described has several advantages over PICC lines and even standard RA TBCs. RA TBCs have the potential to result in pericardial tamponade during withdrawal. They are therefore best removed in an intensive care unit setting with echocardiographic surveillance. The TBCs on the other hand are inserted by tunneling the catheter through the subpericardial diaphragm into the inferior vena cava and then the RA. They can therefore be removed in the non-ICU setting as the transdiaphragmatic pathway negates the risk of intrapericardial bleeding. Ghani and colleagues¹ therefore present a novel technique for RA TBC insertion and demonstrates how instituting small changes can translate into significant benefits to our children with congenital heart disease.

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