See Article page 2198.

Commentary: Challenging paradigms

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Few targets in congenital heart surgery are as tempting to tackle as pulmonary vein stenosis (PVS)—a dismal disease in its progressive form with 1-year survival of 50% to 70%. More than 20 years ago, the sutureless repair was brought forward as a potential surgical solution to a vexing clinical problem. As with most innovations, the sutureless repair went through 3 well-described phases of innovation (the Gartner hype cycle)¹:

1. Enthusiastic early adoption culminating in a “peak of inflated expectations.”
2. Descent into the “trough of disillusionment.”
3. Ascendancy to the “niche phase,” where the innovation is found to be effective.

Recent data suggest that the sutureless technique is now approaching a “niche phase,” with evidence supporting efficacy in postrepair PVS, mixed total anomalous pulmonary venous drainage, and patients with small or irregular morphology of the pulmonary venous confluence.²

In this issue of the *Journal*, Feins and colleagues³ report on a new surgical paradigm for PVS with patch augmentation of the pulmonary veins (“anatomically focused repair”), with impressive outcomes in comparison with the sutureless repair. It is important to note that the authors have adopted this surgical approach within a framework of a well-organized team with aggressive postoperative catheter-based reinterventions, promising medical therapies, and chemotherapeutic trials. Although an era effect is tested in the statistical analysis, it is undeniable that care is improving in the more recent era in most major centers with adoption of multidisciplinary team-based management. We are all getting better at treating PVS.

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Pulmonary vein stenosis remains a major unsolved problem in congenital heart surgery.

CENTRAL MESSAGE

Surgical management of pulmonary vein stenosis has been dominated by the sutureless technique for twenty years. Feins and colleagues report a new approach to challenge the paradigm.

Along with an innovation, one commonly seeks an explanation for why the innovation might be effective. When the sutureless repair was introduced, a commonly cited mechanism for efficacy was based on minimizing contact with the pulmonary veins to prevent endothelial injury and consequent postoperative inflammatory processes leading to restenosis (hence the moniker “the no-touch technique”). Although hard to prove, I doubt that the “no-touch” concept prevents recurrent PVS—and believe that the value of the sutureless technique lies in the fact that the divided pulmonary veins are NOT sutured and therefore entirely free to conform to local blood flow patterns and thereby minimize the flow disturbances that may mediate restenosis...hard to prove.

At present, Feins and colleagues³ postulate that minimizing pulmonary vein angulation is the mechanism whereby the anatomically-focused repair strategy gains efficacy. Unfortunately, the authors have not yet amassed enough data to demonstrate that this association exists. The concept sounds reasonable and will be attractive if ultimately found to be true. Again, it is hard to prove that an innovation works—and even harder to prove why it works.

If the anatomically focused repair follows the common pattern of innovation adoption, it will move through the 3 stages of the Gartner hype cycle. Nevertheless, anybody who routinely cares for patients with PVS will welcome a new tool in our armamentarium. In the meantime, we should applaud the authors for challenging a paradigm with interesting data and advocating for a better way to care for patients with PVS.

Time will (always) tell.

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