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Commentary: One rose does not make a bouquet

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Despite the advances in its surgical and medical management, infective endocarditis is a serious condition that has been associated with a reported 20% to 22% operative mortality rate.¹ The surgical management of endocarditis generally entails a radical debridement in which all the necrotic tissue is removed.² After radical resection, the task of reconstructing the aortic root, left ventricular outflow tract (LVOT), and intervalvular fibrous triangle challenges the creativity and technical skills of any surgeon treating these complicated cases.

In this issue of the *Journal*, Hiremath and Bhatnagar³ describe treating extensive infective endocarditis in a young patient. The authors used a technique of aortic root implantation in which a porcine bioprosthetic root was inverted within the LVOT to facilitate the anastomosis. Inversion as an operative technique was first described by Svensson⁴; by inverting Borst's classic elephant trunk, Svensson simplified and facilitated the distal anastomosis during extensive total arch replacement. The principles of Svensson's inversion approach were then adapted by others to facilitate complex LVOT reconstructions. Sponga and colleagues⁵ reported using an inversion technique with a pliable, rapid-deployment, stentless bioprosthesis in 40 patients undergoing repair for extensive destructive endocarditis. The technique produced excellent results and, apparently, simplified the implantation process.

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CENTRAL MESSAGE

Infection dictates a bold approach. Is an inversion approach useful in extensive aortic root reconstruction?

We agree with Hiremath and Bhatnagar³ that the ability to perform a proximal anastomosis with clear view of the suture line is extremely important, especially in procedures like redo root and reconstruction of a small root, and in scenarios in which because of a lack of annular tissue, suturing exerts tension on the annulus by working the needle at a nonperpendicular angle, potentially leading to suture-line bleeding or to left ventricular-aortic discontinuity. Since its approval for clinical use in North America, the stentless porcine bioprosthetic root has been proved to be extremely versatile. Whereas homografts (the gold standard in repair of infective endocarditis) have limited availability, the porcine bioroot is widely available and comes in several sizes up to 29 mm. It can be implanted as a full root, subcoronary valve, or modified subcoronary valve, all of which have excellent hemodynamic performance. Furthermore, as a tissue-based option, porcine bioroots are resistant to infection and tend to have significantly less progressive aortic valve dysfunction over time—and thus, less risk that redo operation will be needed.⁶ Overall, late survival rates are similar between homograft and porcine bioroot recipients, although homografts may better reduce the risk of persistent or recurrent infection.⁷

A point of concern with this technique is that with the stentless porcine bioroot, the leaflets are fixed with glutaraldehyde and treated to prevent calcification, which hypothetically stabilizes and stiffens this tissue. It is possible that during the inversion and eversion process, structural damage to the leaflets or the aortic wall of the porcine bioroot can occur. Another concern is that the extensive debridement necessitated by infective endocarditis occasionally results in a large annulus (ie, >29 mm) that might be too large to repair with a stentless porcine bioroot.

It is difficult to answer questions about structural damage with a single case report. And, there remains a need for long-term follow-up of inverted valves and roots. However, if the stentless porcine bioroot does degenerate over time, the aortic valve can be readily replaced by a transcatheter approach. Overall, this technique should be welcome in the armamentarium of any surgeon facing this type of complex reconstruction.

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