Rethinking the gold standard of correction for paravalvular leak: Why correct when you can prevent?

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Clinically significant paravalvular leak (PVL), although uncommon, has been associated with mediocre long-term survival after both aortic and mitral valve replacement. In the past decade, open surgical correction of PVL has been supplanted at many centers by transcatheter device closure as first-line therapy. Although data comparing the 2 techniques are limited, long-term recurrence and survival remain suboptimal in retrospective series, suggesting that there may be better management options.

In this issue of the *Journal*, Vekstein and colleagues¹ report a case of open implantation of vascular plugs to seat a mitral prosthesis in a heavily calcified annulus during aortic and mitral valve replacements in a patient with previous mediastinal radiation. After implantation, the mitral prosthesis was left with a sizeable paravalvular gap in an area of residual confluent annular calcium, which likely would have resulted in significant PVL. Two vascular plugs were inserted under direct vision to seat the valve and fill the gap. Postoperative echocardiogram showed good valvular function with no PVL. Although this technique has been reported for the correction of PVL,² this is the first report of prophylactic use to prevent PVL. But is this better than our current management strategies?

In the largest series of surgical PVL repair to date, Bouhout and colleagues³ looked at 190 patients with a mean follow-up of more than 5 years and found a 30-day mortality of 7% (8% for mitral valve replacement, 3% for aortic valve replacement, and 14% for both), with an 8% reoperation rate for bleeding and a 2% permanent stroke rate. PVL recurrence rates were not insignificant at 3%, 14%, and 32% at 1, 5, and 10 years, respectively, with survival of 85%, 73%, and 56%, respectively. All patients had less than 2+ residual PVL.

In a systematic review of transcatheter treatment of PVL, Cruz-Gonzalez and colleagues⁴ reported a technical success rate (no significant residual PVL) of 77% to 86% and a clinical success rate (reduction of New York Heart Association functional class ≥ 1) of 67% to

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Central Message

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77%, with a hospital mortality of 2.2% and a 2.6% stroke rate. Other complications included vascular injury (2%), cardiac perforation (4%), device embolization (4%), and valvular dysfunction requiring reoperation (0.9%).

The case report by Vekstein and colleagues¹ raises an interesting question: Can we achieve better results preventing PVL than responding to it? Although the benefits of open vascular plug implantation during the incident procedure would theoretically include greater accuracy and success of implantation, avoidance of perioperative hemodynamic derangements associated with postoperative PVL, and avoidance of the risks of subsequent interventions, the hybrid procedure may require significantly longer cardiopulmonary bypass, crossclamp, and total operative times. In addition, the risk of PVL would need to be identified during valve implantation and likely would not be helpful for prevention of late PVL, making its use limited to a highly selected group of patients, such as the one described in the report.

Although unlikely to revolutionize the management of PVL, the technique of open implantation of vascular plugs to seat a valvular prosthesis in a hostile annulus and to prevent PVL should become part of the arsenal of the heart valve team.

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