Leads leading leaflets to leak

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Central Message

When pacemaker lead-related TR requires fixing, it is essential to execute thorough leaflet inspection, systematic valve analysis, and subsequently appropriate repairs.

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Today, approximately 1 million new permanent pacemakers (PPMs) are implanted in patients annually worldwide.¹ Increasing cases of transcatheter aortic valve replacement and the use of rapid deployment valves might augment the number of PPM implantations. Among the broad spectrum of complications involving endocardial PPM implantation, tricuspid regurgitation (TR), which requires surgical intervention, is no longer a rarely encountered complication, because the tricuspid valve (TV) is no longer neglected as it had been before. However, there is a paucity of literature on the subject.

In 1980, Gibson and colleagues² reported the first PPM-induced TV malfunction, and in 2013, Al-Bawardy and colleagues³ published a comprehensive review on TR in patients with PPMs and implantable cardioverter-defibrillators. In that review, the authors summarized that device-related TR was usually due to mechanical (perforation/laceration of leaflets, entrapment of leads resulting in scar tissue, or interference with valve coaptation) or physiologic (asynchronous activation of the right ventricle from apex to base) mechanisms.

In this issue of the *Journal*, Saran and coworkers⁴ have analyzed the results of TV surgeries in the presence of PPMs collected during the past 2 decades at their institution. In this retrospective study, the authors have defined 2 concepts: pacemaker-associated TR (PATR) and pacemaker-induced TR (PITR). In PATR, TR is not directly caused by PPM leads, whereas in PITR it is. According to their definitions, 622 patients were reviewed and 598 were enrolled, 349 in the PATR group and 249 in the PITR group. The most common cause of PATR was functional TR (as expected), and TV repair rate was approximately 62%. The authors classified the mechanisms of PITR into 5 categories: (1) restricted mobility of leaflets, (2) adherent leaflet to lead, (3) leaflet perforation, (4) scarring of leaflets, and (5) chordal entrapment. In general, with the exception of extensively destructed

valve leaflets, the majority of TV lesions are repairable. The fundamental principle of TR repair in PITR (especially in “restricted mobility of leaflets”) is putting aside the lead from the valve leaflets and subvalvular apparatus so that valve motions can be free of impediments. In addition, the lead should not be fastened completely, considering the possibility of its future removal. At the time of the operation, when removing the endocardial lead, epicardial lead implantation also should be taken into account.

As Saran and coworkers⁴ have stated, TV replacement was an independent risk factor for mortality; therefore, we have to do our best to repair the valve. TV leaflets often can be difficult to inspect because of their anterior to posterior facing anatomy; yet, the key to success is thorough inspection of the valve leaflets and the subvalvular apparatus. In the absence of a standardized technique to repair PATR/PITR, further studies are warranted to evaluate the outcomes of corresponding repair techniques.

Currently, left ventricular pacing by lead insertion via coronary sinus is considered feasible and safe after TV surgery.⁵ The recent introduction of “leadless” pacemakers, which are virtually free from lead-related complications, is promising.¹

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