



Editorial

Right Bundle Branch Block Pre-Transcatheter Aortic Valve Replacement: Is a Pacemaker the Answer for Everyone?☆



Lena Rivard, MD, MSc*

Department of Cardiology, Montreal Heart Institute, Université de Montréal, Montreal, Quebec, Canada

Since the first-in-human procedure in 2002, transcatheter aortic valve replacement (TAVR) has become a well-established therapeutic option for severe aortic stenosis, and TAVR volume recently surpassed surgical aortic valve replacement in the United States. Despite improvements in techniques, the rate of conduction disturbances requiring permanent pacemaker (PPM) implantation remains relatively high.¹

Several pre- and peri-procedural risk factors have been described.² Pre-existing right bundle branch block (RBBB) is one of the strongest predictors of high-degree atrioventricular block after TAVR. This risk persists for up to 7 days, with a higher latent risk with self-expanding valves. The reported rate of PPM implantation at 30 days is approximately 40% to 50%.³ A 2020 consensus states that in this population with pre-existing RBBB, it is reasonable to maintain transvenous pacing capability with continuous cardiac monitoring irrespective of new changes in PR or QRS duration for at least 24 hours.⁴

The risk of conduction disturbances occurring at a distance from the TAVR procedure and the reported excess of mortality in patients with RBBB without a pacemaker have led some teams to adopt a more aggressive approach with a systematic preprocedural pacemaker implantation.⁵

On the other hand, PPM implantation is associated with increased risks during long-term follow-up (lead dislodgement or dysfunction, infection, etc.), and this becomes particularly relevant as we are currently expanding TAVR to a younger population.

In this issue of Structural Heart, Zorman et al. describe a cohort of 170 patients with pre-existing RBBB who underwent TAVR at two large UK centers between 2014 and 2022. Of these, 62.5% underwent a prophylactic PPM implantation based on physician preference prior to hospitalization (6 to 65 days) for TAVR.

They were compared to a group of patients who did not undergo prophylactic PPM. Of these, 57.8% required a PPM implantation within 30 days of TAVR. While the majority of PPMs were implanted during the

index hospitalization, 12.5% required an urgent PPM within 30 days of discharge after TAVR. Pacemaker follow-up was available for 79 patients, with 29% requiring less than 1% ventricular pacing and 35% requiring more than 90% ventricular pacing. The authors concluded that the use of prophylactic PPMs in patients with pre-existing RBBB is safe, is associated with a high degree of ventricular pacing and, not surprisingly, correlates with a shorter length of hospital stay after TAVR.

In a recent cohort of 98 patients with RBBB, Schoechlin et al.³ reported that 43.9% required PPM after TAVR. The risk appears to be higher in patients with significant calcifications or first-degree atrioventricular block. Tovia-Brodie et al. reported a single-center prospective cohort of 90 individuals with pre-existing RBBB. Permanent pacemakers were implanted before TAVR in 40 patients at the discretion of the treating physician, while in 50 patients, PPM implantation was performed post-TAVR only in those with a postprocedural indication (complete heart block, second-degree Mobitz type II, or alternating bundle branch block). Among patients without prophylactic PPM, 54% received a PPM prior to hospital discharge. No difference in mortality was observed during 2 years of follow-up.⁶

This study confirms that approximately half of patients with pre-procedure RBBB will require a pacemaker within 30 days of TAVI. Prophylactic implantation reduces the length of stay after TAVR implantation, allows for rapid discharge, and is associated with a high rate of pacing at 1 year. This strategy may be useful for a certain group of elderly patients. With the increase of TAVR indications in a younger population, additional strategies for managing pre-existing RBBB in patients undergoing TAVR are needed to reduce pacemaker implantation rates while maintaining safety.

Funding

The authors have no funding to report.

DOI of original article: <https://doi.org/10.1016/j.shj.2024.100326>.

* Due to administrative issues, both editorials invited and submitted and felt both worthy of publication.

* Address correspondence to: Lena Rivard, MD, MSc, Department of Electrophysiology, Montreal Heart Institute, 5000 Belanger Street, Montreal, Quebec, Canada H1T 1C8.

E-mail address: lena.rivard@icm-mhi.org.

<https://doi.org/10.1016/j.shj.2024.100365>

2474-8706/© 2024 Published by Elsevier Inc. on behalf of Cardiovascular Research Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Disclosure Statement

L. Rivard reports research grants from Bayer Inc, Heart and Stroke Foundation, CIHR (Canadian Institutes of Health Research), and FRQS (Fonds de Recherche Québec-Santé).

References

- 1 Cribier A. Invention and uptake of TAVI over the first 20 years. *Nat Rev Cardiol.* 2022; 19:427-428. <https://doi.org/10.1038/s41569-022-00721-w>
- 2 Siontis GC, Juni P, Pilgrim T, et al. Predictors of permanent pacemaker implantation in patients with severe aortic stenosis undergoing TAVR: a meta-analysis. *J Am Coll Cardiol.* 2014;64:129-140. <https://doi.org/10.1016/j.jacc.2014.04.033>
- 3 Schoechlin S, Eichenlaub M, Muller-Edenborn B, et al. Risk stratification for pacemaker implantation after transcatheter aortic valve implantation in patients with right bundle branch block. *J Clin Med.* 2022;11, 5580. <https://doi.org/10.3390/jcm11195580>
- 4 Lilly SM, Deshmukh AJ, Epstein AE, et al. 2020 ACC expert consensus decision pathway on management of conduction disturbances in patients undergoing transcatheter aortic valve replacement: a report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiol.* 2020;76:2391-2411. <https://doi.org/10.1016/j.jacc.2020.08.050>
- 5 Auffret V, Puri R, Urena M, et al. Conduction disturbances after transcatheter aortic valve replacement: current status and future perspectives. *Circulation.* 2017;136:1049-1069. <https://doi.org/10.1161/CIRCULATIONAHA.117.028352>
- 6 Tovia-Brodie O, Ben-Haim Y, Joffe E, et al. The value of electrophysiologic study in decision-making regarding the need for pacemaker implantation after TAVI. *J Interv Card Electrophysiol.* 2017;48:121-130. <https://doi.org/10.1007/s10840-016-0218-2>