Disclosures: T.F., B.G., and S.P. are the Master Proctors for the Perceval sutureless Bioprosthesis (Livanova Group).

the relationship of the inflow collar to the annulus. If appropriately positioned, there should be no annulus visible above the collar or below the collar, which can be examined through the valve with gentle retraction of the leaflets (Figure 1, C). The specific angular position of the valve holder is derived from an anatomic analysis of the 3 Valsalva sinuses: There is often a significant amount of asymmetry among sinuses, with the noncoronary sinus often occupying a lower position relative to the other leaflets compared with the others. The angle of the valve holder different than that depicted in Figure 1, E and F, may lead to an excessively high location of the prosthesis in the noncoronary sinus with the risk of paravalvular leakage, whereas opposite overcorrection near the right coronary sinus may lead to low implantation in the area and compression of the His bundle.

We believe that, if applied by any surgeon, these techniques can standardize the implantation procedure resulting in reduced postoperative permanent pacemaker implantation rates.

Theodor Fischlein, MD, PhD^a

Borut Gersak, MD, PhD^b

Steffen Pfeiffer, MD, PhD^a

^aDepartment of Cardiac Surgery
Paracelsus Medical University
Nuremberg, Germany

^bUniversity of Ljubljana School of Medicine
Ljubljana, Slovenia

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AVOIDING PACEMAKER IMPLANTATION WITH SUTURELESS VALVES: STAYING "ON PACE" IN THE ERA OF TRANSCATHETER AORTIC VALVE

REPLACEMENT

Reply to the Editor:

Sutureless and rapid-deployment aortic valves are being implanted with increasing frequency in Europe and Asia. A similar pattern is expected to occur in the United States, where regulatory approval was granted recently for the Perceval valve (Livanova Group, Milano, Italy) and is likely to be granted for the Intuity Elite valve (Edwards Lifesciences, Irvine, Calif). Although these valves have been demonstrated to facilitate minimal invasive surgery¹ and may represent a viable alternative to transcatheter aortic valve replacement (TAVR) in non-high-risk patients,² some concern exists regarding their associated pacemaker implantation (PMI) rate. The rate of PMI has been reported to be as high as 17% for these devices,³ although it more typically falls in the range of 4%-7%.^{1,2,4} As a comparison, the rates of PMI for balloon-expandable TAVR were recently reported as 8.5% in intermediate-risk patients (compared with 6.9% for conventional surgical AVR).⁵ The rates of PMI for self-expanding TAVR devices are known to be much greater.

If sutureless/rapid-deployment valves are to be seen as an alternative to TAVR, then the rates of PMI should be lower than that achieved with any TAVR device. Such a goal should be achievable given that sutureless/rapid-deployment valves are deployed under direct surgical vision, resulting in more precise placement with regard to the atrioventricular conduction tissue. Some of the variation in reported PMI rates for sutureless and rapid-deployment valves has been the result of controversial indications for pacemaker therapy (eg, left bundle branch block).³ Although differences in valve design (ie, length of the subannular component, balloon deployment stainless-steel vs self-expanding nitinol, balloon inflation volume, and pressure) may also be responsible for some of the variation in observed PMI rates, more data are required in this regard.

In this issue of the *Journal*, Fischlein et al⁶ have described several surgical tips to minimize the risk of PMI post-Perceval implantation. Control of the angle of the valve holder during device deployment to maintain coaxiality with the aortic annulus is particularly crucial. Other factors that may affect the risk of PMI include extent of annular decalcification required, height of the membranous septum, presence of a bicuspid aortic valve (whereby the atrioventricular node location is more variable), and requirement for concomitant mitral or tricuspid valve procedures.

Author has nothing to disclose with regard to commercial support.

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The long-term implications of increased PMI rates associated with TAVR devices are yet to be determined; however, increasing attention will be paid to this issue as TAVR is performed in younger, lower-risk patients in the coming years. If sutureless/rapid-deployment valves, particularly when combined with a minimally invasive approach, are to be seen as a viable alternative to TAVR in such patients, then the rates of PMI need to be minimized. Further research and insights into avoiding PMI during sutureless/rapid-deployment valve implantation, such as those suggested by Fischlein et al, are therefore of significant value. To stay “on pace” with the rapidly advancing field of TAVR, constant improvements in conventional surgical outcomes are required urgently.

Michael A. Borger, MD, PhD
Division of Cardiac
Thoracic and Vascular Surgery
Columbia University Medical Center
New York, NY

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APPLICATIONS FOR ENABLE SUTURELESS AORTIC BIOPROSTHESIS?

To the Editor:

I enjoyed the article titled “North American single-center experience with a sutureless aortic bioprosthesis”

by de Varennes and colleagues in the March edition of the *Journal*.¹ Use of the Enable aortic bioprosthesis decreased

the mean cross-clamp time, and certainly with additional experience will likely further decrease cross-clamp time. I wonder whether the authors had previously used Cor-Knots (LSI Solutions, Victor, NY) during an isolated aortic valve replacement, and if so, whether using Cor-Knots had any significant effect on cross-clamp time.

In addition, the sutureless technology would seem to offer advantages in redo aortic valve cases, particularly when the extraction is difficult or the ring from the original prosthesis is left in place. I noted that the sutureless valve was not used in concurrent aortic and mitral valve replacement surgery, but only in patients who had mitral valve repair, and in 1 patient who had a previous mitral valve replacement. Are there restrictions to use of the sutureless prosthesis in these circumstances? Have the authors used the prosthesis in any of these clinical scenarios?

Finally, can the sutureless valve be placed within a tube graft to construct a biologic conduit? This would save operative time when the aortic biologic conduit needs to be sewn into the conduit, especially in situations where the conduit was not anticipated before placing the aortic cross-clamp.

Frank A. Baciewicz, Jr, MD
Department of Cardiothoracic Surgery
Wayne State University
Detroit, Mich

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OTHER APPLICATIONS FOR THE SUTURELESS AORTIC PROSTHESIS

Reply to the Editor:

Thank you for your kind comments regarding our experience with the Enable sutureless aortic valve prosthesis (Medtronic, Minneapolis, Minn). Unfortunately, Medtronic pulled the product off the market a few months ago. This decision was in keeping with corporate decisions but we still believe that sutureless valves will have their place in the portfolio of treatment strategies for patients with aortic valve disease. We feel strongly that the ease of implant makes this technology very interesting, especially as