Reoperation for Failure of Freestyle Bioprosthesis Using an Edwards Intuity Valve

Vlad Gariboldi, MD, Dominique Grisoli, MD, Antoine Devin, MD, Laetitia Nee, MD, Alexis Theron, MD, Sandrine Hubert, MD, Nicolas Jaussaud, MD, Pierre Morera, MD, and Frédéric Collart, MD

Service de Chirurgie Cardiaque, Hôpital de la Timone Adultes, Marseille, France

We report the first case of a successful implantation of the new Edwards Intuity rapid-deployment bioprosthesis in a 50-year-old man with acute failure of a Freestyle Medtronic root with severe aortic regurgitation and massive calcification of the root and both coronary buttons.


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tentless aortic bioprostheses are commonly used as an alternative to mechanical root replacement in patients over 50 years old because of their hemodynamic performance, potential longevity, and lack of requirement for anticoagulation [1, 2]. These theoretical advantages have resulted in their widespread use in younger patients (under 60 years old) and in adult patients with congenital aortic valvular stenosis [3]. The same studies have shown that the major mode of structural valve deterioration is a leaflet tear with severe aortic insufficiency, leading to scheduled or emergent technically demanding reoperations, either by root replacement or by the implantation of a stented valve within the valve [4, 5]. A transcatheter valve could be proposed as an alternative in this situation [6, 7], but the long-term results are unknown, particularly in younger patients without a classic contraindication to conventional open cardiac operation.

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Address correspondence to Dr Gariboldi, Service de Chirurgie Cardiaque, Hôpital de la Timone Adultes, 264, rue St Pierre, 13005 Marseille, France; e-mail: vlad.gariboldi@ap-hm.fr.

Our patient was a 50-year-old man who had undergone total root replacement with a Freestyle prosthesis (Medtronic Inc., Minneapolis, MN) in 1995 at the age of 33 years for severe aortic stenosis on a type I bicuspid valve. Follow-up evaluations were performed every 6 months, and transthoracic echocardiography showed good functioning of the valve without leakage or stenosis. Ten days before, the patient had presented to the emergency department with asthenia and severe dyspnea. Immediate transthoracic echocardiography showed good left ventricle ejection fraction but mild dilatation of the left ventricle (end-systolic diameter of 21 mm/m²) caused by severe aortic regurgitation and moderate stenosis (22 mm Hg) on the Freestyle prosthesis. There was no clinical or biologic suspicion of infective endocarditis. Intravenous diuretics were administered, with good clinical evolution. Coronary angiography was performed, with normal results, and although computed tomography showed no calcification of the native aorta, severe circumferential calcifications of the entire Freestyle bioprosthesis were observed. The operation was scheduled within 1 week with the goal of either mechanical valve replacement in the Freestyle if possible or performance of a repeated composite Bentall procedure. At the time of operation, the native aorta was small, and the root was entirely calcified. Owing to the exposure, it was difficult to analyze the anatomy. The left main coronary anastomosis was close (1 mm) to the suture of the Freestyle prosthesis to the annulus, and the button was roundly calcified. After resection of the three leaflets, the remaining annulus and left ventricle outflow tract were also calcified. The three commissures were symmetrical. We decided to implant a sutureless 21 Edwards Intuity valve (Edwards Lifesciences LLC, Irvine, CA) (Fig 1) because of the ability to rapidly deploy it using only three stitches to sew the valve on the annulus at the nadir of each sinus [8]. The cross-clamping time was 33 minutes, and the cardiopulmonary bypass time was 55 minutes. The patient required dobutamine (3 μg/kg/min) for bypass weaning. Intraoperative transesophageal echocardiography showed a perfect result without paravalvular leakage and a mean gradient at 8 mm Hg. The patient recovered uneventfully and was discharged on postoperative day 8, with a stable mean gradient.

Fig 1. Sutureless 21 Edwards Intuity valve.
Comment
The Freestyle bioprosthesis is widely used for the treatment of aortic valve pathologic conditions in elderly and young patients because of the advantages of a bioprosthesis [1–3]. However, these bioprostheses can reach the limits of their durability, with structural valve deterioration caused by cusp rupture and massive calcification of the entire root, leading to technical surgical challenges at the time of reoperation [5]. Compared with a repeated Bentall procedure, a new aortic valve replacement appears to be the better strategy regarding morbidity and mortality [4], even if the postoperative gradient appears higher. In younger patients without contraindication to a conventional surgical operation, transcatheter procedures [6, 7] should not be used without long-term data. We describe the first case of an implantation of the Edwards Intuity rapid deployment system in a 50-year-old man with acute failure of a Freestyle root, difficult surgical exposure, and an extremely calcified aortic wall and coronary buttons, where the Bentall procedure and isolated aortic valve replacement were nearly impossible. The Edwards Intuity valve allows fast and simple implantation in technically challenging cases, with good immediate and midterm results [8]. It is believed that the long-term results should be equivalent to the other existing bioprosthesis because it is built on Edwards’ proven valve platform.

References