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Novel Edwards INTUITY Elite valve bioprosthesis implantation in a pediatric patient

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A 13-year-old male with congenital combined valvular disease of bicuspid aortic valve (BAV) was admitted to our department for a surgical replacement of the aortic valve. He had previously undergone commissurotomy at the age of 6.5 months.

Preoperative transthoracic echocardiography (TTE) revealed moderate aortic insufficiency and stenosis (Figure 1A) with the maximum and mean gradient of 80 mm Hg and 40 mm Hg, respectively, and mean flow velocity (MFV) of 4.5 m/s in ascending aorta (AoA) and 1.8 m/s in descending aorta (AoD). Moreover, mild mitral and moderate tricuspid insufficiency were described. The left ventricular ejection fraction was 78%.

The procedure was performed from a re-sternotomy approach. After anterograde del Nido cardioplegic solution was administered, an aortotomy was performed and a functional bicuspid valve was inspected. Thickened and completely degenerated valve cusps were removed entirely.

After visualizing the aortic orifice with the measured internal diameter of 23 mm, three guiding sutures were attached and secured in the mid-commissural region of the native aortic annulus (Figure 1D). The 23 mm sutureless Edwards INTUITY Elite valve was delivered into proper aortic position and maintained using tourniquets prior to expansion of the frame (Figure 1E). The valve prosthesis was expanded by inflating the balloon with a pressure of 5 atmospheres (Figure 1F). The implantation was completed after three guiding sutures were tied under control of correct position and tightness (Figure 1B). The aorta was sutured and declamped. The length of aortic cross-clamp time was 39 min. After achieving reperfusion, extracorporeal circulation was stopped at 64 min without complications.

Intraoperative echocardiography revealed maximum gradient of 27 mm Hg and mean gradient of 11 mm Hg on aortic valve with MFV of 2.6 m/s in AoA. At the discharge, postoperative TTE showed MFV in AoA ranging from 1.6 to 2.0 m/s and MFV in AoD reaching 1.8 m/s (Figure 1C). The postoperative period was uneventful and the patient was discharged from hospital on the twelfth day.

The choice of aortic prosthesis is challenging in the pediatric population. While mechanical prostheses seem to be more durable, bioprostheses do not require a long-term anticoagulant treatment, especially in physically active children. Novel bioprostheses with good clinical outcomes and durability seem to be a compromised solution.

The Edwards INTUITY Elite valve is based on the PERIMOUNT Magna structure, built of three independent bovine pericardial leaflets on a metal stent. An expandable stainless-steel cloth-covered frame is incorporated into the inflow aspect of the valve and is implanted with the aid of a delivery system.

The 5-year outcomes of the TRITON trial demonstrate acceptable long-term safety and excellent hemodynamic performance of rapid deployment aortic valve replacement (RDAVR) with the Edwards INTUITY Elite valve system [1]. According to the TRANSFORM trial, RDAVR of INTUITY may also lead to a relative reduction in aortic cross-clamp time and cardiopulmonary bypass time [2]. This appears to be due to a simplified implantation technique requiring placement of only three guiding sutures instead of the 12–15 sutures as in case of a traditional surgical valve replacement. As the duration of the implantation procedure may be even to a greater degree and radically shortened, the method seems to be a solution by choice in high-risk patients, in whom shortening the surgery time is of a vital importance.

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REFERENCES

1. Laufer G, Haverich A, Andreas M, et al. Long-term outcomes of a rapid deployment aortic valve: data up to 5 years. Eur J Cardiothorac Surg. 2017; 52(2): 281–287, doi: 10.1093/ejcts/ezx103, indexed in Pubmed: 28453629.
2. Barnhart GR, Accola KD, Grossi EA, et al. TRANSFORM (Multicenter Experience With Rapid Deployment Edwards INTUITY Valve System for Aortic Valve Replacement) US clinical trial: Performance of a rapid deployment aortic valve. J Thorac Cardiovasc Surg. 2017; 153(2): 241–251.e2, doi: 10.1016/j.jtcvs.2016.09.062, indexed in Pubmed: 27817951.

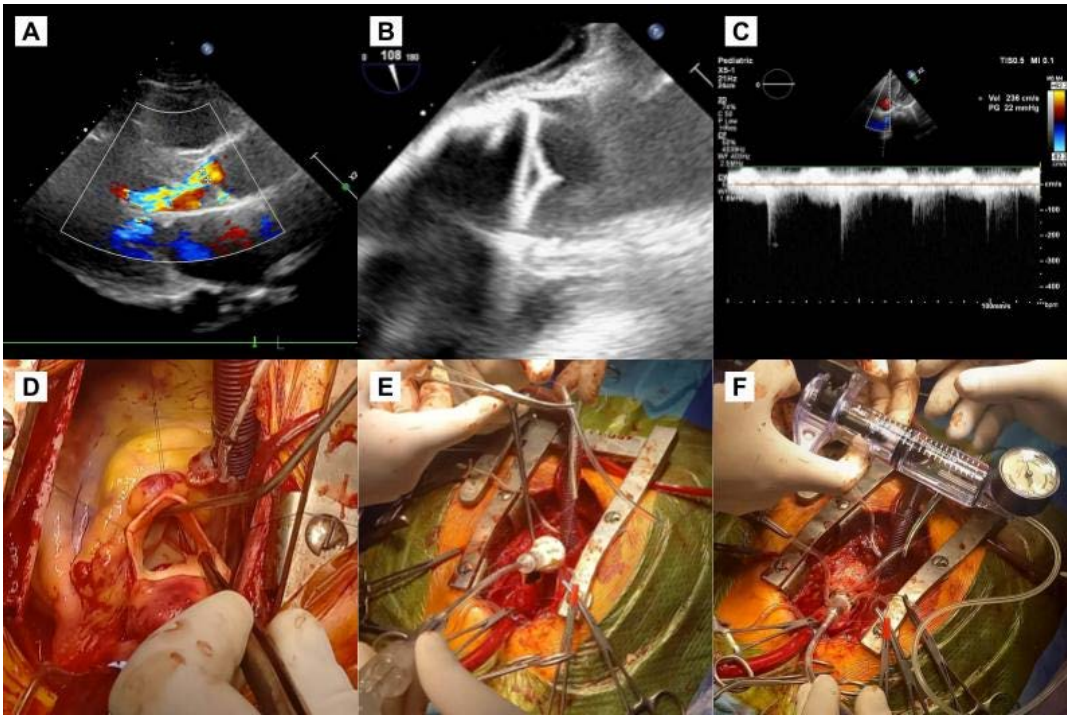

Figure 1. Echocardiography (**A** — preoperative, **B** — intraoperative, **C** — postoperative follow-up). Bioprosthesis implantation procedure intraoperative review (**D** — guiding sutures placement, **E** — valve parachuting with the aid of delivery system, **F** — inflation device)