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Implantation of a self-expanding valve into a degenerated mechanically expanding aortic valve

Short title: Implantation of the Evolut Pro+ valve in the Lotus Edge

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There is an increasing number of transcatheter aortic valve implantation (TAVI) procedures observed recently. As the number of implantations increases, so does the number of patients with degenerated valves requiring subsequent valve-in-valve transcatheter interventions. In addition to patients with the most commonly implanted valves today, there are also patients with valves that are no longer used now, such as Lotus and Direct Flow.

We present the first case in Poland of an Evolut Pro+ valve implanted in a degenerated Lotus Edge valve.

A 79-year-old female was admitted to our hospital with signs of heart failure. She had TAVI procedure with Lotus Edge 23 and a pacemaker implantation four years before. She was diagnosed with persistent atrial fibrillation, dyslipidemia, type 2 diabetes and chronic kidney disease. Two years earlier a left atrial appendage closure procedure was performed with a Watchman FLX 24 system. After TAVI a small paravalvular leak (PVL) was observed, and the mean aortic valve gradient was 18 mm Hg. On admission, echocardiography revealed a reduced left ventricular ejection fraction of 35%, the implanted valve dysfunction with transvalvular gradient of 67/42 mm Hg and a small PVL, moderate mitral and tricuspid regurgitation. Laboratory tests on admission: GFR 26 ml/min/1.73 m^2, NT-proBNP >35 000 pg/ml. Euroscore II was 10.7. A multi-slice computed tomography showed that the internal diameter of the Lotus Edge valve was 18.7 mm on average, which suggested the incomplete expansion of the TAVI valve (Supplementary material, *Figure S1–S4*). The Lotus Edge was implanted low and non-axially relative to the native valve annulus (Figure 1A; Supplementary material, *Figure S5*). The multi-slice computed tomography revealed no risk of coronary access obstruction in case of redo TAVI. The Lotus Edge valve was implanted so that the upper edge of the valve was below the ostia of the coronary arteries (Supplementary material, *Figure S5–S8*). The Heart Team qualified the patient for a redo TAVI procedure. The Evolut Pro+ 23 valve was chosen because of the supra-annular position of the valve leaflets and the low gradients that are expected after a redo TAVI in the Lotus valve [1, 2].

The procedure was performed under general anesthesia with transesophageal echocardiography control. Aortography was performed and PVL was visualized. An Evolut Pro+ valve was implanted through the right femoral artery (Figure 1B). The valve was than implanted using the inflow-to-inflow technique (Figure 1C). After the implantation a mean transvalvular gradient was 19 mm Hg. The valve was postdilated with a 20 × 40 mm Valver balloon (Figure 1D). The final mean transvalvular gradient was 9.7 mm Hg. A control aortography showed a small-to-moderate PVL (Figure 1E). At the end of the procedure the TAVI access artery was effectively closed with two Perclose ProStyle and one Angioseal devices (Figure 1F). The procedure and fluoroscopy time was 145 and 32 min. respectively and radiation dose was 528 mGy.

Postprocedural echocardiography revealed moderately reduced ejection fraction of 42%, a mean aortic valve gradient of 10 mm Hg, and a negligible PVL between the Lotus valve and the aortic bulb. No detectable leak was found between the valves.

Implanting the Evolut Pro+ self-expanding valve in a degenerated Lotus Edge valve produces very good outcomes, with a low transvalvular gradient and no leak between the valves.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

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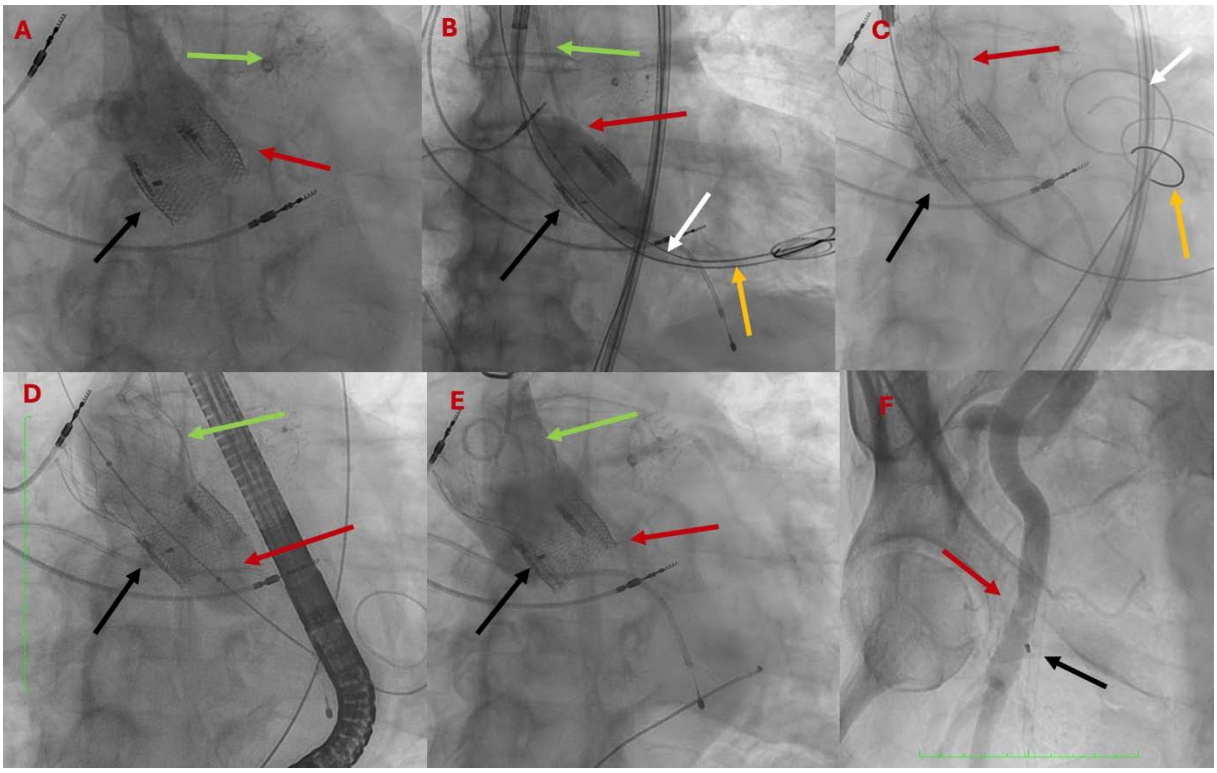

Figure 1. A. Aortography before implantation, black arrow — Lotus Edge 23, red arrow — paravalvular leak, green arrow — Watchman FLX. **B.** Despite the use of a Lunderquist wire, we encountered difficulties in inserting the Evolut Pro+ valve into the Lotus valve, so valvuloplasty had to be performed with a Valver 20 × 40 mm balloon over Confida wire through the left femoral artery. black arrow — Lotus Edge 23, red arrow — 20 mm Valver balloon, green arrow — Evolut Pro+, yellow arrow — Lunderquist wire, white arrow — Confida wire. **C.** Implantation of Evolut Pro+ 23 with valve positioning using the infow to inflow technique, black arrow — Lotus Edge 23, red arrow — Evolut Pro+ 23, yellow arrow — Lunderquist wire, white arrow — Confida wire. **D.** Postdilatation with 20 mm balloon, black arrow — Lotus Edge 23, red arrow — 20 mm Valver balloon, green arrow — Evolut Pro+ 23. **E.** Control aortography after implantation, black arrow — Lotus Edge 23, red arrow — paravalvular leak, green arrow — Evolut Pro+ 23. F. Control arteriography, black arrow — marker of Manta device used during first procedure, red arrow — nonsignificant stenosis of the femoral artery after using 2 Perclose ProStyle and 1 AngioSeal closing devices