

Transcatheter aortic paravalvular leak closure using 3 Amplatzer Vascular Plug III devices in a child

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Paravalvular leak (PVL) is usually related to disruption of prosthetic valve sewing ring sutures. Many previous reports have described transcatheter paravalvular leak closure in adult patients [1–4], but those describing such a procedure in children are scarce.

A 16-year-old boy underwent an aortic valve replacement (AVR) with a stented bioprosthesis Hancock 23 mm due to combined aortic stenosis and insufficiency. Soon after, a significant paravalvular leak was detected and initially managed medically. However, within the next 5 months the patient became breathless on exertion and developed significant left ventricular dilatation. Paravalvular leak closure was performed under general anesthesia, with transesophageal echocardiographic (TEE) and angiographic guidance. Aortography confirmed grade 3 aortic regurgitation (Figure 1 A). The paravalvular leak size was evaluated in TEE at 4 × 3 mm. It was identified as posterior, from the noncoronary Valsalva sinus into the left ventricle (LV). The defect was easily crossed using two JR catheters and hydrophilic wires, then Amplatzer extra-stiff guidewires were introduced from both femoral arteries into the LV. Over these, 120 cm long sheaths (6 Fr and 7 Fr) were advanced through the paravalvular leak. No obstruction during the crossing was met, which was considered confirmatory of the defect size exceeding what was expected from TEE. Accordingly, the decision was taken to implant 3 devices in order to avoid a residual shunt. Two 8/4 Vascular Plugs type III were implanted and one 6/3 mm Vascular Plug type III (St Jude Medical Inc.). After sequential opening of the distal discs in the LV all plugs were withdrawn simultaneously to the

level of the paravalvular leak orifice. The proximal discs were then opened (Figure 1 B) with immediate complete closure of the shunt on TEE (Figure 1 C). Prior to devices release, proper function of the prosthetic valve was confirmed by TEE. Control aortography showed proper position of devices without Ao–LV shunt (Figure 1 D). Fluoroscopy time was 18.5 min. The next morning the patient underwent transthoracic echocardiography which confirmed a good procedure result with normal function of the prosthetic aortic valve, without any regurgitant jet. The patient was discharged 3 days after the procedure on 150 mg Aspirin q.d.

Early mortality in redo AVR reaches 3.5–6% [1]. Transcatheter treatment has been constantly developing during the last years. Transcatheter PVL closure was initially performed with devices dedicated to patent ductus arteriosus, ventricular septal defect and atrial septal defect [2]. In our and others' opinion, especially useful for such purposes is Amplatzer Vascular Plug type III [3]. Lack of internal fabric, which could potentially promote clot formation, may be considered a major disadvantage of the device. We suspect that use of one or two bigger plugs in the hereby-presented case might result in residual leaking and possibly hemolysis [4]. To avoid such complications we chose 3 plugs to ensure tight as possible filling of the defect. Simultaneous implantation of multiple devices increases the chance of final success, which was described previously [3].

Conflict of interest

The authors declare no conflict of interest.

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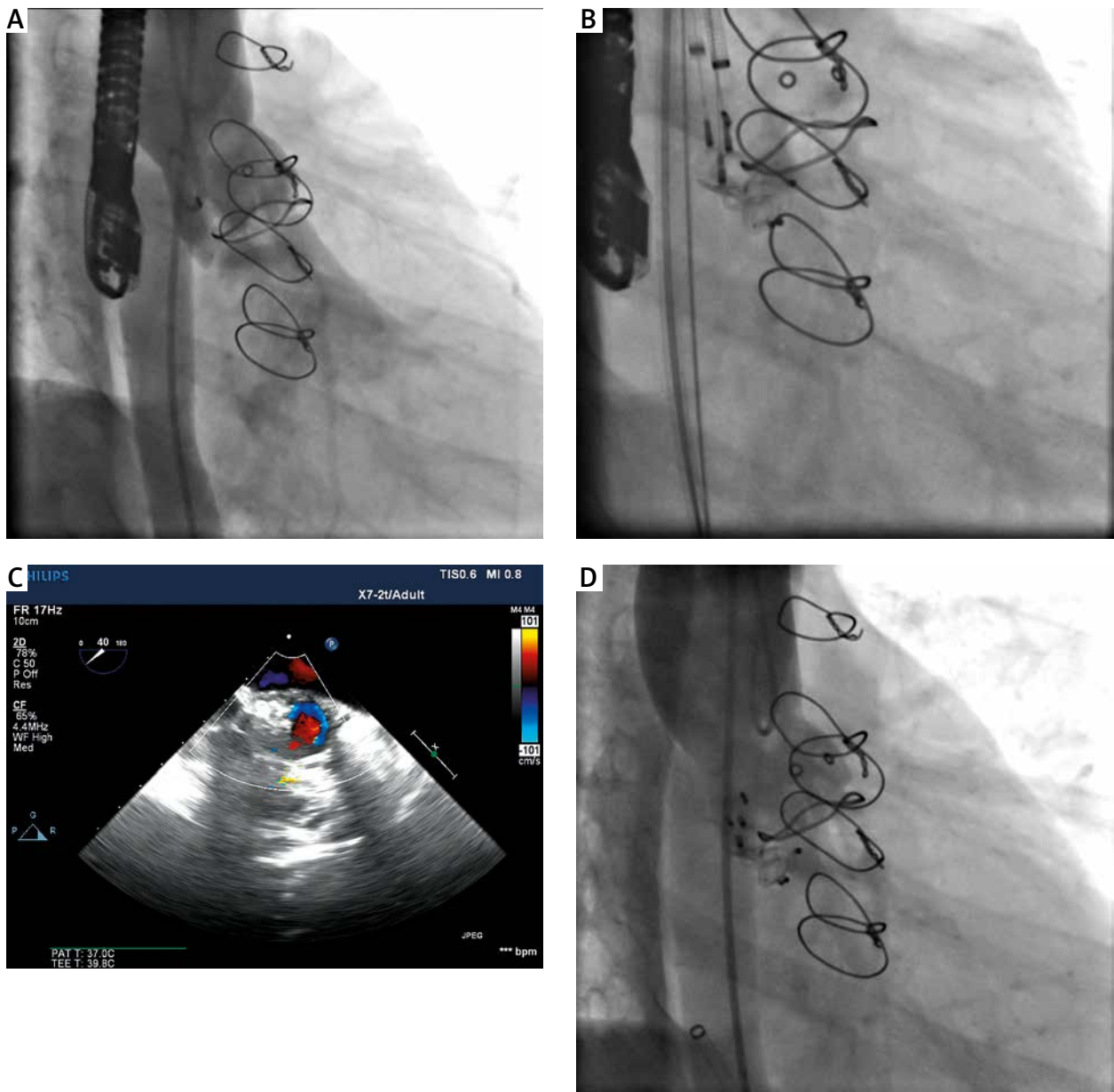


Figure 1. **A** – Aortography RAO 30 Caud 30. Paravalvular leak from posterior Valsalva sinus to LV. **B** – Three Amplatzer Vascular Plug 3 devices closing paravalvular leak still connected with delivery system. **C** – Transesophageal echocardiographic scan – aortic short axis view. Complete paravalvular aortic leak closure with 3 devices. **D** – Control aortography after procedure (RAO 30 Caud 30 projection). Complete closure of previously observed paravalvular leak

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