Case Report

A Tricky Percutaneous Paravalvular Leak Closure Two Years After Implantation of 3f Enable Sutureless Bioprosthetic Aortic Valve

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Key words:
Paravalvular leak, percutaneous, bioprosthesis, elderly, aortic stenosis.

Sutureless valves were designed in an attempt to simplify the aortic valve replacement procedure and reduce extracorporeal circuit time, whilst allowing complete excision of the calcified native valve using a minimally invasive approach. Elderly patients with significant comorbidities are considered to benefit the most, although randomized data are lacking. In registries of patients treated with implantation of a 3f Enable sutureless bioprosthetic aortic valve, all patients who developed paravalvular leak have been treated with valve explantation. This is the first case report describing a tricky yet successful percutaneous paravalvular leak closure 2 years after implantation of a 3f Enable sutureless aortic bioprosthesis.

Manuscript received:
May 23, 2014;
Accepted:
January 27, 2015.

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Sutureless valves were designed in an attempt to simplify the aortic valve replacement procedure and reduce extracorporeal circuit time, whilst allowing complete excision of the calcified native valve using a minimally invasive approach (right anterior mini-thoracotomy). Elderly patients with significant comorbidities are considered to benefit the most, even though randomized data are lacking. In a registry of 140 patients with aortic stenosis[1] who were treated with the 3f Enable valve (Medtronic Inc., Minneapolis, USA) there were 4 cases with major paravalvular leaks (PVL), 3 early and one late, all of which resulted in valve explantation. In the current case report we describe for the first time a tricky yet successful percutaneous paravalvular leak closure 2 years after the implantation of a 3f Enable sutureless bioprosthetic aortic valve in an elderly patient.

Case presentation

A 79-year-old gentleman presented with worsening breathlessness, New York Heart Association class III, 2 years after surgical aortic valve replacement with a 27 mm sutureless 3f Enable bioprosthesis alongside coronary artery bypass (left internal mammary to left anterior descending). His admission transthoracic and transoesophageal echocardiograms revealed a volume-loaded, dilated left ventricle (left ventricular end-diastolic diameter [LVEDD] 67 mm, LV end-systolic diameter [LVESD] 47 mm) with preserved ejection fraction (60%). There was a well seated aortic bioprosthesis with severe paravalvular aortic regurgitation (grade +3, with diastolic flow reversal in the thoracic aorta; Figure 1A) originating from two orifices adjacent to the non- (NCC) and left coronary cusp (LCC) (distance

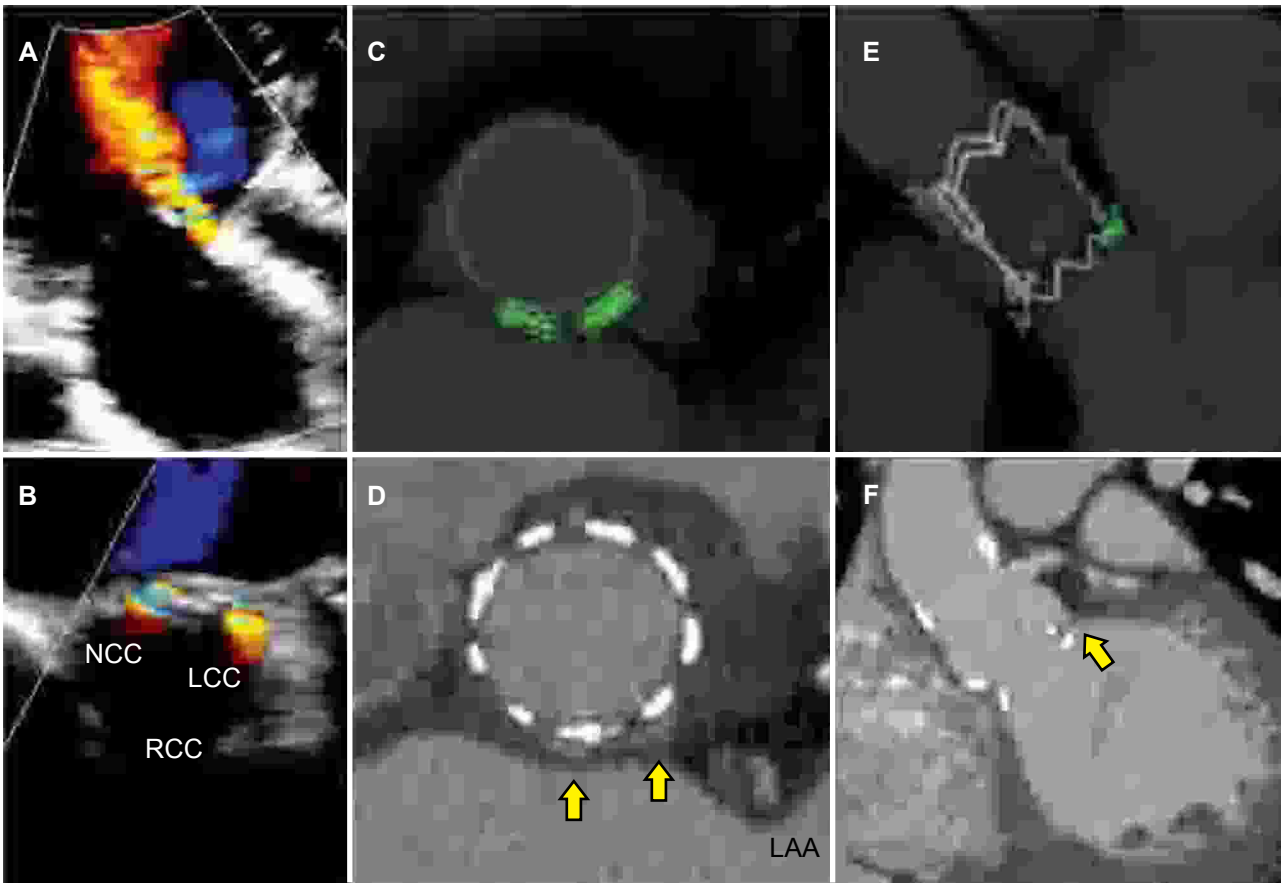

Figure 1. A: Three-chamber transthoracic echocardiogram pre percutaneous closure of a paravalvular leak (PVL), demonstrating severe aortic regurgitation. B: Transoesophageal echo pre percutaneous PVL closure, demonstrating two regurgitant orifices, each 4 mm, adjacent to the non-coronary and left coronary cusps. C: Computed tomography (CT) volume reconstruction, transverse double oblique view. Green dots highlight the orifices of the two paravalvular defects. D: CT, transverse double oblique plane just below the coronary cusps. Yellow arrows highlight the presence of two paraprosthetic defects, the larger adjacent to the left coronary cusp (8 × 3 mm), and the smaller adjacent to the non-coronary cusp (6 × 3 mm), in close proximity to first one. E: CT volume reconstruction, coronal oblique view, demonstrating the location of the PVL in relation to the 3f Enable valve. F: CT coronal oblique plane with yellow arrow demonstrating PVL. LCC – left coronary cusp; NCC – non-coronary cusp; RCC – right coronary cusp.

between orifices <10 mm; Figure 1B). Computed tomography revealed two paraprosthetic defects adjacent to each other, with the one closer to the LCC being larger (8 × 3 mm; Figure 1C-F). The case was discussed by the local Heart Team. In view of the need for redo aortic valve replacement in a patient with a patent LIMA-to-LAD graft and moderately high surgical risk (Logistic EuroSCORE 13.6%, EuroSCORE II 4.67%, STS 3.6% STS-PROM 24.05%), the decision was made to proceed to percutaneous paravalvular leak closure[2] using Amplatzer vascular plugs II (AVPII; AGA Medical Corp., Plymouth, Minnesota, USA). The procedure was performed under general anaesthesia and transoesophageal echo guidance. Using a right femoral approach, and a multipurpose diagnostic catheter, the LCC paravalvular defect was crossed with a Storq 0.035" wire (Cordis, Johnson and Johnson, Miami Lakes, FL, USA) (Figure 2A). A 10 mm AVPII device was delivered via a long 6 F sheath (Figure 2B, C) and released from its cable as the paravalvular leak originating from this orifice diminished. However, the second orifice contributed to moderate residual paravalvular aortic regurgitation. The decision was therefore made to seal the adjacent defect with a second AVPII, size 8 mm. However, catheter manipulations in the adjacent NCC orifice appeared to interfere with the stability of the first device.

Unfortunately, the first AVPII device had already been released from its delivery cable. Hence,