Successful transcatheter treatment of late complications after
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Authors: Radosław Targoński, Robert Sabiniewicz, Jarosław Meyer-Szary, Marcin Fijałkowski, Dariusz Jagielak

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Successful transcatheter treatment of late complications after the Bentall procedure

Radosław Targoński¹; Robert Sabiniewicz²; Jarosław Meyer-Szary²; Marcin Fijałkowski³; Dariusz Jagielak¹

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1. Department of Cardiac and Vascular Surgery, Medical University of Gdańsk, Gdańsk, Poland
2. Department of Pediatric Cardiology and Congenital Heart Diseases, Medical University of Gdańsk, Gdańsk, Poland
3. 1st Department of Cardiology, Medical University of Gdańsk, Gdańsk, Poland

Corresponding author: Radosław Targoński
Department of Cardiac and Vascular Surgery
Sklodowskiej-Curie 3a Street, 80-210 Gdansk, Poland
Email: rtargonski@gmail.com
Phone: +48 58 584 42 00

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A 50-year-old male presented with symptoms of progressive exertional dyspnea. The patient had a history of bicuspid aortic valve stenosis with valve replacement at the age of 16 (Bjork-Shiley 21mm, mechanical valve). Due to the structural valve deterioration and progressive dilatation of the thoracic aorta, the Bentall procedure was performed 25 years later. A mechanical valved St. Jude 23mm conduit was implanted. The postoperative period was complicated by infective endocarditis and reoperation was performed after three months - with the implantation of the Biovalsalva 25mm conduit. The patient remained asymptomatic up until two months before index hospitalization.

Diagnostic imaging (Figure 1 A, C, D; Video 1) revealed a huge pseudoaneurysm, extending from the aortic valve to the distal anastomosis at the level of the brachiocephalic trunk. The pseudoaneurysmal cavity bordered with the right coronary ostium, however surgical stitches from previous coronary reimplantation, probably prevented its further progression into that direction, since there were no clinical signs of myocardial ischemia. Ostia of the left and the right coronary arteries were located 18 and 28mm above the aortic annulus, posing no threat of closure after valve in valve implantation. The pseudoaneurysm cavity communicated with LVOT through a 4 x18mm fistula just beneath the aortic annulus's non-coronary side. Severe (PHT 215ms, holodiastolic flow reversal in ascending aorta with end-diastolic velocity> 20cm/s) aortic regurgitation resulting from the aortic valve cusp prolapse, was found on transthoracic and transesophageal echocardiography, together with the shunt from the left ventricle to the aneurysmal cavity.

In order to avoid another thoracotomy, transcatheter treatment was recommended. Because of the atypical anatomy, a 3D printed model was used for planning the procedure (Figure 1 B). The angiographic working projection was calculated from agnioCT data, and set at the angle perpendicular to both: the aortic annulus and the fistula orifice.
The fistula was closed through an apical access, with simultaneous implantation of 2 Amplazer Vascular Plugs III (12x4mm) through 12F sheath, followed by the implantation of a Sapien3 26 mm valve (Figure 1 F; Video2-6). The multi-slice computed tomography (MSCT) performed 3 days later revealed a thrombus occupying the larger part of the aneurysm (Figure 1 E). There was no visible shunt in control echocardiography. After discharge the patient remained asymptomatic and control the MSCT was scheduled 12 months after the procedure.

Although surgical re-do operations for pseudoaneurysm and SVD are still the most common choice after the Bentall procedure [1,2] a growing number of patients will be treated endovascularly in the near future. In the opinion of authors, nowadays every case of a reintervention after previous heart valve surgery should be assessed by the heart team for a transcatheter treatment option, provided there are no signs of an active infection, when a surgical procedure is still warranted [3].
References:


Figure 1. Imaging of the aortic root and the aneurysm before and after intervention.

(A) Multi-slice computed tomography reconstruction of the heart and ascending aorta. (B) 3D printed model with red probe inside true lumen and black entering aneurysmal cavity. Multi-slice computed tomography images pre (C) and post intervention (E) with thrombosed aneurysmal cavity. Transthoracic echocardiography images showing degenerated biological valve leaflet prolapse (D). Final angiographic view after intervention (F).