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IMAGES IN CARDIOVASCULAR INTERVENTION

Temporary immobile leaflet following transcatheter aortic valve replacement of a SAPIEN-XT valve

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An 84-year-old man with carotid artery stenosis and prior history of lower limb amputation was admitted with symptomatic aortic stenosis. Echocardiogram showed an aortic valve area of 0.83 cm^2 with a preserved left ventricular ejection fraction of 67%. Computed tomography (CT) demonstrated an aortic annulus area of 437 mm^2, a porcelain aorta, and heavily calcified stenotic lesions of the bilateral iliac arteries. Due to high surgical risk and poor femoral access, we decided to perform transapical transcatheter aortic valve replacement (TAVR). A 26-mm Edwards SAPIEN-XT™ valve (Edwards Lifesciences, Irvine, California) was implanted after aortographic and transesophageal echocardiographic (TEE) confirmation of appropriate valve position. However, his blood pressure did not recover even with inotropic medications after aortic valve deployment. Aortography and TEE revealed severe intravalvular aortic regurgitation (Fig. 1a, b), and confirmed that while one leaflet was mobile and functioning, another was immobile. While preparing for a second valve implantation, removal of the guidewire and post-dilation were tried, but were ineffective. Hypotension was observed to worsen, and he then developed ventricular tachycardia. Defibrillation successfully restored sinus rhythm, and his hemodynamic parameters recovered rapidly. TEE and aortography revealed adequate functioning of all valve leaflets with only a mild paravalvular leak (Fig. 1c, d). Finally, the procedure was successful without requiring a second valve implantation. Postoperative CT showed a mass of calcification located adjacent to the commissure between the two leaflets of the implanted valve. The patient was discharged home on postoperative day 18 without any sequelae.

The development of an immobile leaflet following TAVR is a rare complication. Only a few reports have described the successful management of this complication using valve-in-valve implantation [1, 2]. To our knowledge, ours is the first report to describe a temporary immobile leaflet, which was restored accidentally without requiring a second valve implantation. To date, the mechanism of leaflet malfunction remains unclear. In this patient, calcification was noted adjacent to the temporary immobile leaflet of the implanted valve. The SAPIEN-XT™ valve shows a shorter stent height than the leaflet height; therefore, calcification might cause anchoring of the leaflets, resulting in leaflet failure. Furthermore, we concluded that the impact caused by defibrillation accidentally restored the normal function of the fixed/immobile leaflet, suggesting that this complication can occur unexpectedly even without any inherent valve-related

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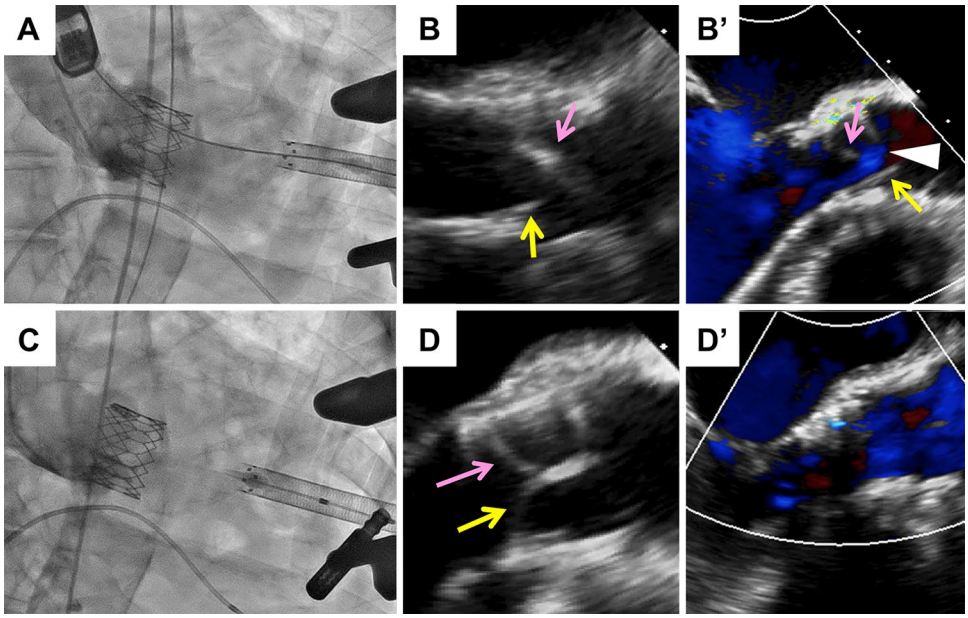

Fig. 1 **a** Aortography performed after implantation of a 26-mm SAPIEN-XT™ valve showing severe aortic regurgitation. **b** Transesophageal echocardiography (TEE) showing a mobile leaflet (pink arrow) and another immobile leaflet (yellow arrow). **b'** Intravalvular aortic regurgitation jet (white triangle) is observed through the side of the immobile leaflet (yellow arrow), but not the side of the mobile leaflet (pink arrow) during the diastolic phase. **c** Aortography performed after defibrillation showing only mild aortic regurgitation. **d** TEE after defibrillation showing functioning leaflets (yellow and pink arrows). **d'** No intravalvular aortic regurgitation can be visualized

pathology. Further investigations are needed to improve our understanding of this life-threatening complication.

Compliance with ethical standards

Conflict of interest Hideki Ishii received lecture fees from Astellas Pharma Inc., Astrazeneca Inc., Daiichi-Sankyo Pharma Inc., and MSD K. K. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Ethical standard The human subject has given informed consent and the authors have conformed to institutional guidelines.

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