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Aortic regurgitation after transcatheter aortic valve implantation: understanding the mechanism to guide treatment

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Introduction: Paravalvular regurgitation is a recognized complication of transcatheter aortic valve implantation (TAVI), and significant paravalvular leak (PVL) is associated with reduced survival[1]. Extensive calcification is a major contributor, limiting prosthesis expansion and apposition to the native annulus[2]. Treatment options include balloon post-dilatation, valve-in-valve implantation and percutaneous PVL closure. Transesophageal echocardiography (TEE) helps define the mechanism and anatomy of regurgitation and supports procedural planning[3].

Case report: 74-year-old patient with previous myocardial infarction, coronary artery bypass grafting and permanent pacemaker implantation for complete atrioventricular block presented with worsening heart failure (NYHA III, progressive increase of NTproBNP) three years after TAVI with a 26-mm Edwards SAPIEN 3 prosthesis for symptomatic severe aortic stenosis. Transthoracic echocardiography (TTE) described transvalvular aortic regurgitation of uncertain severity, without clearly identifying PVL. Further assessment with TEE demonstrated normal prosthetic leaflet motion and only mild transvalvular regurgitation. The dominant lesion was significant PVL, involving almost half of the circumference of the prosthesis, with a three-dimensional vena contracta area (3D VCA) of 1.8 cm². Extensive calcification had prevented complete expansion and apposition of the prosthesis at the original implantation, resulting in incomplete paravalvular sealing. Balloon post-dilatation and percutaneous PVL closure were considered. Following assessment of the calcification, prosthesis position and paravalvular anatomy, the Heart Team selected percutaneous closure. Under sedation and fluoroscopic and TEE guidance, an Amplatzer Vascular Plug III (5 × 14 mm) was implanted. Immediate echocardiographic assessment demonstrated reduction of PVL to mild

Conclusion: This case highlights the importance of defining the source and mechanism of regurgitation when heart failure develops after TAVI. TEE clarified that the dominant lesion was paravalvular despite the initial TTE description of transvalvular regurgitation, thereby directing treatment towards the paravalvular defect. Anatomical assessment should guide the choice between post-dilatation, repeat valve implantation and plug closure; percutaneous closure is an effective option in selected patients[3,4].

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