Bioprostheses “Thrombosis” After Transcatheter Aortic Valve Replacement

To the Editor: Surgical replacement of the aortic valve reduces symptoms and improves survival in patients with symptomatic and severe aortic stenosis (1). Transcatheter aortic valve replacement (TAVR) provides a safe and efficient alternative for inoperable and high-risk surgical patients (2–4).

Available guidelines recommend aspirin for all patients with biological prosthetic heart valves and for those with no risk factors for thromboembolism. After TAVR, it is common practice to prescribe antiplatelet therapy only.

No cases of valve thrombosis were reported after TAVR in 1 randomized trial and in large-scale registries (4–6). In the PARTNER EU (Randomized Placement of Aortic Transcatheter Valves Trial European) Study (7), only 1 case of valve thrombosis was reported. This patient required explant on day 257.

We report here on 3 cases of bioprostheses dysfunction due to leaflet thrombosis after TAVR.

Case 1 was an 80-year-old woman with severe aortic valve stenosis who underwent TAVR (23-mm Sapien XT, Edwards Lifesciences Inc., Irvine, California). The patient was discharged home as asymptomatic on day 5 on dual antiplatelet therapy (DAPT). At discharge, transthoracic echocardiography (TTE) showed normal function of the aortic prosthesis, with a mean pressure gradient (MPG) of 10 mm Hg. At 1-month follow-up, a MPG of 12 mm Hg was observed. At 10 months, the patient was asymptomatic for dyspnea (New York Heart Association [NYHA] functional class III), and TTE showed severe aortic restenosis with a MPG of 54 mm Hg ($V_{max}$ 510 cm/s). Transesophageal echocardiography (TEE) showed fusion of 2 leaflets with suspicion of “thrombotic apposition” (Figs. 1A and 1B). Screening tests for thrombophilia, allergy to valve components, and systemic inflammation activation were all negative.

Oral anticoagulation therapy (OAT) was prescribed. After 3 months, TEE (Figs. 1C and 1D) showed restored bioprostheses function (MPG 13 mm Hg), and the patient was asymptomatic. Two months after discontinuing OAT, the patient is still asymptomatic, and the aortic bioprostheses is functioning properly.

Case 2 is a 81-year-old man with severe dysfunction of the aortic valve bioprostheses (25-mm Carpentier Edwards, Edwards Lifesciences) who underwent TAVR (23-mm Sapien XT, Edwards Lifesciences). The patient was discharged home as asymptomatic on day 5. At discharge, TTE showed normal function of the aortic prosthesis (MPG 15 mm Hg). At 1-month follow-up, a MPG of 14 mm Hg was observed. At 4 months, the patient was symptomatic for dyspnea (NYHA functional class III), and TTE showed severe aortic restenosis with a MPG of 51 mm Hg ($V_{max}$ 4.24 cm/s). TEE showed fusion of 2 leaflets with a suspicion of thrombotic apposition. OAT was prescribed. After 2 months, TEE showed restored bioprostheses function (MPG 9 mm Hg), and the patient was asymptomatic.

Case 3 involved a 74-year-old woman with severe aortic valve stenosis who underwent TAVR (26-mm Sapien XT, Edwards Lifesciences). The patient was discharged home as asymptomatic on day 4 on DAPT. At discharge, TTE showed normal function of the aortic bioprostheses (MPG 7 mm Hg). At 1-month follow-up, a MPG of 8 mm Hg was observed. At 2 months, the patient was symptomatic for dyspnea (NYHA functional class II), and TTE showed severe aortic restenosis with a MPG of 34 mm Hg ($V_{max}$ 328 cm/s). TEE showed a suspicion of thrombotic apposition blocking the movement of a bioprosthesis leaflet. OAT was prescribed. After 2 months, the patient was asymptomatic, and TEE showed restored bioprostheses function (MPG 9 mm Hg).

Edwards SAPIEN aortic valve stents (Edwards Lifesciences) are manufactured in the same way as conventional aortic bioprostheses, and they should have the similar thrombogenicity. For this

REFERENCES


reason, after TAVR, it is common practice to prescribe antiplatelet therapy and no oral anticoagulation.

In all 3 reported cases, valve thrombosis was resolved with OAT, and the patients did not require open-heart surgery.

We believe that this report can be hypothesis-generating to design a trial aimed at identifying the proper antiplatelet or anticoagulation therapy after TAVR and to identify therapy for bioprostheses thrombosis.

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Figure 1  Echocardiography of Aortic Valve Bioprostheses 3 Months After Percutaneous Implantation

Transesophageal (short axis) identified thrombus (red arrows) on the bioprostheses leaflet (A, diastole), which limited mobility (B, systole) and determined an elevated peak aortic flow velocity \( V_{\text{max}} = 510 \text{ cm/s} \) (C). After 3 months of oral anticoagulation therapy, thrombus resolved (D, diastole), the leaflet was moving properly (E, systole), and peak aortic velocity was reduced \( V_{\text{max}} = 253 \text{ cm/s} \) (F).
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