Efficacy of Pericardial Drainage in Annular Rupture and Periaortic Hematoma After Transcatheter Aortic Valve Replacement

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Figure. Time-course of the (A) periaortic hematoma and (B) pericardial effusion. (A) Transesophageal echocardiography (TEE) in the (a-e) short-axis and (a'-e') long-axis views (a,a') before and (b,b') after valve deployment showing periaortic hematoma around the aortic valve (yellow arrowhead); (c,c') reduction of periaortic hematoma after pericardial drainage; (d,d') 1 day after transcatheter aortic valve replacement (TAVR) showing gradual reduction of periaortic hematoma; and (e,e') 2 days after TAVR with hematoma resolution. (B) Pericardial effusion (red arrow). (f) TEE before drainage showing pericardial effusion around the right atrium (RA) and right ventricle. (g) TEE after drainage. (C) Computed tomography after TAVR showing a pseudoaneurysm below the right coronary sinus of Valsalva (yellow arrow), which was not detectable on TEE due to the stent artifact of the SAPIEN 3 valve. AO, aorta; LA, left atrium; LV, left ventricle; POD, postoperative day.
A 92-year-old man with symptomatic severe aortic stenosis (aortic valve area, 0.4 cm²; maximum aortic valve velocity, 4.9 m/s; mean pressure gradient, 56 mmHg) was referred for transcatheter aortic valve replacement (TAVR). Computed tomography (CT) showed severe left ventricular outflow tract calcification. After implantation of a 26-mm SAPIEN 3 valve (Edwards Lifesciences, Irvine, CA, USA), transesophageal echocardiography (TEE) confirmed the appearance of periaortic hematoma and modest pericardial effusion (Figure A-a,a',b,b',B-f), suggesting annular rupture. We first selected pericardial drainage via a subxiphoid approach, rather than surgical repair, because the patient presented with pre-shock, and the pericardial effusion had gradually increased and plateaued. Pericardial drainage resulted in reduction of periaortic hematoma and pericardial effusion, and hemodynamic stabilization (Figure A-c–e,c’–e’,B-g). Ultimately, additional surgery was unnecessary.

CT after TAVR showed a small pseudoaneurysm below the right sinus of Valsalva (Figure C-h,i), which led to annular rupture. Although the aneurysm remained for 7 days after TAVR, it was managed conservatively.

Given that annular rupture after TAVR results in poor prognosis, early identification on TEE is important for appropriate therapy, as in the present case.1 Furthermore, pericardial drainage for pericardial effusion along with periaortic hematoma resulting from annular oozing rupture after TAVR may be an option prior to conventional surgery.

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