

IMAGES IN INTERVENTION

Multimodality Imaging of a Very Late Thrombosis of a Sutureless Aortic Prosthesis



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An 80-year old woman was admitted to our department for syncope and worsening effort dyspnea (New York Heart Association functional class III). The patient underwent surgical aortic valve replacement with a 21-mm Enable (Medtronic, Irvine, California) sutureless valve 6 years before. Although follow-up transthoracic echocardiography showed good aortic valve hemodynamics (mean gradient of 15 mm Hg) without any leak and with normal left ventricular ejection fraction, the exam performed at admission showed severely increased gradients across the prosthesis (mean gradient 30 mm Hg). Subsequent multidetector computed tomography (MDCT) scan evaluation (**Figures 1A to 1C**, **Online Video 1**) revealed the presence of low attenuation mass compatible with thrombus formation on aortic side of noncoronary and left aortic prosthetic cusps, leading to reduced leaflet motion, confirmed by subsequent transesophageal echocardiography (**Figures 1D and 1E**, **Online Video 2**). The patient was on long-term acetylsalicylic acid (100 mg/day) since surgery with good therapeutic compliance. Warfarin therapy (with a target international normalized ratio of 2 to 3) was chosen over a novel anticoagulant agent because of moderately reduced renal function (estimated glomerular filtration rate 30 ml/min/1.73 m²) and was started after a bridging period with low-molecular-weight heparin. Transthoracic echocardiography

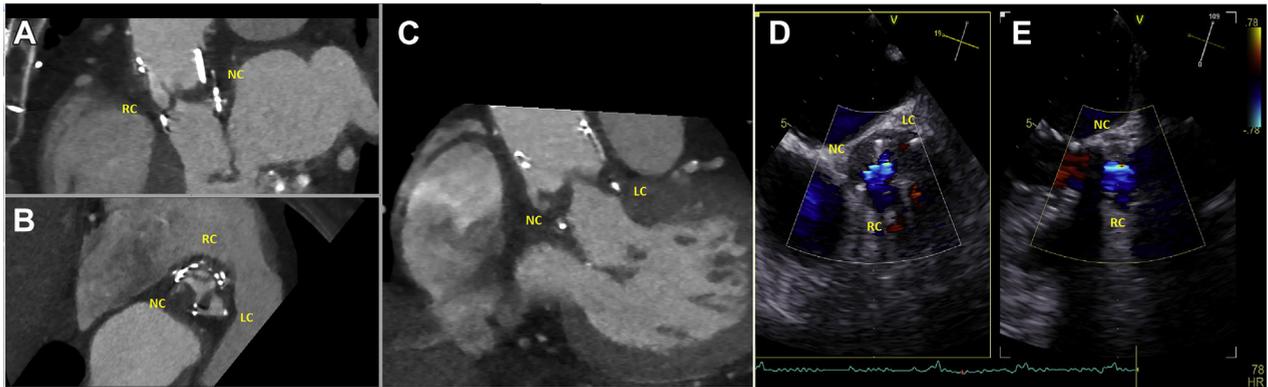
was repeated 1 month after discharge and showed complete normalization of transvalvular gradient (mean gradient 10 mm Hg) and of leaflet motion (**Online Figure 1**, **Online Video 3**), thus confirming the diagnosis of prosthetic leaflet thrombosis. Notably, the patient was asymptomatic at clinical evaluation, and she did not suffer any syncope.

First, this case demonstrates that very late valve thrombosis can also occur in sutureless surgical prostheses and contributes to the discussion of whether different valve designs require different antithrombotic regimens. Sutureless aortic valve bioprostheses emerged in the past few years as an alternative to standard surgical aortic prosthesis because of reduced cross-clamp and cardiopulmonary bypass time needed for implant. The Enable valve is a self-expanding bioprosthesis, made of bovine pericardium, that showed good hemodynamic results in a prospective, multicenter clinical study: at midterm follow-up (up to 14 months after surgery), no structural deterioration, valve-related thrombosis, or hemolysis was reported (1). Leaflet thrombosis has recently been shown to occur in both transcatheter and surgical valves (2), but in the largest available registry, there were no reported cases of reduced leaflet motion in this type of prosthesis.

Second, the remission of thrombus and the restored valvular function confirmed that oral

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FIGURE 1 Coronary Computed Tomography Scan and Transesophageal Echocardiogram

Multidetector computed tomography evaluation of the (A) sagittal plane, (B) axial plane, and (C) frontal plane demonstrates low-attenuation mass on noncoronary (NC) and left coronary (LC) cusps consistent with thrombus formation. Interestingly, right coronary (RC) cusp does not seem affected. (D) Short-axis and (E) x-plane transesophageal echocardiography showing hypoechoic formation on NC and LC cusps with deviated and turbulent flow at color Doppler. See [Online Videos 1 and 2](#).

anticoagulant agents are more effective than antiplatelet therapy (single or double) (3) to both prevent and treat this phenomenon. The clinical and therapeutic implications of this finding warrant further investigation.

Last, this case shows the importance of maintaining a high index of suspicion in patients presenting with elevated transvalvular gradients (with or without heart failure symptoms) after surgical or

percutaneous aortic valve replacement and the utility of multimodality imaging to detect reversible causes of valve dysfunction, also keeping in mind the possibility of very late leaflet thrombosis.

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KEY WORDS aortic stenosis, sutureless aortic valve, thrombosis

APPENDIX For a supplemental figure and videos, please see the online version of this paper.