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IMAGES IN INTERVENTION

Subclinical Leaflet Thrombosis After Transcatheter Mitral Valve-in-Ring Implantation

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A 66-year-old man with a history of ischemic cardiomyopathy (ejection fraction 35%) and severe functional mitral regurgitation underwent coronary artery bypass grafting and mitral valve repair by quadrangular resection of the posterior leaflet and 30-mm Carpentier-Edwards annuloplasty ring (Edwards Lifesciences, Irvine, California) implantation in 2012. In 2015, after mitral valve repair failure with severe regurgitation, a transapical mitral valve-in-ring procedure with implantation of a 26-mm Edwards Sapien 3 transcatheter heart valve (THV) was performed, due to high surgical risk. The patient was discharged on dual antiplatelet therapy (aspirin and clopidogrel) for 6 months, with a residual mean pressure gradient of 4 mm Hg. After 2 years, he was admitted to the emergency department for vasovagal syncope. At the time of presentation, he was on aspirin alone. Transesophageal echocardiography (TEE) showed normal THV hemodynamic with a mean pressure gradient of 4 mm Hg and mild intraprosthetic regurgitation. However, mild spontaneous echo contrast in the left atrium was present, and a hypoechoic thickening on the ventricular side of the 2 posterior leaflets was evident, with concomitant reduced diastolic opening (**Figures 1A and 1B**, Online Video 1). Taken together, these findings were consistent with subclinical THV thrombosis. Anticoagulant treatment with vitamin K antagonist with a target international normalized ratio of 2.5 was started, after enoxaparin bridging and aspirin interruption. After 8 weeks, follow-up TEE showed complete resolution of leaflet thickening with restored leaflet motion and reduction of spontaneous echo contrast (**Figure 1C**, Online Video 2).

Transcatheter mitral valve-in-ring and valve-in-valve procedures have become valid therapeutic options for high-risk patients with failed annuloplasty rings or degenerated bioprosthetic valves (1). Subclinical leaflet thrombosis seems far from being a rare condition and may also affect THVs implanted in the mitral position (2,3). Limited data are available about its role in prosthetic dysfunction, thromboembolic risk, and valve durability or whether it could be prevented with routine anticoagulation. Two-dimensional and 3-dimensional TEE are fundamental imaging modalities for the diagnosis, although further data are needed to define their sensitivity and specificity. Anticoagulation represents the treatment of choice and may confirm the diagnosis (4).

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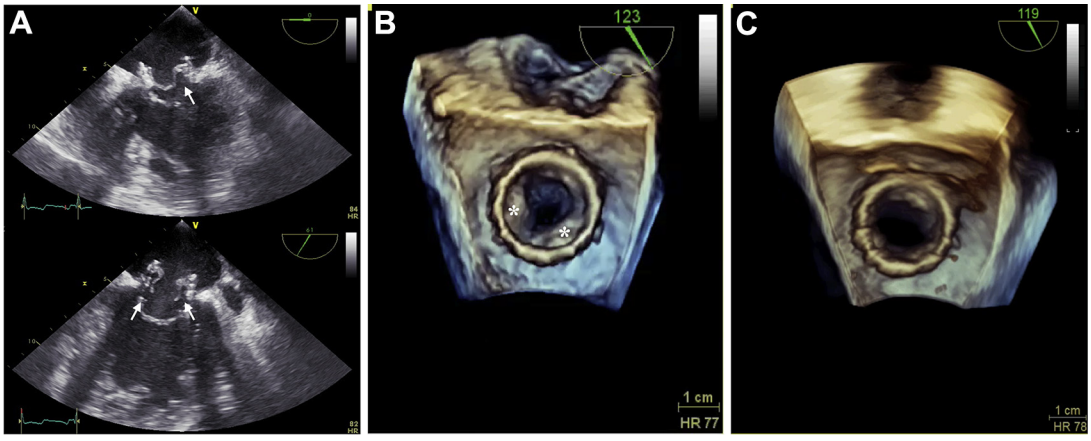
FIGURE 1 Transesophageal Echocardiography



Multiple 2-dimensional views **(A)** and 3-dimensional atrial perspective reconstruction in diastole **(B)** demonstrate a hypoechoic thickening of the 2 posterior leaflets on their ventricular side **(arrows)**, with concomitant reduced opening **(asterisks)**, consistent with thrombus formation (Online Video 1). Interestingly, diastolic flow turbulence related to native mitral valve could play a role in thrombus formation. Follow-up 3-dimensional transesophageal echocardiography (TEE) shows complete resolution of leaflet thickening and restoration of motion **(C)** (Online Video 2).

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KEY WORDS 3D transesophageal echocardiography, subclinical leaflet thrombosis, transcatheter heart valve, transcatheter mitral valve-in-ring

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