

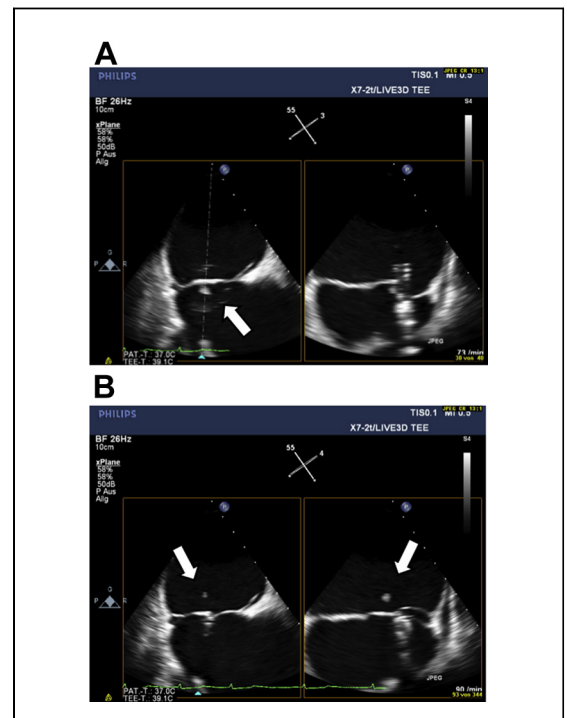
IMAGES IN INTERVENTION

# Thrombus Formation at the MitraClip System During Percutaneous Mitral Valve Repair



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Percutaneous mitral valve repair is increasingly used to improve mitral regurgitation in patients who are considered not suitable for surgery, without significant thrombus-related complications (1,2). We report, for the first time, an acute thrombus formation on the right atrial side of the atrial septum adjacent to the MitraClip steerable guide catheter ([SGC]; Abbott Vascular, Santa Clara, California), which was successfully recovered. An 86-year-old woman with a clinically relevant severe, functional mitral regurgitation was referred to our clinic for percutaneous mitral valve repair. One MitraClip was successfully placed, resulting in a significant improvement and acceptable result with mild to moderate remaining mitral regurgitation. Repeated doses of heparin were applied, leading to an activated clotting time of 356 s. In preparation to retract the delivery system, a highly mobile thrombus was detected by transesophageal echocardiography, which appeared to be attached to the right side of the atrial septum next to the SGC. The thrombus had a polyplike shape with an oval body (7 × 5 mm) and a hairlike appendix of 15 mm in length (Figure 1A, Online Video 1). To our concern, a cardiac cycle-dependent prolapse on the left atrial side was noted through the iatrogenic atrial septum defect at the SGC puncture site, posing a threat for left-sided embolism (Figure 1B, Online Video 2). The thrombus was recovered by thrombus aspiration through the slowly retracted SGC (Online Video 2) after a possible

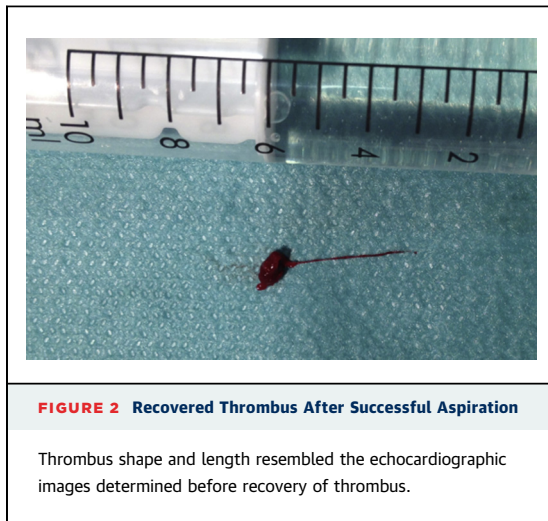


**FIGURE 1** Echocardiographic Images of the Thrombus

(A) Imaging of the thrombus on the right side of the atrial septum next to the MitraClip steerable guide system visualized by transesophageal echocardiography (size 7 × 5 mm, with a tail length of 15 mm). (Online Video 1) (B) Thrombus with cycle-dependent intermittent prolapse to the left atrial side. White arrows indicate thrombus position (Online Video 2).

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systemic embolization was prevented by increasing left atrial pressure (via increasing systemic pressure

by norepinephrine infusion) and reducing right atrial pressure (by decreasing pulmonary resistance via the increase of inspiratory oxygen concentration to 100%). The retrieved blood volume was flushed through a filter, displaying a thrombus resembling the echocardiographic features (**Figure 2**, **Online Video 3**). No residual thrombus was found by transthoracic echocardiography, and no post-procedural embolic events became evident.

In summary, thrombus formation on the MitraClip system can occur despite an effective anticoagulant regimen. We therefore urge careful screening for thrombus formation during and at the end of any MitraClip procedure.

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**KEY WORDS** complication management, MitraClip, percutaneous mitral valve repair, thrombus, thrombus aspiration

**APPENDIX** For accompanying videos, and their legends, please see the online version of this article.