

IMAGES IN INTERVENTION

Low-Dose and Slow-Infusion Thrombolysis for Prosthetic Valve Thrombosis After a Transcatheter Valve in the Mitral Position



John Roosen, MD,^a Peter Haemers, MD,^{a,b} Peter Verhamme, MD, PhD,^b Koen Ameloot, MD,^{a,b} Herbert De Praetere, MD^{a,b}

An 82-year-old female patient with a history of aortic valve replacement and mitral valve repair was admitted several times with severe heart failure due to severe mitral valve regurgitation (Figure 1A). Given the poor prognosis and the high operative risk of redo surgery (European System for Cardiac Operative Risk Evaluation II 40.63%), the heart team scheduled the patient for a valve-in-ring procedure. A left anterolateral minithoracotomy was performed, the apex was punctured and a Safari wire (Boston Scientific, Marlborough, Massachusetts) was placed in the left atrium. Using a BOLT sheath (Boston Scientific), a 23-mm LOTUS valve (size based on the preoperative ultrasound with valve diameter of 1.5 mm × 1.8 mm) (Boston Scientific) was smoothly delivered in the mitral annulus and gradually deployed (Figure 1B). In the final position, the grade of mitral regurgitation was reduced to less than grade 1 with only slight obstruction of the left ventricular outflow tract (Figure 1C). Hemodynamics improved immediately after valve implantation, dual antiplatelet therapy (aspirin, clopidogrel) was started, and patient was discharged home after 10 days. Six weeks later, the patient presented with pulmonary edema. Ultrasound revealed a severe increase of the mitral valve gradient with confirmation of prosthetic valve

thrombosis (Figure 1D). Low-dose alteplase (1 mg/h) in combination with fondaparinux (2.5 mg, given previously positive heparin-induced thrombocytopenia antibodies) was administered. During 38 h of thrombolysis, gradual improvement of the clinical condition and the mitral valve gradient were observed. Echocardiography confirmed resolution of thrombotic material (Figures 1E to 1H). Patient was discharged with oral vitamin K antagonists in combination with aspirin. To the best of our knowledge, this is the first case of thrombosis of a transcatheter valve in the mitral position. The position of the transcatheter valve is more atrialized compared to the conventional position of a surgical mitral valve. This might cause a worse wash-out of blood by the flow in the outflow tract. It remains open to discussion whether patients with transcatheter valves in more prothrombotic mitral position would benefit from post-operative anticoagulation as suggested for surgical mitral valve replacement.

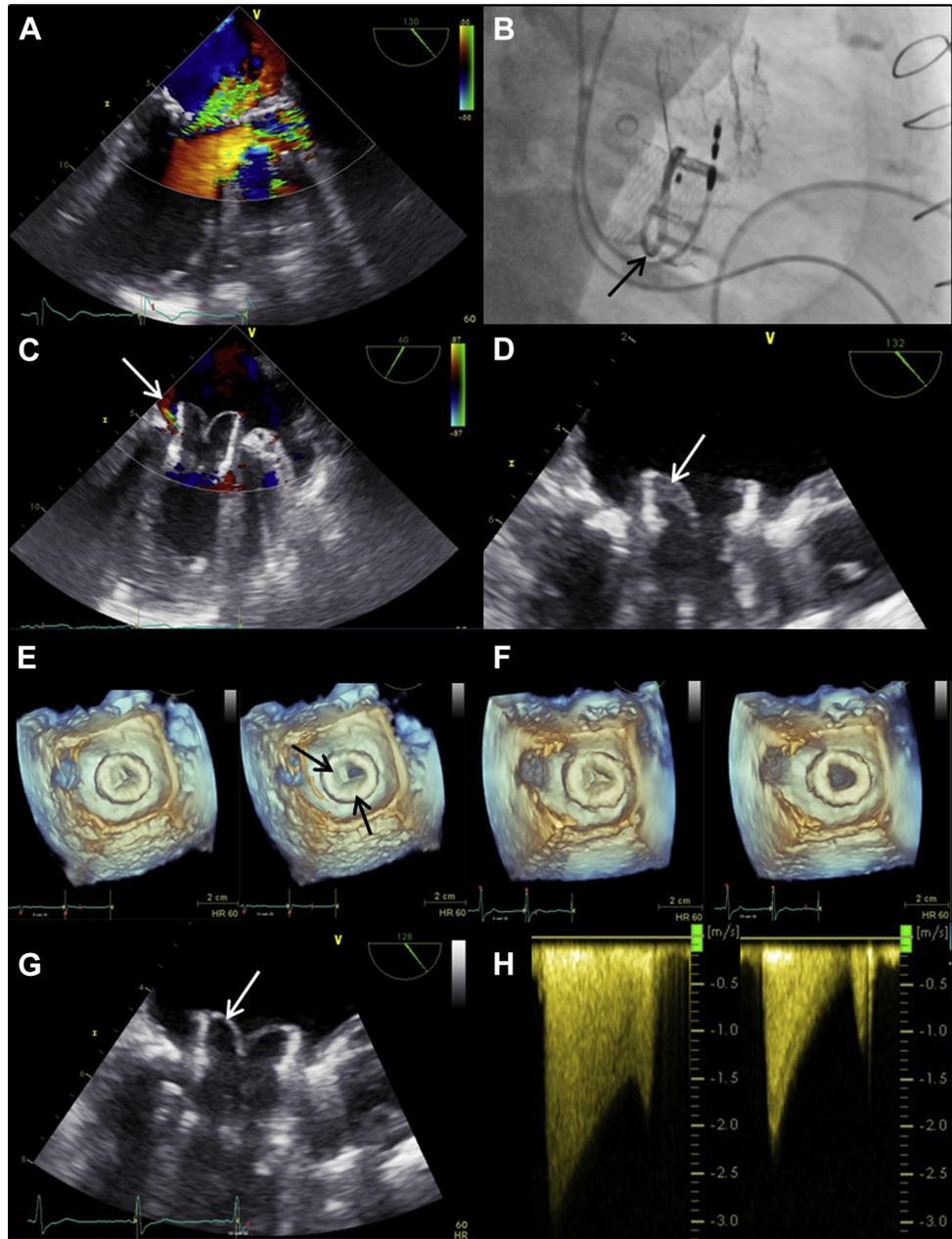
ADDRESS FOR CORRESPONDENCE: Dr. Peter Haemers, Cardiology Department, Imelda Hospitals Bonheiden, Imeldalaan 9, 2820 Bonheiden, Belgium. E-mail: peter.haemers@kuleuven.be.

KEY WORDS mitral position, thrombolysis, transcatheter valve

From the ^aCardiology Department, Imelda Hospitals Bonheiden, Bonheiden, Belgium; and the ^bDepartment of Cardiovascular Sciences, University Hospitals Leuven, Leuven, Belgium. The authors have reported that they have no relationships relevant to the contents of this paper to disclose. Drs. Roosen and Haemers contributed equally to this study.

Manuscript received December 26, 2016; revised manuscript received January 19, 2017, accepted January 26, 2017.

FIGURE 1 Thrombolysis of a Transcatheter Valve in the Mitral Position



(A) Prior to mitral intervention there was severe mitral regurgitation. **(B)** Fluoroscopic image after placement of the transcatheter valve in the mitral position (**arrow**). **(C)** Transesophageal ultrasound after placement of transcatheter valve in the mitral position showing only a mild paravalvular mitral regurgitation (**arrow**). **(D)** Six weeks after discharge, ultrasound reveals thrombotic material (**arrow**) at the ventricular side of the LOTUS valve (Boston Scientific, Marlborough, Massachusetts) leaflets. **(E)** Three-dimensional ultrasound imaging showing a closed valve with 3 leaflets during systole. During diastole, 2 of 3 leaflets are immobilized by thrombotic material (**arrows**), inducing a severe mitral valve stenosis. **(F)** After low-dose and slow infusion thrombolytic therapy, 3-dimensional ultrasound imaging demonstrates a recovery of the mobility of all 3 leaflets, with a full opening of the LOTUS valve during diastole. **(G)** Disappearance of all thrombotic material at the ventricular side of the leaflets (**arrow**, same view as **D**). **(H)** After thrombolytic therapy, continuous-wave Doppler ultrasound showing a normalization of the mean mitral valve gradient (before: 15 mm Hg, after: 5 mm Hg) and the calculated mitral valve area (before: 0.93 cm², after: 1.69 cm²).