

IMAGING VIGNETTE

ADVANCED

CLINICAL VIGNETTE: STRUCTURAL HEART DISEASE

Kissing Balloon “Valvuloplasty” of Obstructed Mechanical Aortic Valve

When You Are Running Out of Options



David Smith, MD,^a Ayush Khurana, MPhil,^a Aprim Youhana, MD,^b Adrian Ionescu, DM, MD^a

ABSTRACT

We report an unusual case where “stuck” bileaflet aortic prosthetic valve occluders were partly released by performing emergency balloon dilatation with 2 noncompliant balloons by a percutaneous femoral approach. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2022;4:799–801) © 2022 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 76-year-old woman was admitted to hospital. She had previously undergone coronary artery bypass grafting with aortic valve replacement (AVR) and mitral valve replacement (MVR) with mechanical St Jude valves (Abbott) (#23 and #29, respectively) for rheumatic heart disease 14 years earlier. She had been asymptomatic until this admission. A week before admission, her warfarin had been replaced with enoxaparin before a bone marrow biopsy. Her international normalized ratio had decreased to 1.4. Two days later, she developed rapidly progressive dyspnea and was admitted.

Fluoroscopy demonstrated severe restriction of the AVR occluders (Figure 1A, Video 1) with normal MVR function (mean diastolic gradient on Doppler imaging had been 4 mm Hg). Systemic thrombolysis with tissue-type plasminogen activator (t-PA) produced no clinical or echocardiographic improvement. The patient declined reoperation and continued to deteriorate hemodynamically, with new, severe left ventricular (LV) impairment (ejection fraction [EF], 35%) resulting from afterload mismatch from the obstructed valve and with persistent hypotension.

With the patient under general anesthesia, we attempted percutaneous release of the disks after pre-procedural bench testing of an identical bileaflet mechanical aortic valve prosthesis for accurate balloon sizing. A Sentinel cerebral protection device (Boston Scientific) was placed from the right radial artery, and an 8-F sheath was placed from the right femoral artery. A Sion angioplasty guidewire (Asahi Intecc) passed between the disks, and a 2.5-mm semicompliant balloon, followed by a 3.5-mm balloon, was inflated at 20 atm at multiple levels across and behind the valve occluders, thereby improving the motion of the anterior occluder. We delivered 20 mg of t-PA locally through the guide catheter, without improvement. We wired both sides of the stuck posterior occluder and then simultaneously inflated a 3.5-mm balloon centrally and a 6-mm balloon

From the ^aDepartment of Cardiology, Morrision Cardiac Centre, Swansea Bay University Health Board, Swansea, United Kingdom; and the ^bDepartment of Cardiac Surgery, Morrision Cardiac Centre, Swansea Bay University Health Board, Swansea, United Kingdom. Marco Barbanti, MD, served as Guest Associate Editor for this paper.

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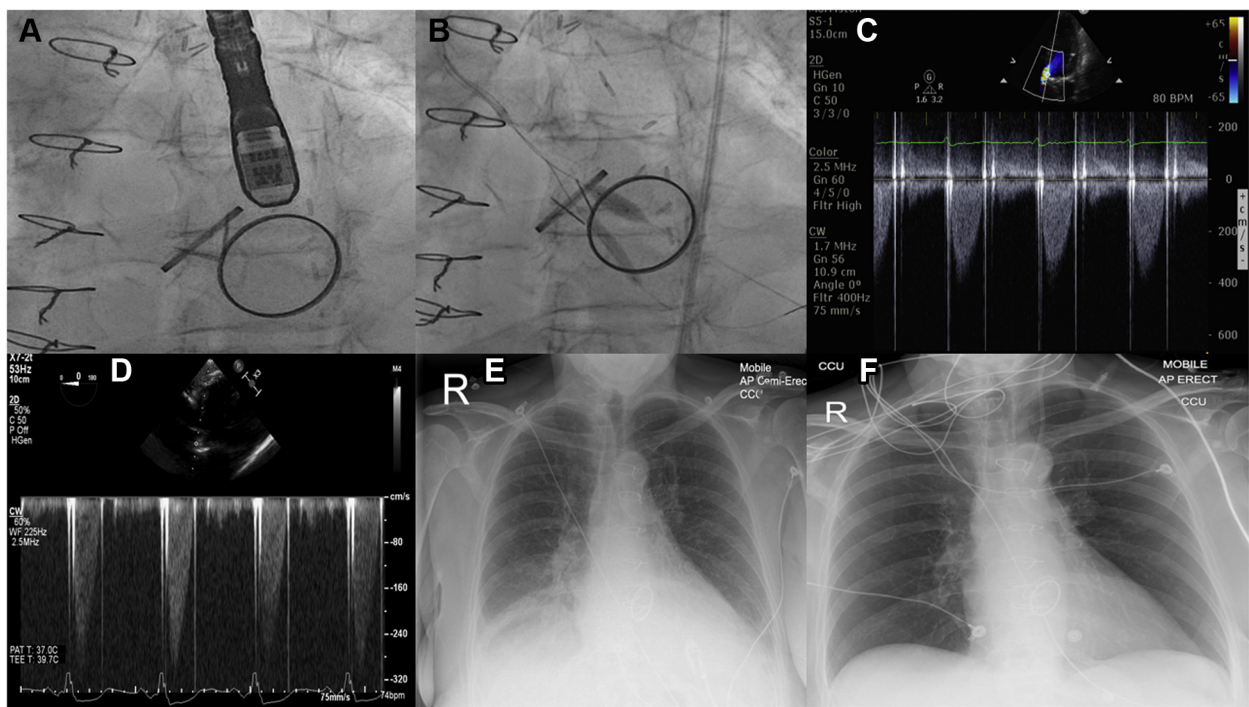
**ABBREVIATIONS
AND ACRONYMS**

AVR = aortic valve replacement
EF = ejection fraction
LV = left ventricular
MVR = mitral valve replacement
t-PA = tissue-type plasminogen activator

on the other side of the occluder to release it (Figure 1B, Videos 2 to 5). The peak velocity across the AVR decreased from 4.1 to 3 m/s (Figures 1C and 1D). Pulmonary edema resolved on the chest radiograph (Figures 1E and 1F), and this was accompanied by clinical improvement; there was no evidence of damage to the occluders on repeat echocardiography.

Thrombolysis is an accepted option for the treatment of obstructive thrombosis of prosthetic valves,¹ but there was no improvement clinically or on imaging after its use systemically or locally in our patient. With emergency reoperation initially refused by the patient, valvuloplasty became the only intervention feasible² in the context of worsening hemodynamic parameters and clinical deterioration. The success of this intervention allowed the LVEF to improve. The patient agreed to undergo redo valve replacement surgery, but she died of pneumonia and sepsis before that could be performed.

FIGURE 1 Balloon Valvuloplasty of Bileaflet Prosthetic Aortic Valve



(A) Fluoroscopic en face view of bileaflet mechanical aortic prosthesis showing stuck occluders. **(B)** Simultaneous inflation of a 3.5-mm balloon centrally and a 6-mm balloon on the other side of the occluder. **(C and D)** Pre- and post-gradients on Doppler echocardiography. **(E)** Chest radiograph before percutaneous intervention showing pulmonary congestion. **(F)** Chest radiograph post-balloon intervention showing resolution of chest congestion.


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ADDRESS FOR CORRESPONDENCE: Dr A. Ionescu, Department of Cardiology, Morriston Cardiac Centre, Swansea Bay University Health Board, Heol Maes Eglwys, Swansea SA6 6NL, United Kingdom. E-mail: adrian.ionescu@wales.nhs.uk.

REFERENCES

1. Biteker M, Altun I, Ozcan B, Dogan V, Yldirim B, Erguna G. Treatment of prosthetic valve thrombosis: current evidence and future directions. *J Clin Med Res*. 2015;7:932-936.
2. Kandzari DE, Carlson H, Gott JP, Kaul P, Brown WM. Balloon "valvuloplasty" for mechanical valve dysfunction. *J Am Coll Cardiol Intv*. 2017;10(5):e47-e49.

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

KEY WORDS mechanical valves, obstructed occluders, pannus