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VALVULAR HEART DISEASE MINI-FOCUS ISSUE

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Asymmetric Calcification in Rheumatic Mitral Stenosis and Implications for Balloon Valvuloplasty

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ABSTRACT

A 50-year-old man with severe rheumatic mitral stenosis was deemed too high risk for surgery and was referred for percutaneous balloon valvuloplasty. The valvuloplasty was successful in reducing the transmitral gradient and improving the patient's symptoms; however, it was complicated by a tear in the posteromedial commissure and moderate mitral regurgitation. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2019;1:493–4) © 2019 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 50-year-old man with a past medical history of severe rheumatic mitral stenosis began to experience increased dyspnea on exertion. The patient's Wilkins score was 14 on the basis of limited valve mobility, extensive valvular and subvalvular thickening, and severe calcification, as assessed by transesophageal echocardiography (TEE) (**Figure 1A**) (1). Because of the presence of severe pulmonary hypertension and severely reduced right ventricular function, the patient was deemed to be a high-risk surgical candidate after multidisciplinary discussion between the cardiology and cardiothoracic surgery departments. The decision was made to proceed with percutaneous balloon mitral valvuloplasty.

On initial intraprocedural evaluation, 3D TEE with transillumination showed a heavily calcified, rheumatically deformed mitral valve with a small orifice of 0.8 cm^2 (**Figure 1B**, blue arrow, Video 1) (2). Next, TEE was used to guide the mitral balloon valvuloplasty procedure with a 28-mm Inoue balloon (Toray, New York, New York) that was inflated to 28 mm across the mitral valve (**Figure 1C**, blue arrow, Video 2). TEE post-valvuloplasty (**Figure 1D**, yellow arrow) showed an increased area of the mitral valve orifice of 1.9 cm^2 (**Figure 1E**, blue arrow, Video 3) with color Doppler showing moderate mitral regurgitation (**Figure 1F**, Video 4). The transmitral gradient decreased from 24.3 to 7.1 mm Hg. Although the patient had significant improvement in his degree of mitral stenosis post-valvuloplasty, the asymmetric calcification near the anterolateral commissure likely resulted in the nonuniform expansion of the mitral valve and a tear in the posteromedial commissure, ultimately causing moderate mitral regurgitation.

At 2 weeks following the mitral valvuloplasty procedure, the patient was able to return to work after reporting improvement in his dyspnea and an increased walking distance. A follow-up transthoracic echocardiogram showed reduction in right ventricular systolic pressure from 101.1 to 42.7 mm Hg with significant improvement in right ventricular systolic function.

This case illustrates the challenges associated with balloon valvuloplasty in the setting of severe, rheumatically deformed mitral stenosis with a high Wilkins score.

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Informed consent was obtained for this case.

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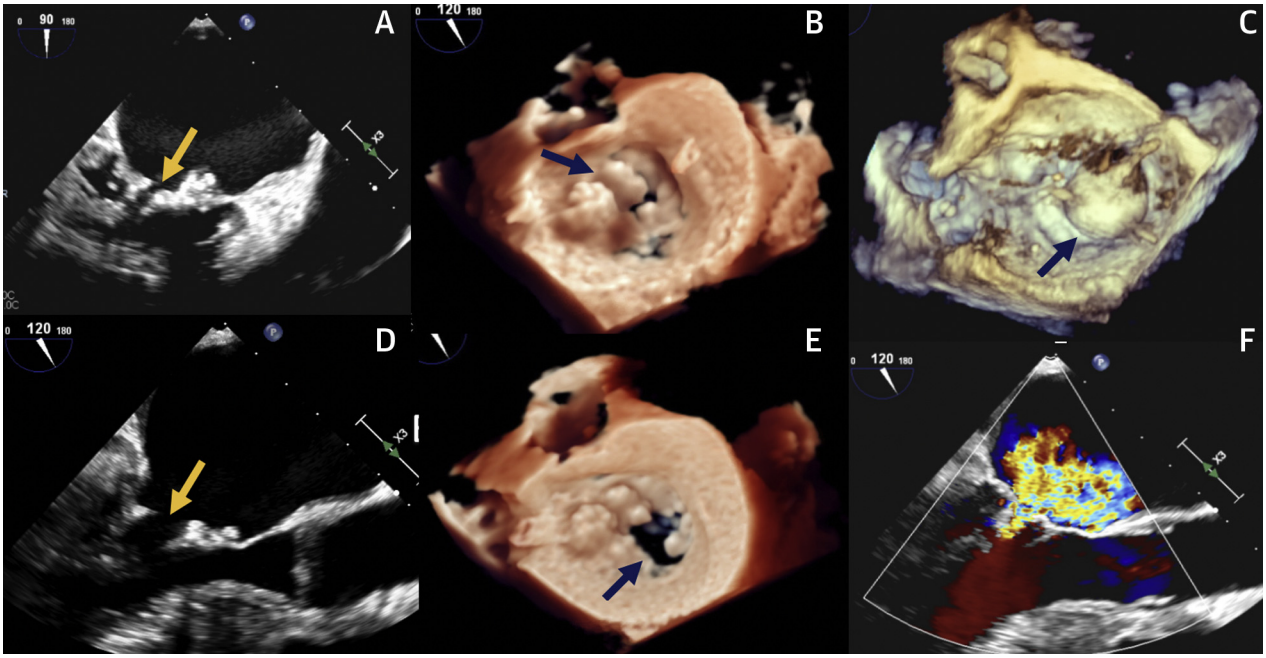
ABBREVIATION AND ACRONYM

TEE = transesophageal echocardiogram

FIGURE 1 Mitral Balloon Valvuloplasty Imaging Panel



(A) Pre-procedural transesophageal echocardiogram showing a heavily calcified, rheumatically deformed mitral valve with a small orifice **(yellow arrow). (B)** A 3-dimensional echocardiogram with transillumination (2) (Philips, Amsterdam, the Netherlands) was used to highlight the small mitral valve orifice (0.8 cm^2) with severe, asymmetrical calcification near the anterolateral commissure **(blue arrow). (C)** Next, transesophageal echocardiography was used to guide the mitral balloon valvuloplasty procedure with an Inoue balloon that was inflated to 28 mm across the mitral valve **(blue arrow). (D)** Transesophageal echocardiography post-valvuloplasty showed increased area of the mitral valve orifice **(yellow arrow). (E)** A 3-dimensional echocardiogram with transillumination highlighted the enlarged mitral valve area post-valvuloplasty (1.9 cm^2) with a tear in the posteromedial commissure **(blue arrow). (F)** Transesophageal echocardiography with color Doppler showed moderate mitral regurgitation post-valvuloplasty. See Videos 1, 2, 3, and 4.

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REFERENCES

1. Wilkins GT, Weyman AE, Abascal VM, et al. Percutaneous balloon dilatation of the mitral valve: an analysis of echocardiographic variables related to outcome and the mechanism of dilatation. Br Heart J 1988;60:299–308.

2. Genovese D, Addetia K, Kebed K, et al. First clinical experience with 3-dimensional echocardiographic transillumination rendering. J Am Coll Cardiol Img 2019;12:1868–71.

KEY WORDS 3-dimensional imaging echocardiography, imaging, mitral valve, rheumatic heart disease, stenosis

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