

## IMAGING VIGNETTE

## INTERMEDIATE

## CLINICAL VIGNETTE

# 3-Dimensional Multiplanar Reconstruction With Transesophageal Echocardiography for Alcohol Septal Ablation



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## ABSTRACT

This study described the first experience with 3-dimensional multiplanar reconstruction transesophageal echocardiography to guide percutaneous alcohol septal ablation. This study demonstrated that 3-dimensional transesophageal echocardiography multiplanar reconstruction allowed for simultaneous assessment of the targeted myocardial area from left ventricular base to apex, akin to imaging seen with spatial imaging with cardiac magnetic resonance. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2023;24:102016) © 2023 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/>).

Contrast echocardiographic guidance is imperative to improve the hemodynamic result and decrease complications associated with percutaneous alcohol septal ablation. Three-dimensional (3D) multiplanar reconstruction (MPR) transesophageal echocardiography (TEE) has been used successfully in both transcatheter mitral and tricuspid valve interventions.<sup>1-3</sup> This report describes the first experience with 3D TEE MPR to guide percutaneous alcohol septal ablation.

An 83-year-old woman with severe symptomatic hypertrophic obstructive cardiomyopathy (NYHA functional class III) despite maximally tolerated medical therapy was treated in our institution. Invasive hemodynamic assessment was performed with transeptal puncture and a balloon wedge catheter in the left ventricle, documenting a left ventricular outflow tract (LVOT) gradient of 75 mm Hg at rest ([Supplemental Figure 1A](#)) with echocardiographic evidence of systolic anterior motion of the anterior mitral valve leaflet ([Supplemental Figure 2](#)). The most proximal septal perforator was identified angiographically and wired with a 0.014-inch guidewire followed by placement of a 2.0-mm over-the-wire angioplasty balloon and inflation to 3 atm ([Supplemental Figure 3](#)). Following removal of the guidewire, angiographic and echocardiographic contrast (Definity, Lantheus) was injected. Using Philips Epiq 3D TEE MPR was generated from a 0° view with x-plane across the LVOT and alignment of plains of interest at basal septum. This imaging allowed simultaneous assessment of the targeted myocardial area from left ventricular base to

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Nicole Bhave, MD, served as Guest Associate Editor for this paper. James Januzzi, Jr, MD, served as Guest Editor-in-Chief for this paper.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

Manuscript received March 2, 2023; revised manuscript received May 22, 2023, accepted August 14, 2023.

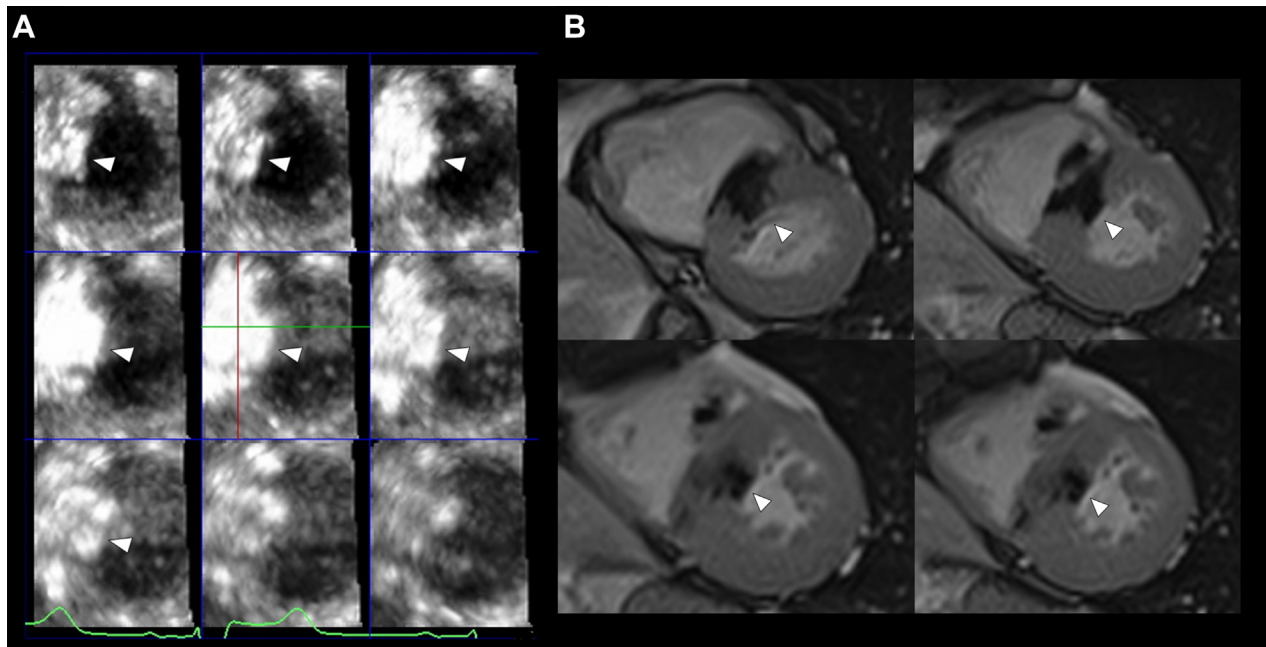
**ABBREVIATIONS  
AND ACRONYMS****3D** = 3-dimensional**LVOT** = left ventricular outflow tract**MPR** = multiplanar reconstruction**TEE** = transesophageal echocardiography

apex, akin to imaging seen with spatial imaging with cardiac magnetic resonance (**Figure 1**). Additionally, this imaging demonstrated transmural enhancement localized to the basal anteroseptal myocardium, with mild hypokinesis and sparing of the inferomedial papillary muscle and ventricular free-wall. A total of 1.8 mL of ethanol were infused leading to hypokinesis of the basal most segment of the anterior septum (**Figure 1A**). Following septal ablation, the resting LVOT gradient was reduced to 10 mm Hg, with a mild provokable gradient of 20 mm Hg and evidence of normal left atrial pressure (mean, 10 mm Hg) (**Supplemental Figure 1B**). Subsequent cardiac magnetic resonance revealed microvascular obstruction of the basal anteroseptum with late peri-obstruction enhancement, coinciding with the territories demonstrated on 3D TEE MPR (**Figure 1B**, **Supplemental Figures 4A to 4E**) and acceleration across the LVOT (**Supplemental Figure 4F**). The hemodynamic results were sustained on 30-day echocardiography.

For patients undergoing alcohol septal ablation, 3D-TEE MPR contrast imaging can improve target area demarcation through assessment of multiple myocardial areas simultaneously, potentially enhancing procedural guidance and safety.

**FUNDING SUPPORT AND AUTHOR DISCLOSURES**

Dr Sorajja has served as a consultant for 4C Medical, Abbott Structural, Anteris, Boston Scientific, Edwards LifeSciences, Evolution Medical, Foldax, HighLife, Medtronic, Shifamed, Shockwave, TriFlo, VDyne, and WL Gore. Dr Hamid has served as a consultant for Anteris, Edwards Lifesciences, Philips, Alleviant Medical, AMX Axis, 4C Medical, Valcare Medical, VDyne, and WL Gore. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

**FIGURE 1** Utility of Multimodality Imaging of the Target Area During and After Alcohol Septal Ablation

(A) Three-dimensional transesophageal echocardiography multiplanar reconstruction with short-axis view of the entire left ventricle, from base to apex, with contrast enhancement of the target area during alcohol ablation (arrows). (B) Subsequent cardiac magnetic resonance showing corresponding areas of microvascular obstruction (arrow) in the same patient.

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**KEY WORDS** alcohol septal ablation, multiplanar reconstruction, transesophageal echocardiography

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