

ACC IMAGING COUNCIL HIGHLIGHTS

ADVANCED

IMAGING VIGNETTE: CLINICAL VIGNETTE

MitraClip Implantation in a Patient With Post-Surgical Repair of Primum Atrial Septal Defect and Residual Mitral Cleft



Mark J. Russo, MD, MS,^a Aakash Garg, MD,^b Alexis Okoh, MD,^a Ashok Chaudhary, MD,^c Abdul Hakeem, MD,^c Leonard Y. Lee, MD,^a Chunguang Chen, MD^d

ABSTRACT

This paper presents the case of a 67-year-old female with primum atrial septal defect and congenital mitral cleft status-post surgical repair 40 years previously who was recently found to have severe mitral regurgitation. Percutaneous mitral valve repair was successfully performed using implantation of 2 MitraClips with mild residual mitral regurgitation. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2020;2:2027-9) © 2020 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/>).

Percutaneous mitral valve (MV) repair is primarily used for patients with acquired degenerative mitral regurgitation (MR) and high surgical risk and for patients with secondary MR with suitable anatomy if still symptomatic on optimal medical therapy (1). MitraClips (Abbott Vascular, Santa Clara, California) are considered unfavorable for patients with MR due to congenital mitral cleft, and surgical correction is the mainstay of treatment. This paper describes a novel approach to MitraClip implantation in a patient who had surgical repair of partial atrioventricular canal defect and mitral cleft 40 years previously.

A 67-year-old female with severe lung disease (forced expiratory volume in 1 s = 43%) requiring home oxygen and who previously underwent surgical repair of an atrioventricular canal defect using a fabric membrane patch (Gortex, Gortex, Reisterstown, Maryland) and an attempted MV repair was referred to the authors' center for evaluation of progressive dyspnea. Echocardiography showed severe MR and mild left ventricular dilation with reduced ejection fraction of 40%. Transesophageal echocardiography (TEE) showed severe MR from 2 regurgitant jets (**Figure 1A, Video 1**); one MR jet was centered between A2 and P2 (A2/P2), whereas the other jet was placed through the residual anterior leaflet cleft laterally. Three-dimensional (3D) TEE revealed a thickened mid-A2 segment and a cleft between A2/A1 with distorted anterior mitral leaflet shape (**Figure 1B**). Given the patient's high surgical risk and severe chronic lung disease, the heart team decided to attempt transcatheter repair using a MitraClip.

Initially, an NTR MitraClip was placed at the A2/P2 scallops medial to the residual cleft (**Figure 1B**), which eliminated the central MR jet (**Figure 1C, right, Video 2**). However, there appeared to be moderate residual MR lateral to the clip secondary to the mitral cleft (**Figure 1C, left**). A second NTR MitraClip was then aligned

From the ^aDivision of Cardiac Surgery and Structural Heart Disease, Robert Wood Johnson Medical School, Rutgers, New Jersey; ^bCardiovascular Institute, Robert Wood Johnson Medical School, Rutgers, New Jersey; ^cDivision of Cardiology, Robert Wood Johnson Medical School, Rutgers, New Jersey; and the ^dAdvanced Cardiac Imaging, Robert Wood Johnson Medical School, Rutgers, New Jersey.

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**ABBREVIATIONS
AND ACRONYMS**

MR = mitral regurgitation

MV = mitral valve

TEE = transesophageal
echocardiogram

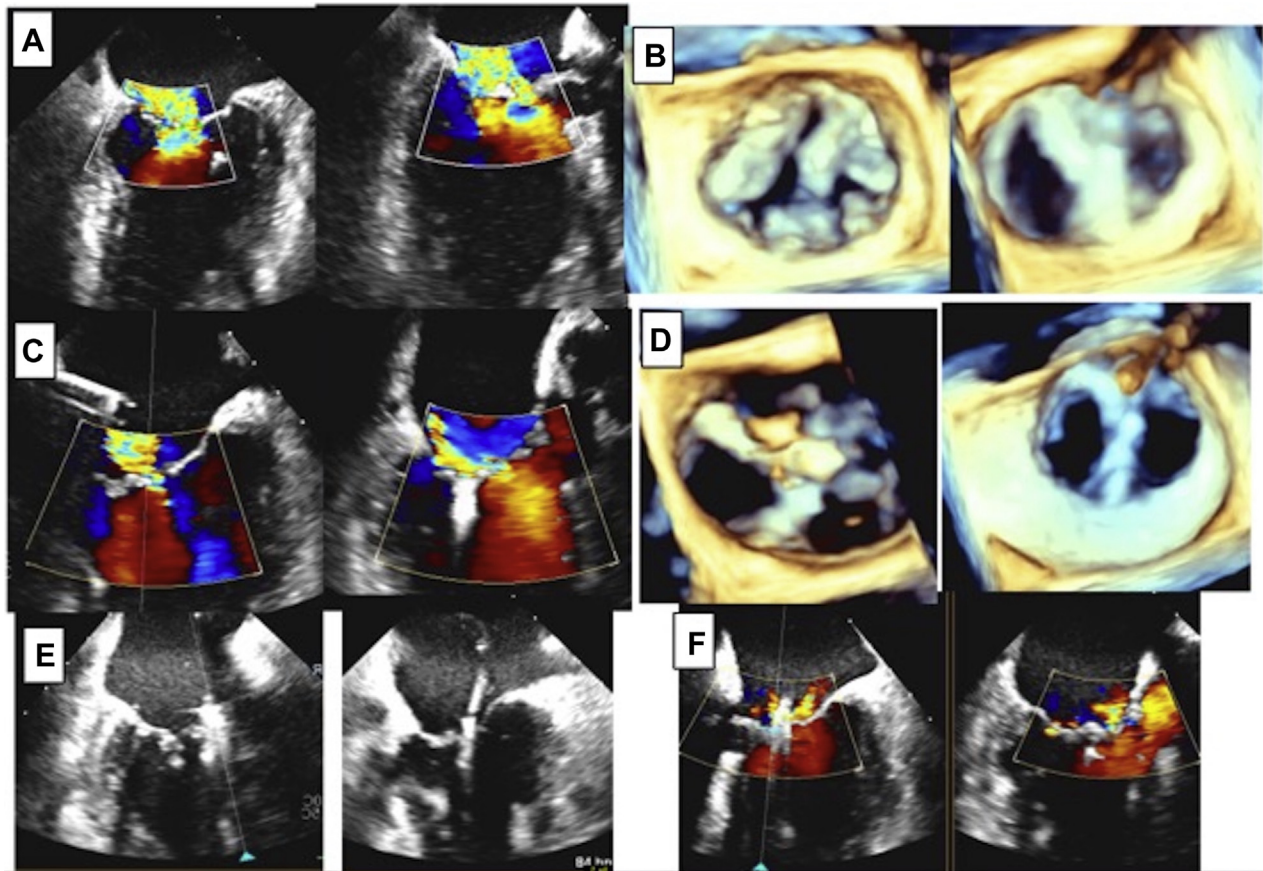
perpendicular to the first clip and deployed between A1/A2 at the base with adequate tissue grasp, thus closing the cleft (**Figure 1D**, left, E; **Supplemental Figure 1**; **Video 2**). This transformed a trileaflet MV with cleft (A1, A2/A3, and P1/P2/P3) to a double-orifice functional bileaflet MV (**Figure 1D**, right) with 1+ residual MR (**Figure 1F**, **Video 2**). The transmitral mean gradient was 5 mm Hg, and there was significant improvement in the pulmonary venous flow pattern (**Supplemental Figure 2**).

This case illustrates some unique aspects. The usual approach to implant a second MitraClip would be to grasp it as parallel as possible lateral to the first clip (2). In the present case, the A1/A2 cleft limited the grasp of a second clip immediately adjacent to the first clip. Thus, this novel approach, implanting the second MitraClip so that it grasped the cleft scallops (perpendicular to the initial clip), resembles the surgical repair and could be an effective strategy to decrease residual MR in challenging anatomies.

AUTHOR RELATIONSHIP WITH INDUSTRY

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

FIGURE 1 Biplane TEE With Commissural and LVOT Views




(A) Biplane TEE with commissural (left) and LVOT (right) views. Two MR jets, one near the A2/P2 coaptation and one through the A1/A2 cleft. (B) Distorted MV with A1/A2 cleft, focal thickening of A2 adjacent to cleft, and focal A2/P2 prolapse. (C) Post-first clip, A2/P2 jet eliminated, MR jet through the cleft noted. (D, E) MitraClip device catheter oriented perpendicularly to A1/A2 cleft on 3-dimensional enface mitral valve and implanted A1/A2 cleft clip. (F) Mild residual MR. LVOT = left ventricular outflow tract; MR = mitral regurgitation; MV = mitral valve; TEE = transesophageal echocardiogram.

ADDRESS FOR CORRESPONDENCE: Dr. Aakash Garg, 125 Paterson Street, Suite 4100, New Brunswick, New Jersey 08901. E-mail: drgarg.aakash@gmail.com. Twitter: [@Dr_Agarg_MD](https://twitter.com/Dr_Agarg_MD).

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KEY WORDS mitral cleft, MitraClip, mitral regurgitation

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