

Single Leaflet Device Attachment Complicating Percutaneous Edge-to-Edge Repair of the Tricuspid Valve Using the MitraClip

Chak-Yu So, MBChB; Kun-Chong Tam, MD; Yat-Yin Lam, MD; Alex Pui-Wai Lee, MD

A 72-year-old woman with severe mitral and tricuspid regurgitation (TR) secondary to chronic atrial fibrillation presented with refractory heart failure despite optimal medical treatment. She was considered inoperable and underwent transcatheter edge-to-edge repair of

both mitral and tricuspid valves using the MitraClip system (Abbott) as a compassionate use treatment.

AsingleMitraClipwasdeployedattheA2-P2 segments of the mitral valve, resulting in significant reduction of mitral regurgitation. Transesophageal echocardiogram revealed

thewidestregurgitantorificeofTRbetween the anterior and septal leaflets (Figure 1A, Video 1 [videos at [invasivecardiology.com/multimedia](https://www.invasivecardiology.com/multimedia)]), and the first clip for TR was implanted in the anteroseptal commissure (Video 2). Despite initial successful leaflet grasping, the clip was detached from the septal leaflet after release, resulting in single leaflet device attachment (SLDA). The detached clip repeatedly “hit” the right ventricular anterior wall, triggering multiple premature ventricular complexes (PVCs) (Figures 1B-1D, Videos 3 and 4). A second clip was deployed in the posteroseptal commissure and achieved partial stabilization of the first clip, but PVC persisted (Figure 1E, Videos 5 and 6). A third clip was deployed in the anteroposterior commissure and finally stabilized the detached clip (Figure 1F, Videos 7 and 8), resulting

in reduction of TR and cessation of the ventricular arrhythmias without tricuspid stenosis (mean gradient, 2 mm Hg).

Transcatheter treatment of severe TR using MitraClip has shown encouraging initial results. Intraprocedural SLDA is rare (<1%) when using MitraClip implantation for mitral regurgitation and has never been reported for TR. We speculate that the thinner tricuspid valve leaflet and grasping at more of the commissural side where leaflets are shorter may be more prone to lose leaflet insertion. Besides, the optimal treatment of tricuspid SLDA is unknown. We demonstrated that immediate deployment of one or more adjacent clips, particularly to the remaining attached leaflet, may stabilize the flailing clip and be a possible transcatheter treatment option for SLDA in the tricuspid valve. ■

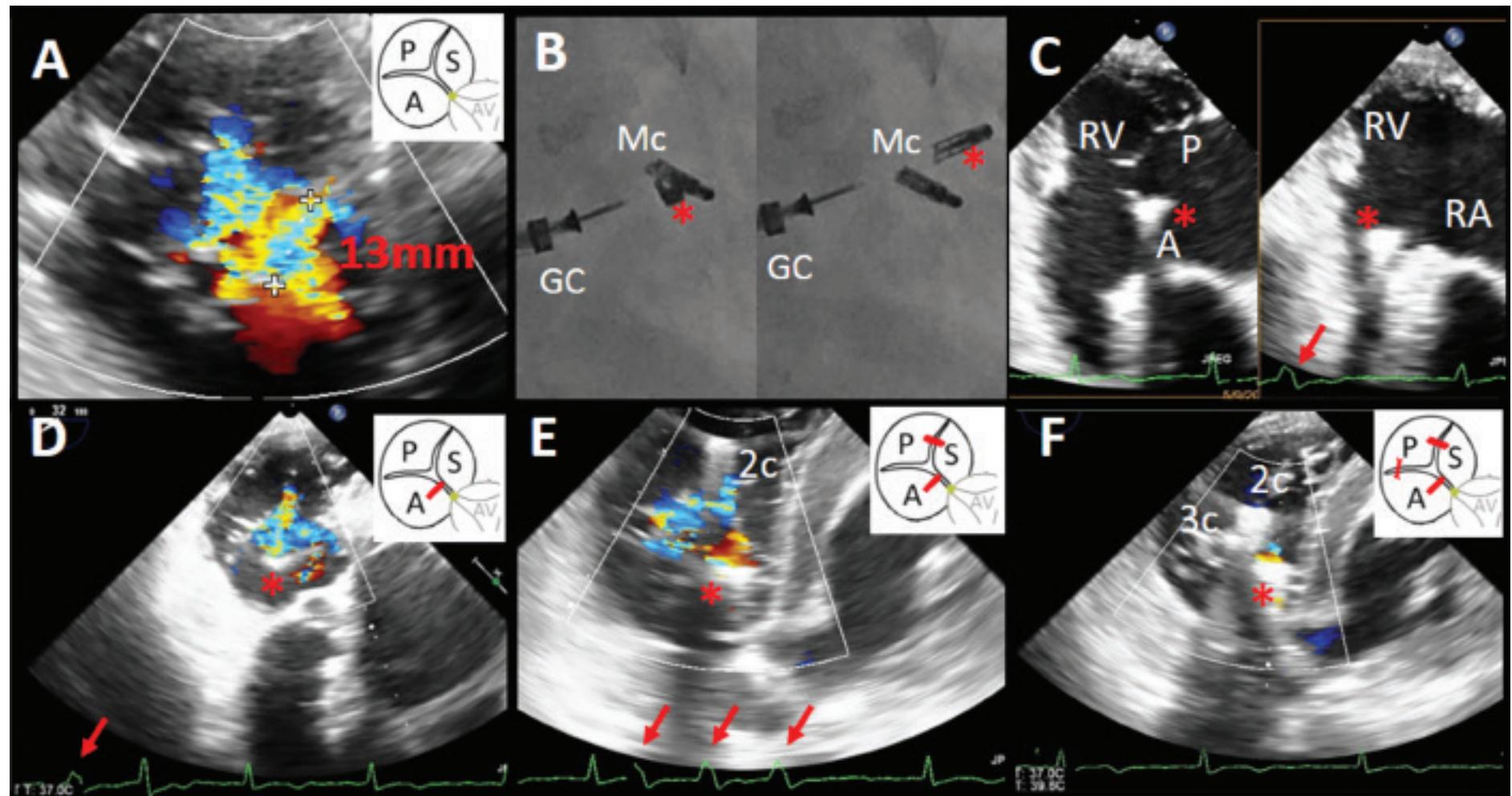


Figure 1. Transesophageal echocardiogram (TEE) and fluoroscopy images of single leaflet device attachment (SLDA) in MitraClip for tricuspid regurgitation (TR). (A) Baseline TEE at transgastric short-axis view showing the widest regurgitant orifice of TR is between the anterior and septal leaflets (A = anterior; S = septal; P = posterior leaflet; AV = aortic valve). (B) Fluoroscopy showing the flailing SLDA (* = SLDA clip; GC = guiding catheter; Mc = MitraClip placed at mitral valve). (C) TEE showing the flailing SLDA clip everted into the right atrium where it “hit” the right ventricle, triggering premature ventricular complex (RA = right atrium; RV = right ventricle; * = SLDA clip; PVC, red arrow = premature ventricular complex). (D) TEE showing significant tricuspid regurgitation after SLDA clip deployment and the presence of PVC (red arrow). (E) TEE after second clip placed at posteroseptal commissure, showing partial stabilization of the SLDA clip and reduction of tricuspid regurgitation, but PVC persisted (red arrow = PVC; 2c = second clip). (F) Final TEE after third clip was placed at the anteroseptal commissure, which stabilized the SLDA clip and resulted in further reduction of tricuspid regurgitation and cessation of ventricular arrhythmia (3c = third clip).

From the Division of Cardiology, Department of Medicine and Therapeutics, Chinese University of Hong Kong, Hong Kong SAR, China.

Video for this article is available at <https://www.invasivecardiology.com/content/transcatheter-edge-edge-repair-using-mitraclip-system>. (or visit [invasivecardiology.com/multimedia](https://www.invasivecardiology.com/multimedia)).

Funding: This work is partially funded by the Innovation and Technology Support Program Tier 3/Seed project (ITF ITS/025/16).

Disclosure: The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Lee received speaker honoraria from Abbott and unrestricted research grants from Philips, Medtronic, and Boston Scientific. The remaining authors report no conflicts of interest regarding the content herein.

Address for correspondence: Alex Pui-Wai Lee, MD, FACC, 9/F Department of Medicine and Therapeutics, Lui Che Woo Clinical Sciences Building, Prince of Wales Hospital, 30-32 Ngan Shing Street, Shatin, NT, Hong Kong SAR. Email: alexpwlee@cuhk.edu.hk