

A large iatrogenic tearing of atrial septal defect after MitraClip implantation: a rare and cautionary complication during transcatheter edge-to-edge mitral valve repair

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Case description

A 70-year-old man on haemodialysis with a history of surgical aortic valve replacement presented with exertional dyspnoea. Transesophageal echocardiography (TEE) showed severe mitral regurgitation (MR) due to P3 and posterior commissure (PC) prolapse, which are more challenging to grasp than central lesions.¹ Transcatheter edge-to-edge mitral valve (MV) repair (TEER) with MitraClip (Abbott Vascular, CA, USA) was performed for the high surgical risks. A 22-Fr steerable guide catheter (SGC) was placed through a floppy-shaped interatrial septum, and a clip delivery system (CDS) was tightly bent towards the innermost MV region to target the P3/PC segments (Supplementary material online, figures). Although CDS manipulation was difficult because of tangling with the plentiful chordae near the P3 segment while determining an optimal clipping point, both segments were optimally grasped with one NTW clip, leaving only mild MR (Figure 1A–F, see Supplementary material online, Video S1). However, a comparison of fluorography pre- and post-clip implantation confirmed that the CDS was moving downward (Figure 1G–H). Transesophageal echocardiography post-clip

implantation revealed an unexpectedly large tear (16.3-mm long) originating from an iatrogenic atrial septal defect (ASD) (Figure 1I–K, Supplementary material online, Video S2). Emergent closure of this large ASD was postponed as the patient presented normoxia despite bidirectional shunting. His New York Heart Association functional class had improved from III preoperatively to II post-procedure, and TEE 3 months later revealed no remarkable changes in size or bidirectional shunting (pulmonary-to-systemic blood flow ratio 1.4), and residual shunting did not cause hypoxaemia or progressive right ventricular failure for 6 months.

During TEER, the interatrial septum is punctured with a large-bore SGC, often causing residual ASDs.² Extensive SGC movement could cause higher persistence rates of ASDs³; however, a large, tearing iatrogenic ASD is rare and has unclear risk factors. Our case suggests that interference between a CDS and plentiful chordae during clip manipulation while targeting the innermost MV region could produce an unexpected force on the floppy-shaped atrial septum, causing a large tearing ASD. Therefore, we should carefully check the trajectory and the orientation of the CDS in the left atrium to avoid making

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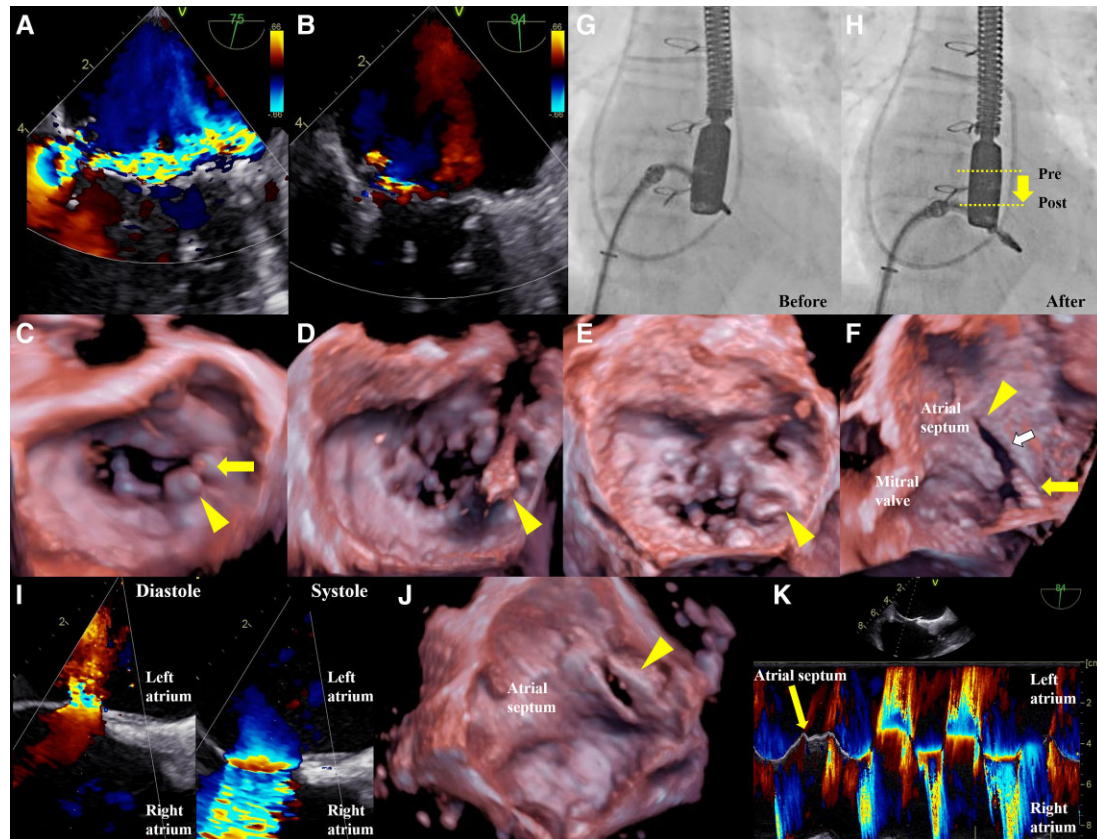
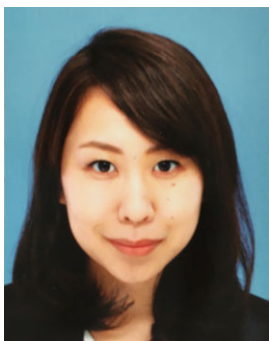


Figure 1 (A and B) Mid-esophageal bi-commissure view on transesophageal echocardiography of mitral regurgitation before and after MitraClip. (C–E) Three-dimensional images of transesophageal echocardiography show prolapse of the P3 segment (yellow arrowhead) and posterior commissure (yellow arrow) of pre-procedure (C), during the procedure with the clip delivery system (yellow arrowhead) (D), and after the procedure with the clip (yellow arrowhead). (E and F) Three-dimensional images of transesophageal echocardiography show an unexpectedly large tear (white arrow) beside the 22-Fr steerable guide catheter (yellow arrow). A yellow arrowhead indicates the initial puncture site in the middle of the foramen ovale. (G and H) Comparison of fluorography before the clip delivery system moves downward (G) and afterward (H), demonstrating the possible downward force added to the lower edge of the puncture site. (I) Bidirectional shunting through the iatrogenic atrial septum defect. (J) The large tearing iatrogenic atrial septum defect 3 months later (arrowhead). (K) Colour M-mode echocardiography shows bidirectional flow through the atrial septum defect and the excessive movement of the floppy interatrial septum (arrowhead).

unnecessary movements inside the left ventricle when treating the innermost MV region in cases with a floppy-shaped interatrial septum.

Lead author biography



Akiko Masumoto achieved her licence to practice medicine at Osaka University, Japan. After completing junior residency at Kobe City Medical Center General Hospital, she is currently a senior resident of cardiovascular medicine at Hyogo Brain and Heart Center, Japan. Her interest is in structural heart diseases and intensive cardiac care.

Supplementary material

Supplementary material is available at *European Heart Journal—Quality of Care and Clinical Outcomes* online.

Informed consent: Informed consent for publication of the case was obtained.

Conflict of interest: none declared.

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