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Case Report

Possible Transmitral Pressure Gradient Elevation in MitraClip XTR

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ABSTRACT

A 74-year-old man presented with dyspnea due to severe mitral regurgitation (MR) caused by rupture of the chordae tendineae. Percutaneous edge-to-edge mitral valve repair was performed using the MitraClip system (Abbott Vascular, Santa Clara, CA). After leaflet grasping via an XTR clip, transesophageal echocardiography (TEE) revealed marked reduction of MR, but elevation of the transmitral gradient was detected no matter how the position of grasping was changed. Finally, we replaced the XTR to the NTR system. After leaflet grasping via an NTR clip, TEE revealed marked reduction of MR from severe to mild and an adequate transmitral gradient.

RÉSUMÉ

Un homme de 74 ans présentait une dyspnée causée par une régurgitation mitrale (RM) grave attribuable à une rupture du cordage tendineux. Une réparation mitrale percutanée bord à bord a été effectuée au moyen du système MitraClip (Abbott Vascular, Santa Clara, CA). Après le rapprochement des feuillets au moyen d'une pince XTR, l'échocardiographie transœsophagienne (ETO) a révélé une réduction marquée de la RM, mais une élévation du gradient transmitral a été détectée, peu importe le positionnement de la pince. Nous avons remplacé le système XTR par un système NTR. Après le rapprochement des feuillets au moyen d'une pince NTR, l'ETO a révélé une réduction marquée de la RM, qui est passée de grave à légère, et un gradient transmitral adéquat.

Case

A 74-year-old man presented with dyspnea NYHA class III. Twenty-two years ago, he underwent surgical aortic valve replacement using a mechanical valve. Transesophageal echocardiography (TEE) revealed severe mitral regurgitation (MR) due to rupture of the chordae tendineae (Fig. 1A; Video 1, view video online). There was no significant transmitral gradient, and the mitral valve area (MVA) was 4.2 cm^2 (Fig. 1B; Video 2, view video online). Percutaneous edge-to-edge mitral valve repair was performed using the MitraClip system (Abbott Vascular, Santa Clara, CA). After leaflet grasping via an XTR clip in the A2-P2 segment, intraprocedural TEE reveled marked reduction of MR (Fig. 1C; Video 3, view video online), and hemodynamic monitoring showed decreased V wave from 70 mm Hg to 48 mm Hg (Fig. 1D). However, elevation of the transmitral gradient (8 mm Hg) was detected by TEE (Fig. 1E). We repositioned the XTR clip at various times, but the elevated transmitral gradient did not improve. The MVA was 2.72 cm^2 (Fig. 1F). Finally, we replaced the XTR to the NTR system. After leaflet grasping via an NTR clip in the A2-P2 segment, intraprocedural TEE revealed marked reduction of MR from severe to mild (Fig. 2A; Video 4, view video online) and hemodynamic monitoring showed decreased V wave from 65 mm Hg to 46 mm Hg (Fig. 2B). TEE revealed an adequate transmitral gradient (5 mm Hg, Fig. 2C). The MVA was 3.01 cm^2 (Fig. 2D). Thus, we deployed this technique (Fig. 2E; Video 5, view video online).

Discussion

MitraClip XTR is a new-generation system with clip arms and grippers that are 3 mm longer than NTR; the clip length of XTR is 18 mm, and the coaptation length of XTR is 12 mm (Supplemental Fig. S1). Therefore, it is easier to grasp and increases the leaflet coaptation length. Two Clip sizes expand treatment options and reduce device time and Clip number. There are a few reports about the efficacy of XTR in complex cases.[1-3] In particular, large flail and redundant leaflet are good candidates for XTR (Supplemental Table S1). Conversely, small MVA is a good candidate for NTR to avoid transmitral gradient. From overviewing this case, the patient had large flail gap and was a good candidate for XTR. However, the patient also had relatively small MVA (4.2 cm^2).

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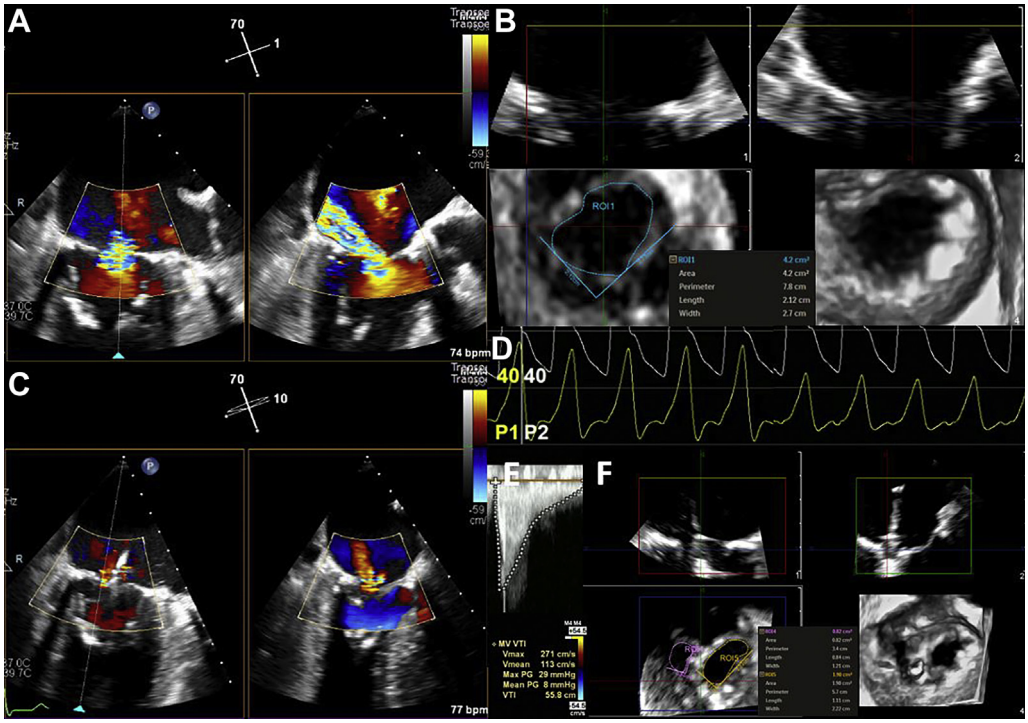

Figure 1. (**A**) Transesophageal echocardiography (TEE) showing severe mitral regurgitation (MR) caused by rupture of the chordae tendineae. (**B**) TEE showing the well-opened mitral valve. (**C**) Intraprocedural TEE showing significant reduction of MR from severe to mild after leaflet grasping using the MitraClip XTR system. (**D**) Hemodynamic monitoring showing decreased V wave after leaflet grasping using the MitraClip XTR system. (**E**) Intraprocedural TEE showing elevation of the transmitral gradient after leaflet grasping using the MitraClip XTR system. (**F**) Intraprocedural TEE showing decreased mitral valve area (MVA) after leaflet grasping using the MitraClip XTR system.

Herein, an important case of the patient with transmitral pressure gradient elevation in MitraClip XTR was described. Clinicians may be cautious because of the risk of iatrogenic mitral stenosis caused by longer leaflet coaptation in the MitraClip XTR system compared with the NTR system.

Disclosures

M.M. is a consultant for Japan Lifeline. M.T. is a consultant for Abbott Vascular and 4 Tech. F.M. is a consultant for Abbott Vascular, Medtronic, Edwards Lifesciences, Perifect, Xeltis, Transseptal Solutions, Cardiovalve, and Magenta. He receives grant support from Abbott Vascular, Medtronic, Edwards Lifesciences, Biotronik, and Boston Scientific Corporation and royalties from Edwards Lifesciences, 4 Tech, Transseptal Solutions, Perifect, and Cardiovalve. All other authors have no conflicts of interest to disclose.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.onlinecjc.ca and at https://doi.org/10.1016/j.cjca.2019.01.024.

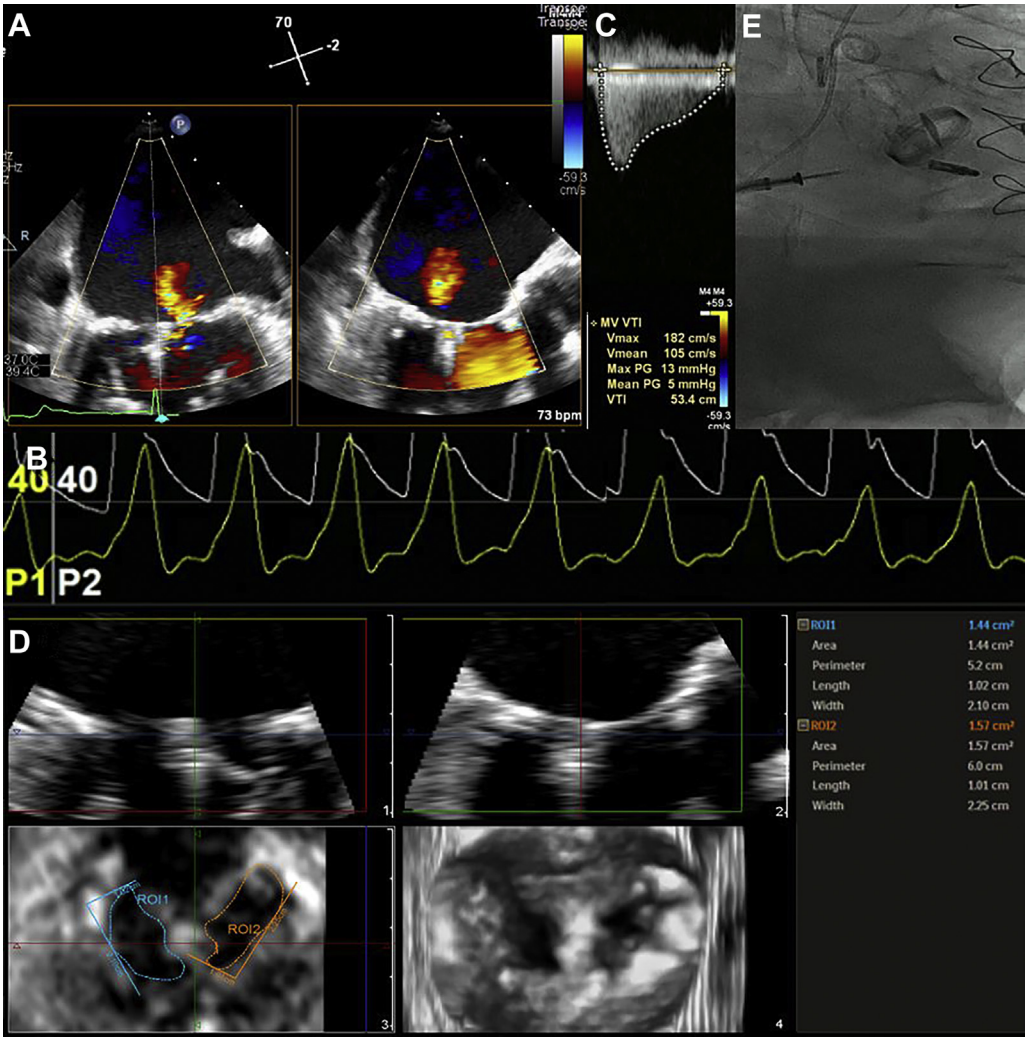

Figure 2. (**A**) Intraprocedural TEE showing significant reduction of MR from severe to mild after leaflet grasping using the MitraClip NTR system. (**B**) Hemodynamic monitoring showing decreased V wave after leaflet grasping using the MitraClip NTR system. (**C**) Intraprocedural TEE showing an adequate transmitral gradient after leaflet grasping using the MitraClip NTR system. (**D**) Hemodynamic monitoring showing decreased V wave after leaflet grasping using the MitraClip NTR system. (**E**) A MitraClip NTR was deployed in the A2-P2 segment.