Structural Heart
The Journal of the Heart Team

ISSN: 2474-8706 (Print) 2474-8714 (Online) Journal homepage: https://www.tandfonline.com/loi/ushj20

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To cite this article: Johannes Patzelt, Rezo Jorbenadze, Markus Renner, Juergen Schreieck, Christian Schlensak, Meinrad Gawaz, Peter Seizer & Harald F. Langer (2019) First Experience with the MitraClip XTR® Compared to the MitraClip NTR® System in a Patient with Severe Mitral Regurgitation and Complex Mitral Valve Anatomy, Structural Heart, 3:1, 79-80, DOI: 10.1080/24748706.2018.1524611

To link to this article: https://doi.org/10.1080/24748706.2018.1524611

Accepted author version posted online: 19 Sep 2018.
Published online: 19 Oct 2018.

STRUCTURAL HEART
2019, VOL. 3, NO. 1, 79–80
https://doi.org/10.1080/24748706.2018.1524611

IMAGES IN STRUCTURAL HEART DISEASE

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First Experience with the MitraClip XTR® Compared to the MitraClip NTR® System in a Patient with Severe Mitral Regurgitation and Complex Mitral Valve Anatomy

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Percutaneous edge-to-edge mitral valve repair (PMVR) is a successful treatment option in patients with severe mitral regurgitation (MR) not eligible for conventional open surgery.[1] There are two new MitraClip® systems available (Abbott Vascular, Wetzlar, Germany), the MitraClip XTR® and the MitraClip NTR®. While the latter has the same clip geometry as the contemporary MitraClip NT® system, the XTR® system has longer clip-arms (extended 3 mm of length for each arm) and improved grippers with two additional rows of frictional elements. Here, we report the case of a patient with complex mitral valve anatomy and severe MR. While grasping with the NTR® system was difficult, we experienced a straightforward implantation using the XTR® system instead.

The patient presented with a history of repeated hospitalization due to decompensated heart failure. Echocardiography showed a good systolic left ventricular (LV) function with severe primary MR with a prolapse of the anterior mitral valve (MV) leaflet (AML) in segment 2 with an eccentric posterior-directed jet (Figure 1A,B). Furthermore, calcifications were present with a restrictive posterior MV leaflet (PML) (Figure 1C). 3D EROA (effective regurgitant orifice area) was measured as 1.46 cm^2 (Figure 1D). A decision for PMVR was made by our interdisciplinary heart team due to severe comorbidities. Although in difficult mitral valve anatomies mechanical ventilation with elevated positive end-expiratory pressure may facilitate PMVR,[2] we chose to carry out the intervention in conscious sedation considering the frailty of our patient.

First, a MitraClip NTR® was advanced and positioned underneath the mitral valve plane. However, due to the prolapse of the AML and the restrictive PML, no sufficient grasp of both leaflets could be promptly achieved. Thus, the MitraClip NTR® was removed and a MitraClip XTR® was introduced, instead. In our experience, the location of the transseptal puncture does not differ between the NTR® and the XTR® clip. Due to its extended arms, sufficient leaflet material could be loaded rather easily on both arms of the device (Figure 1E). 3D view of the mitral valve confirmed optimal orientation of the opened clip device (Figure 1F) and implantation of the clip resulted in good coaptation and a clear reduction of MR. Subsequently, a second MitraClip XTR® (Figure 1G) further improved the result with only mild residual MR (Figure 1H). 3D EROA showed two small residual regurgitant orifices with a total area of 0.26 cm^2 (Figure 1I).

Funding

This study was supported by grants from the German research foundation (KFO 274), the Volkswagen foundation (Lichtenberg program) and the German Heart foundation.

P. Seizer and H.F. Langer were reimbursed by Abbott Vascular for training courses in the percutaneous mitral valve repair procedure.

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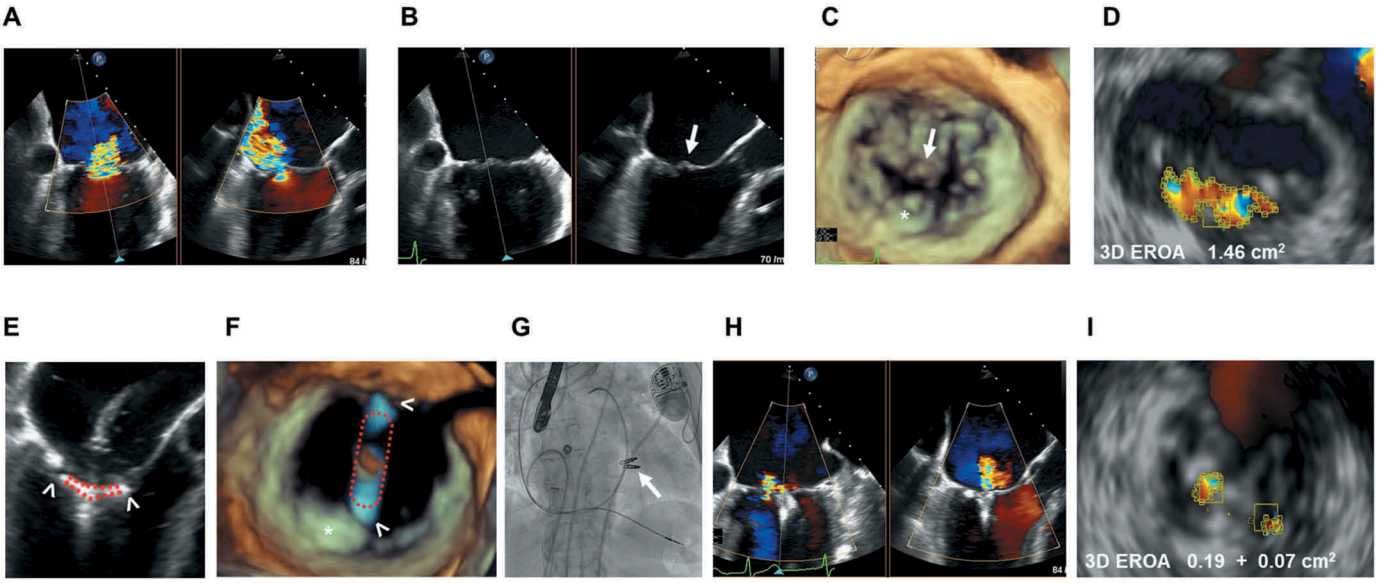

Figure 1. Images of transesophageal echocardiography (TEE) and fluoroscopy during percutaneous edge-to-edge mitral valve repair (PMVR). (A) Color flow imaging of the mitral valve (MV) using the simultaneous biplane TEE view (intercommissural view at 60° in mid-esophageal position, left part of the picture). An eccentric posterior-directed jet of the MR (right part of the picture) was caused by a prolapse of the AML in segment 2 (B, arrow). (C) MV 3D-TEE (surgeon's view). The arrow indicates the prolapse of the AML in segment A2, the white asterisk indicates a severe calcification of the PML and the posterior MV annulus. (D) Measurement of the 3D EROA revealed a value of 1.46 cm^2. (E) Left ventricular outflow tract (LVOT) TEE view with the MitraClip XTR® positioned with opened arms (arrow heads) below the MV. The red dotted contour indicates the arm length of a NTR® clip. (F) 3D view showing the opened MitraClip XTR® positioned under the mitral valve plane. Arrow heads indicate the extended clip arms (17 mm (NTR®) vs. 22 mm (XTR®), clip opened to 120°). The posterior clip arm is partially concealed by the calcification of the PML (indicated by *). The red dotted contour indicates the arm length of a NTR® clip. (G–I) Fluoroscopy and TEE depicting two XTR® clips in correct position with only mild residual MR. The white arrow indicates the implanted clips. (I) The post-interventional 3D-EROA was measured with two small regurgitant orifices of 0.19 and 0.07 cm^2.