Direct, transapical, echocardiography-guided laceration of an Alfieri stitch to facilitate transcatheter mitral valve implantation: Keeping it simple

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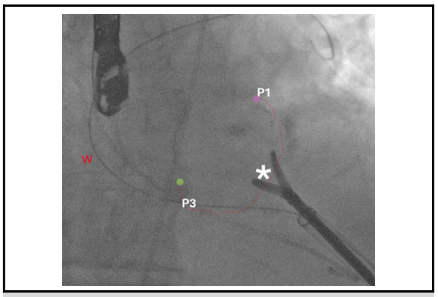
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Direct, transapical, beating-heart, scissors-mediated leaflet modification to cut a previously performed Alfieri stitch before transcatheter mitral valve implantation.

Video clip is available online.

CENTRAL MESSAGE

We present a novel method for direct, transapical, beating-heart, scissors-mediated leaflet modification to cut a previously performed Alfieri stitch before transcatheter MV implantation.

An 81-year-old patient was referred to our center for severe, symptomatic mitral valve (MV) regurgitation of mixed etiology. The patient had undergone surgical MV reconstruction with a flexible MV annuloplasty ring and an additional Alfieri stitch with a monofilament, nonabsorbable suture without pledgets 10 years prior.

Full-cycle computed tomography and transesophageal echocardiography (TEE) revealed a partially detached flexible annuloplasty ring in segments P2 and P3 (Figure 1, *A-C*) and an intact Alfieri stitch that divided the MV in 2 smaller orifices lateral and medial (Figure 1, *A* and *B*). For the transcatheter MV implantation of a Tendyne prosthesis (Abbott Cardiovascular), restoration of a single orifice MV is mandatory. Our strategy was to restore the single-orifice MV using the endovascular transapical scissors-mediated approach we have developed and published previously.[1] A backup strategy in case this proved unsuccessful was to perform a modified transapical ELASTA-Clip procedure[2] by externalizing a wire through the medial and the lateral MV orifice and performing transcatheter electrosurgery on the Alfieri stitch.

Standard apical access to the left atrium (LA) was obtained, and entanglement with chordae was ruled out with the standard "lollipop" maneuver. A Gore DrySeal Sheath (26F, 30 cm) was advanced into the LA while a wire remained in the LA ("W" in Figure 1, *D* and *F*). Endoscopic scissors (Karl-Storz, CLICKLine, 43 cm, 5 mm) were advanced through the sheath into the left ventricle. In computed tomography simulation (Figure 1, *E*), the angulation to achieve the plane perpendicular to the Alfieri stitch bridge was calculated (Figure 1, *D*). In this angulation, the scissors were advanced so that one blade of the scissors was in the medial orifice and the other was in the lateral orifice (Figure 1, *D* and *F*). A gentle push of the scissors toward the LA and continuous TEE were used to verify that the hinge point of the scissors was directly under the Alfieri tissue bridge ("*" in Figure 1, *A, B, D,* and *F*) and each scissor blade was in a different orifice. The leaflet bridge of the Alfieri stitch was transected (Video 1) with a single cut. The laceration was verified by TEE (Video 1), and an immediate aggravation of mitral regurgitation (Video 1) was medically managed without significant hemodynamic deterioration. Thereafter, the implantation of

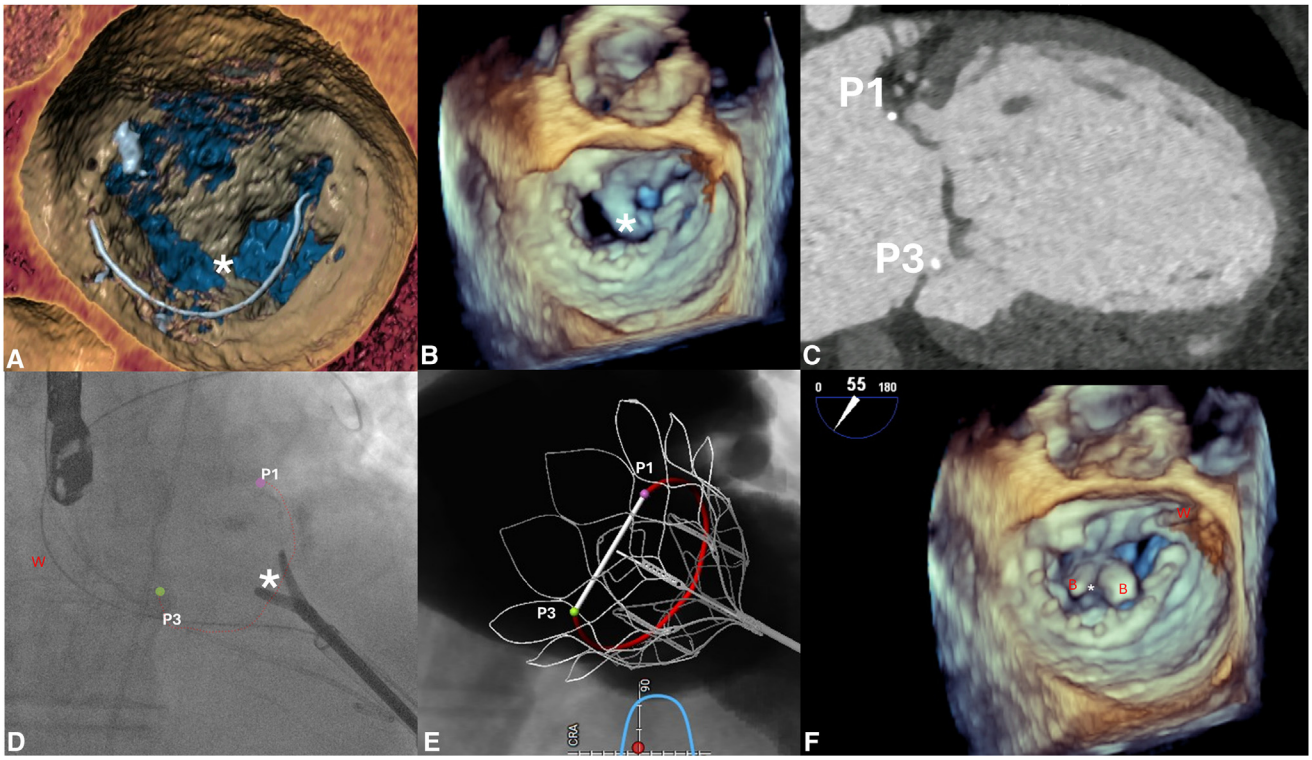
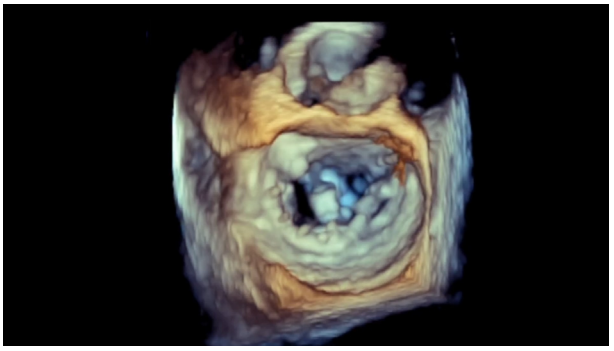


FIGURE 1. Computed tomography (CT) planning and echocardiographic procedural images. A and B, TEE showing the partial detachment of the flexible ring and the leaflet bridge of the Alfieri stitch (*) leading to a double orifice MV. C, CT reconstruction showing the detachment of the flexible ring in the P3 segment. D, Orientation of the scissors under the Alfieri stitch bridge to facilitate cutting. The partially detached ring can be faintly seen, and the ring from the CT reconstruction has been overlayed. E, CT reconstruction and calculation of the angulation required to facilitate optimal scissor blade orientation. F, TEE visualization of the scissor blade orientation, each blade ("B") being in a separate orifice, with the hinge of the scissor blades in the cutting point of the scissors.

the 35-mm M standard profile Tendyne valve was successful. Postoperative echocardiography showed no paravalvular leaks or device migration.

Restoration of a single MV orifice in patients after a surgical Alfieri stitch or transcatheter edge-to-edge repair is mandatory to facilitate transcatheter mitral valve implantation (TMVI). Although complex electrocautery procedures have been performed to restore the single-orifice MV, to our knowledge this is the first description of a direct, transapical, scissors-mediated restoration, which was performed in less than 10 minutes. For transapical TMVI devices, this procedure might be shorter and less complex than an interventional approach, does not require specialized catheters or wires, and uses the same established access for transapical TMVI.

This case report did not require approval by our Institutional Review Board/Ethics Review Board. The patient has provided informed written consent for case and study data.



VIDEO 1. Alfieri stitch cutting and immediate aggravation of mitral regurgitation. Video available at: https://www.jtcvs.org/article/S2950-6050(25)00016-6/fulltext.

Conflict of Interest Statement

W.K. reports personal fees from Abbott. All other authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

References

1. Charitos EI, Busch N, Renker M, et al. Direct, transapical, scissors-mediated LAMPOON: keeping it simple! *JACC Cardiovasc Interv.* 2023;16(8):991-992.
2. Lindman BR, Goel K. Clip it, cut it, and then replace it: ELASTA-Clip for failed MitraClip. *JACC Cardiovasc Interv.* 2020;13(20):2371-2373.