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One-Stop Dual-Valve Transcatheter Intervention: Simultaneous Mitral TEER and K-Clip Tricuspid Annuloplasty

CASE REPORT

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INTRODUCTION

Intraoperative echocardiography, particularly real-time 2D/3D imaging, is essential for structural heart interventions and a key driver of innovation.[1] This case describes a 59-year-old female with severe functional mitral regurgitation (MR) and tricuspid regurgitation (TR), New York Heart Association (NYHA) IV heart failure, atrial fibrillation, and reduced ejection fraction who underwent a single-session transcatheter dual-valve repair under transesophageal echocardiography (TEE) guidance. Both regurgitations were reduced to mild, and she recovered well.

CASE REPORT

A 59-year-old hypertensive female was admitted with exertional chest tightness and dyspnea for 4 years, worsening over 2 weeks. Symptoms remained uncontrolled despite guideline-directed medical therapy (GDMT) including metoprolol, sacubitril/valsartan, dapagliflozin, spironolactone, furosemide, and rivaroxaban. After admission, she remained in NYHA class IV with persistent severe regurgitation. Elevated N-terminal pro-B-type natriuretic peptide levels were noted at 3689 pg/mL. Electrocardiography indicated atrial fibrillation. Transesophageal echocardiography revealed global cardiac enlargement, mitral valve leaflet malcoaptation, tricuspid annulus dilation (mean 42.8 mm), severe MR and TR, a reduced left ventricular ejection fraction of 36%, and coronary sinus dilation (approximately 0.9 cm), consistent with dilated cardiomyopathy (Figure 1A and 1B). Mitral valve assessment at zone 2 showed anterior and posterior leaflet lengths of 2.8 cm and 1.3 cm, respectively, an anteroposterior diameter of 38 mm, and a mitral valve area of 7.4 cm^2. The mitral effective regurgitant orifice area was 0.58 cm^2 by proximal isovelocity surface area, with a regurgitant volume of 86 mL. Severe TR (velocity, 3.4 m/s and gradient, 45 mmHg) suggested an estimated pulmonary artery systolic pressure of 60 mmHg. Following evaluation by the multidisciplinary heart team and considering the patient's preference against surgery, a single-session transcatheter dual-valve intervention was performed, comprising mitral transcatheter edge-to-edge repair (TEER) and transcatheter tricuspid annuloplasty using the K-Clip system. A dual-access strategy was employed: via the right femoral vein, transseptal puncture was performed under TEE guidance, and 2 mitral clips were sequentially implanted, reducing MR to mild (grade 1+) (Figure 1C and 1D, Supplementary material online, Video 1 and 2). Concurrently, via the right radial artery, a guidewire was positioned in the distal right coronary artery for annular marking; the K-Clip system was introduced via the right internal jugular vein. Under real-time TEE guidance, 2 clips (12T and 14T) were deployed at the posterior-septal and anterior-posterior annular commissures, respectively (Figure 1E, Supplementary material online, Video 3). The clip arms were then deployed to plicate the annular tissue, creating a permanent plication. Final TEE showed reduction of TR from severe to mild (Figure 1F). The patient recovered uneventfully and was discharged on postoperative day 5. Postoperatively, the patient was treated with GDMT (sacubitril/valsartan, metoprolol, dapagliflozin,

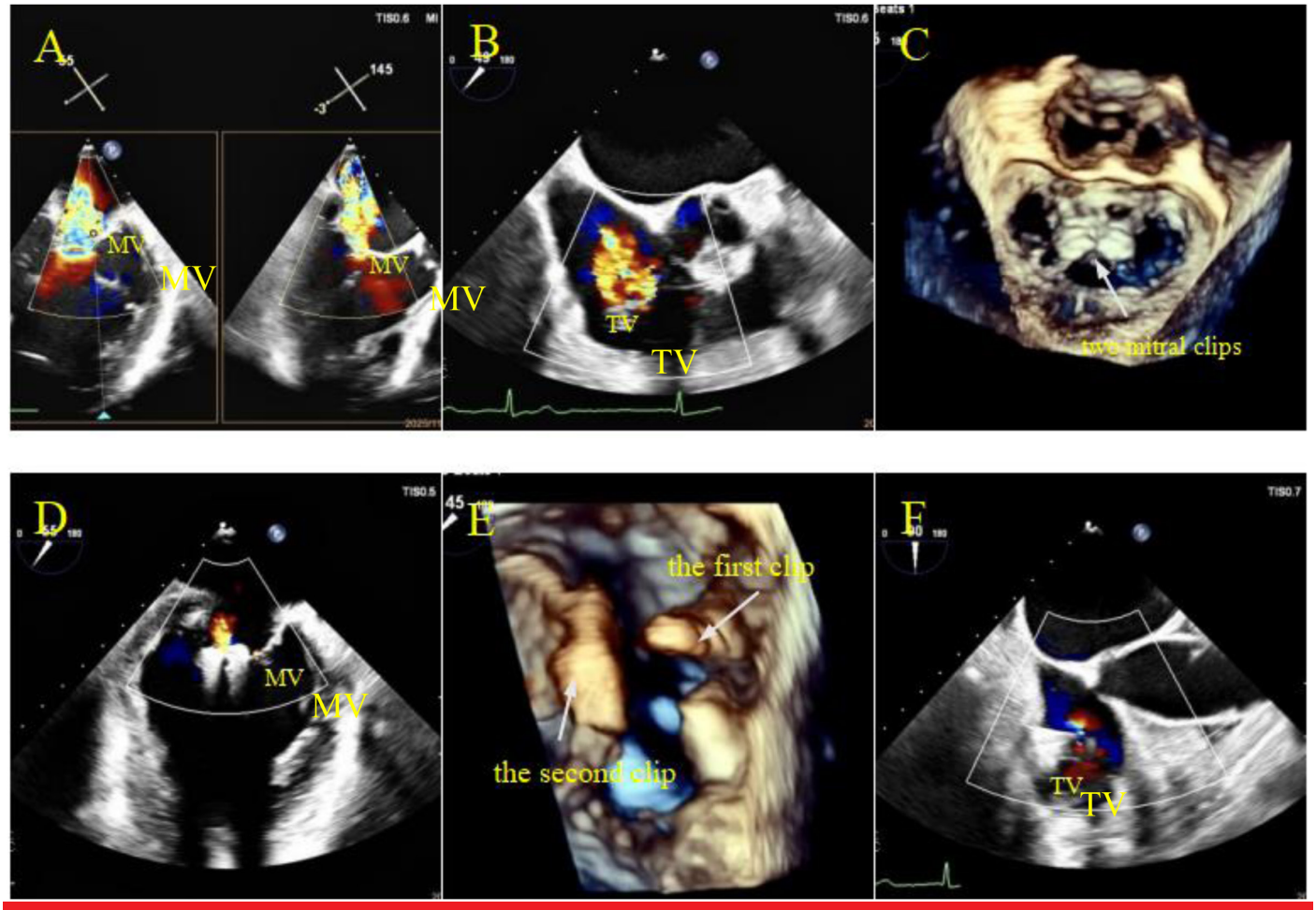

Figure 1. Pre-procedural transesophageal echocardiography (TEE) revealed severe mitral regurgitation with the primary jet origin from zone 2, extending to zones 1 and 3 (A), and severe tricuspid regurgitation (TR) (B). Intra-procedural 3-dimensional TEE showed the 2 implanted mitral clips (C). Post-procedural color Doppler imaging demonstrated mild residual regurgitation (grade 1+) between the 2 clips (D). Intra-procedural 3-dimensional TEE further confirmed the deployment of 2 tricuspid annuloplasty clips: the first clip (12T) was positioned at the 5:30 direction (posterior-septal commissure) on the tricuspid short-axis view, and the second clip (14T) was placed at the 7:30 direction (anterior-posterior commissure) (E). Post-procedural color Doppler imaging showed a reduction in TR from grade 4+ to grade 1+ (F).

spironolactone, vericiguat) and rivaroxaban for atrial fibrillation. Three-month postoperative echocardiography showed mild MR and TR, with no device-related complications, indicating sustained successful repair.

DISCUSSION

This patient underwent "one-stop" dual-valve repair combining mitral TEER with K-Clip annuloplasty. Transcatheter edge-to-edge repair effectively reduces MR with low adverse events.[2] K-Clip, the first ultrasound-guided tricuspid annuloplasty device, achieves annular reduction by anchoring/plicating the dilated annulus without altering leaflet morphology.[3] Its transjugular access avoids conflict with femoral TEER. Several considerations support simultaneous rather than staged intervention. First, TR improvement after mitral transcatheter edge-to-edge repair (M-TEER) is limited: Adamo et al[4] reported only 35% improved ≥1 grade, 46% unchanged, 19% worsened. Second, no reliable predictors of non-improvement exist, highlighting staged uncertainty.[5] The patient had multiple high-risk features for persistent severe TR: annular dilation 42.8 mm, right heart enlargement, pulmonary hypertension, long-standing atrial fibrillation, NYHA IV. Spontaneous resolution was unlikely. Staged strategy would risk right heart deterioration, loss of second procedure opportunity, and cumulative anesthesia trauma. After full disclosure, the team and patient opted for simultaneous intervention. Compared with staging, simultaneous TR intervention does not increase mortality or major adverse events, modestly prolongs procedure time, and reduces costs. This strategy should be strictly limited to carefully selected high-risk patients, not routine practice.

CONCLUSION

This case shows that a single-session "one-stop" transcatheter dual-valve repair consisting of mitral TEER plus

K-Clip tricuspid annuloplasty is feasible, safe, and effective in a selected high-risk patient with severe functional MR and TR. Both regurgitations were reduced to mild with a sustained 3-month outcome. While not routinely recommended, this approach may be considered in carefully selected patients who have multiple predictors of persistent severe TR after multidisciplinary evaluation and shared decision-making.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Declaration of Interests: The authors have no conflicts of interest to declare.

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REFERENCES

1. Khalique OK, Hahn RT. Role of echocardiography in transcatheter valvular heart disease interventions. *Curr Cardiol Rep*. 2017;19(12):128. [CrossRef]
2. Rottländer D, Beucher H, Ghaddioui KA, et al. Continuous atrial pressure monitoring via steerable guide catheter in transcatheter mitral and tricuspid edge-to-edge repair. *Catheter Cardiovasc Interv*. 2022;99(6):1796-1806. [CrossRef]
3. Pan W, Long Y, Zhang X, et al. Feasibility study of a novel transcatheter tricuspid annuloplasty system in a porcine model. *JACC Basic Transl Sci*. 2022;7(6):600-607. [CrossRef]
4. Adamo M, Pagnesi M, Ghizzoni G, et al. Evolution of tricuspid regurgitation after transcatheter edge-to-edge mitral valve repair for secondary mitral regurgitation and its impact on mortality. *Eur J Heart Fail*. 2022;24(11):2175-2184. [CrossRef]
5. Basman C, Kodra A, Pirelli L, et al. Predictors of residual severe tricuspid regurgitation after transcatheter mitral valve repair. *J Soc CardioVasc Angiogr Interv*. 2023;2(4):100612. [CrossRef]

Supplementary material online, Video 1. Intraprocedural three-dimensional TEE view demonstrating the two sequentially implanted mitral clips positioned at the mitral valve (zone 2). The clips are seen grasping the anterior and posterior leaflets, establishing a double-orifice configuration.

Supplementary material online, Video 2. Post-procedural color Doppler TEE image obtained immediately after deployment of the two mitral clips. The video shows only a mild (grade 1+) residual regurgitant jet located between the two clips. There is no significant paravalvular leakage or worsening of mitral stenosis.

Supplementary material online, Video 3. Intraprocedural three-dimensional TEE view demonstrating sequential deployment of two K-Clip devices (12T and 14T) for transcatheter tricuspid annuloplasty. The first clip (12T) was positioned at the posterior-septal commissure, and the second clip (14T) at the anteroposterior commissure of the tricuspid annulus.