

## Images in Cardiovascular Disease



# A Challenging Mitral Valve Anatomy for Transoesophageal Echocardiographic Mitraclip Procedural Guidance: Back to the Future

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### Conflict of Interest

The authors have no financial conflicts of  
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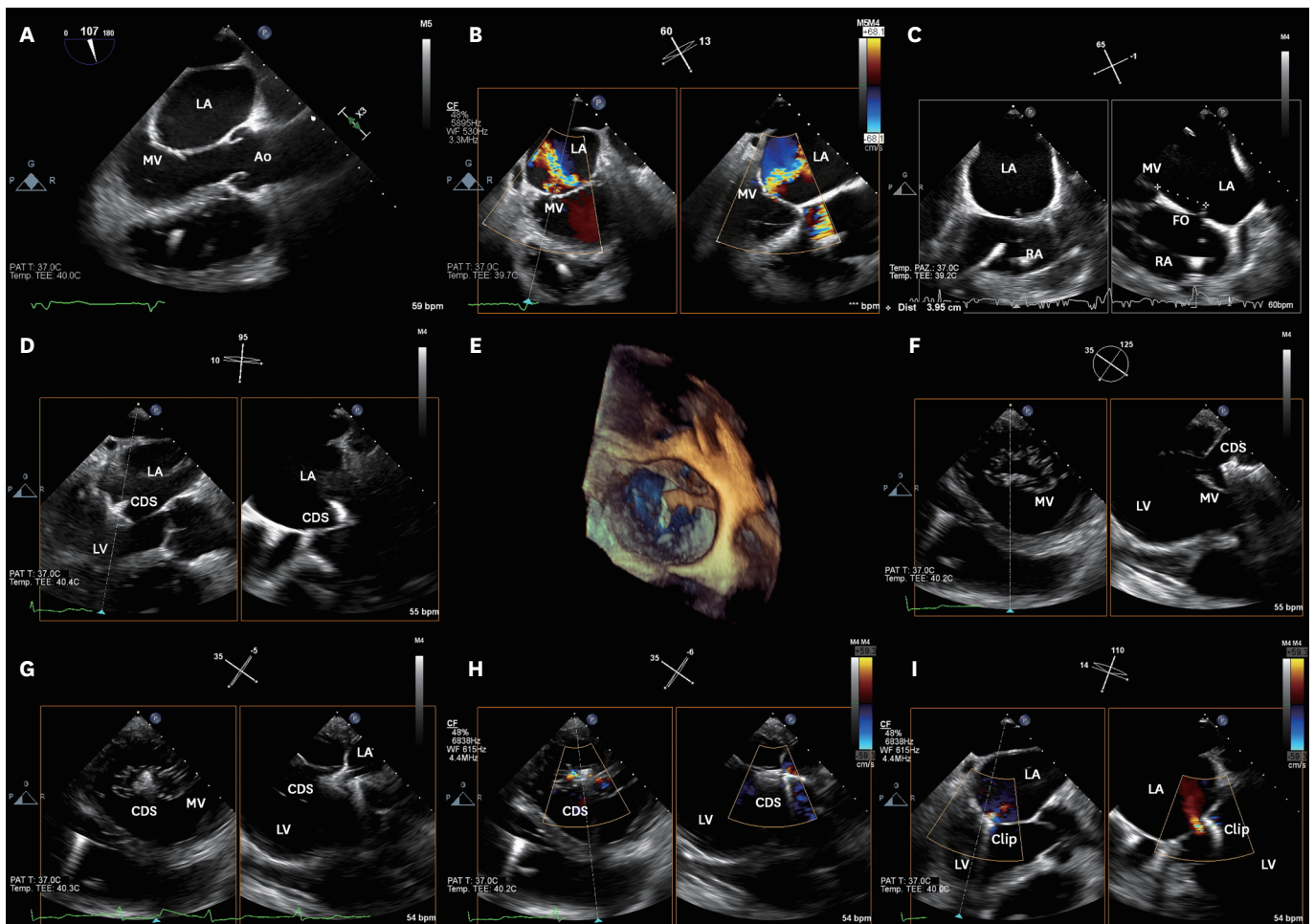
A 72-year-old man with a past medical history of ischemic cardiomyopathy and multiple heart failure hospitalizations was referred to our Institution for worsening exertional dyspnea (New York Heart Association functional class III).

Transoesophageal echocardiography (TOE) showed moderate left ventricular systolic dysfunction and severe secondary mitral regurgitation (MR) (EROA 3D 40 mm<sup>2</sup>), as result of symmetric leaflet tethering. Unfortunately, the patient had poor mid-esophageal (ME) acoustic windows: we noticed an extreme rotation of mitral coaptation line, leading to a difficult mitral valve (MV) assessment in ME views (**Figure 1A and B**).

Following Heart Team discussion, MitraClip (Abbott Vascular, Santa Clara, CA, USA) procedure with TOE intraprocedural guidance was planned. During transseptal puncture, XPlane mode helped the assessment of the height of the puncture (**Figure 1C**). Suboptimal ME views made navigation of the tip of the device through MV very difficult (**Figure 1D, Movie 1**) and provided also a poor quality MV real-time 3D rendering, not useful for clip arms orientation (**Figure 1E, Movie 2**). To overcome the problem, we performed transgastric (TG) view of MV. We noticed a horizontal mitral coaptation line at 20° TG Short Axis (SAX) view; through utilizing XPlane modality perpendicular to coaptation line, simultaneous TG Long Axis (LAX) view was obtained. This solution permitted an adequate navigation of the device (**Figure 1F, G, and H, Movies 3, 4, and 5**): the clip arms were oriented orthogonally in respect to the coaptation line, leading to effective first-attempt leaflets grasping. A single central XTR clip was successfully implanted with mild residual MR (**Figure 1I, Movie 6**) without significant stenosis (mean post-procedural gradient 1 mmHg).

The subsequent clinical course was uneventful, and the patient was discharged a week later.

In this report, we aim to highlight the role of TG views in guiding MitraClip procedure. Since the advent of good quality real-time 3D TOE imaging with MV surgical view, TG views of MV were less and less used<sup>1</sup>; nevertheless, in selected cases these can help a skillful imager to achieve procedural success. As for ME views, two orthogonal TG planes are used to guide clip positioning: TG SAX (usually 0°, a plane parallel to the coaptation line) to assess medial and lateral position and TG LAX (usually 110–130°, a plane perpendicular to the coaptation line) for antero-posterior adjustments and to visualize both clip arms in full length.<sup>2</sup> Therefore,



**Figure 1.** The use of transgastric projections for transoesophageal echocardiographic Mitraclip procedural guidance in challenging mitral valve anatomy with poor mid-esophageal acoustic window. (A, B) 2D and Colour Doppler TOE long axis view showing poor ME acoustic window for mitral assessment. (C) Height assessment during transeptal puncture. (D, E) Intraprocedural 2D and 3D TOE showing suboptimal ME views and poor quality MV real-time volume rendering, not useful for MitraClip System navigation guidance. (F-H) Intraprocedural 2D and Colour Doppler TG views showing a correct clip orientation and grasping. (I) Colour Doppler TOE long axis image showing mild residual MR. Ao: aorta, CDS: clip delivery system, FO: fossa ovalis, LA: left atrial, LV: left ventricular, ME: mid-esophageal, MR: mitral regurgitation, MV: mitral valve, RA: right atrial, TG, transgastric, TOE: transoesophageal echocardiography.

**Author Contributions**

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with this case report we would like to highlight the usefulness and the intraprocedural information that can be obtained from the use of transgastric projections: utilizing XPlane with a TG SAX on the left of the screen and TG LAX on the right side of the screen, the interventionalist may efficiently manipulate the clip to reach an appropriate trajectory and orientation. In selected cases such as the one reported, the use of these projections is essential for the execution of a correct intraprocedural guide.

**SUPPLEMENTARY MATERIALS**

**Movie 1**

Intraprocedural 2D transoesophageal echocardiography showing suboptimal mid-esophageal views, not useful for MitraClip System navigation guidance.

[Click here to view](#)

**Movie 2**

Intraprocedural 3D transoesophageal echocardiography showing poor quality mitral valve real-time volume rendering.

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**Movie 3**

Intraprocedural 2D transgastric views showing clip navigation.

[Click here to view](#)

**Movie 4**

Intraprocedural 2D transgastric views showing clip orientation.

[Click here to view](#)

**Movie 5**

Intraprocedural Colour Doppler transgastric views showing a correct clip grasping.

[Click here to view](#)

**Movie 6**

Colour Doppler transoesophageal echocardiography long axis image showing mild residual mitral regurgitation.

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## REFERENCES

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