

Title: The Complementary Roles of Intracardiac and Transesophageal Echocardiography in Guiding Transcatheter Tricuspid Interventions.

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The Complementary Roles of Intracardiac and Transesophageal Echocardiography in Guiding Transcatheter Tricuspid Interventions

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Short Title: ICE and TEE Guidance for TTVI

Key Words: Tricuspid disease; Imaging modalities; TTVR

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Transesophageal echocardiography (TEE) is the standard imaging modality for procedural guidance of tricuspid edge-to-edge repair. Typically, 2 TEE views are necessary: a mid-esophageal view to guide leaflet grasping, and a transgastric view to assess the adequacy of tissue bridging. However, TEE imaging at least in one of these views can be challenging due to the remote location of the tricuspid valve from esophagus, the degree of right heart enlargement and cardiac rotation, and the acoustic shadowing from cardiac prostheses. In such situations, intracardiac echocardiography (ICE) can provide complementary images to facilitate the procedure.

Figure 1A-D and Video-1 illustrate excellent leaflet grasping views from the mid-esophagus during a concomitant mitral and tricuspid edge-to-edge repair but poor transgastric image quality precluding proper assessment of tissue bridging. In this scenario, a 10-French ICE probe (AcuNav; Siemens, Mountain View, CA) was advanced via the left femoral vein across the iatrogenic transseptal defect (residual from the mitral edge-to-edge repair) into the left ventricle. This allowed visualization of the tissue bridge and placement of 2 MitraClip-XTr reducing the TR to mild (Figure-1E-H, Video-2).

Figure-1A'-C' and Video-3, demonstrate excellent transgastric views but suboptimal mid-esophageal views limiting the operator's ability to grasp the leaflets during isolated tricuspid edge-to-edge repair. In this scenario, an ICE probe in the mid right atrium clearly showed grasping of the anterior-posterior leaflets with the clip arms/grippers (Figure-1D'-F'). Clockwise rotation of the ICE probe showed grasping of the anterior-septal leaflets (Figure-1G',H', Video-4), facilitating the successful placement 2 MitraClip-XTr devices.

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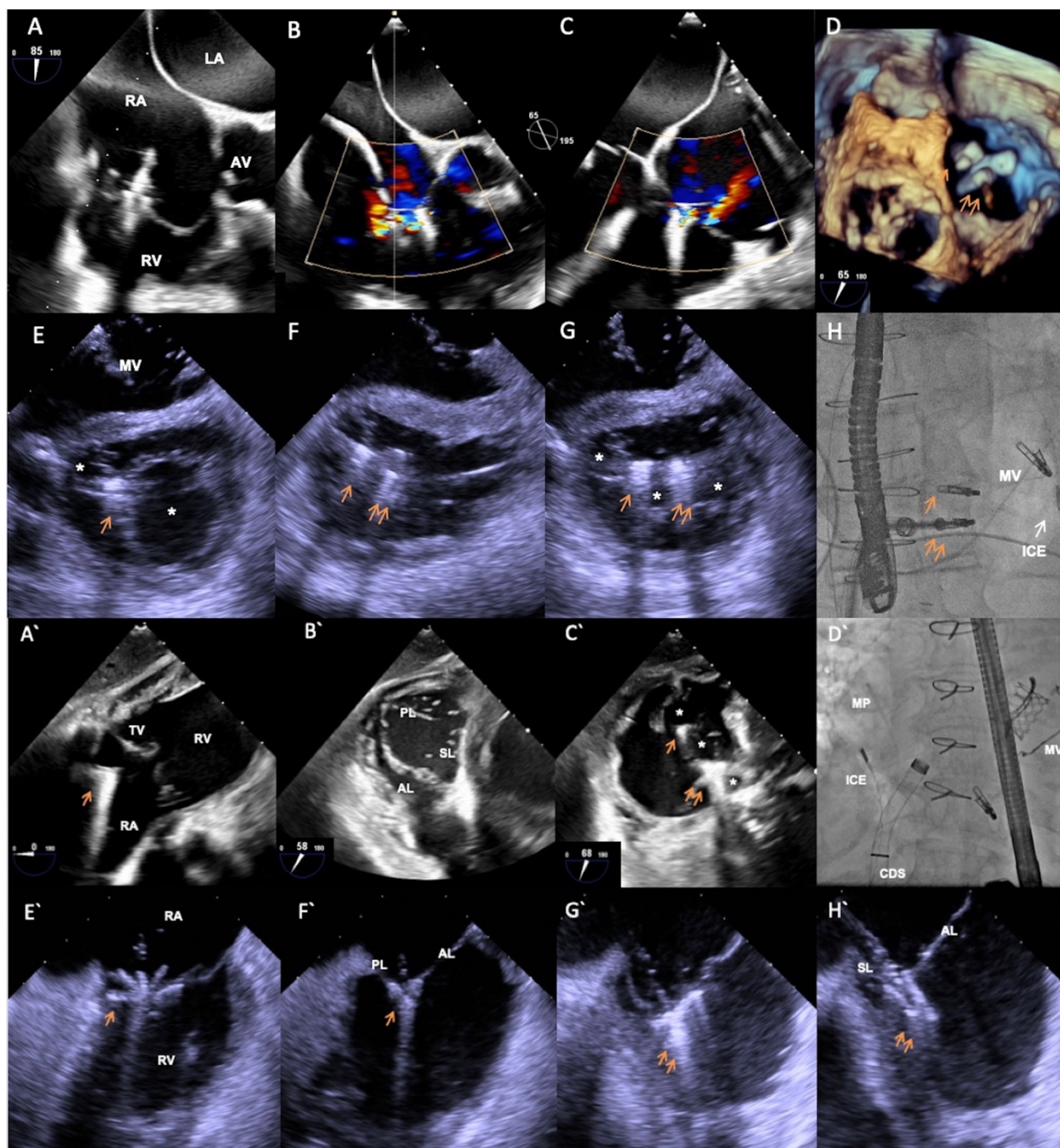
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Figure/Video Legends:

Figure-1: Illustration of the Complementary Role of ICE in Tricuspid Edge-to-edge Repair.

A-D: limited TEE transgastric views during a concomitant mitral and tricuspid edge-to-edge repair procedure. E-H: ICE probe in LV allowing adequate delineation of the tissue bridge after tricuspid clipping. A'-D': limited TEE mid-esophageal views during an isolated tricuspid edge-to-edge repair. E'-H'-:ICE imaging from the RA showing excellent grasping views.

ICE; intracardiac echo, TEE; transesophageal echo, RA; right atrium, LA; left atrium, RV; right ventricle, LV; left ventricle, AV; aortic valve, MV; mitral valve, TV; tricuspid valve, PL; posterior-leaflet, SL; septal-leaflet, AL; anterior-leaflet, MP; multipurpose catheter, CDS; clip-delivery system, single-arrow; first clip, double-arrow; second clip. *new orifice(s)



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Online Supplementary Material:

Video Legends:

Video-1: Limited TEE transgastric views during tricuspid edge-to-edge repair

Video-2: ICE views showing adequate tissue bridge

Video-3: Limited TEE mid-esophageal views during tricuspid edge-to-edge repair

Video-4: ICE views showing adequate leaflet grasping

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