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**3D Echocardiography in the Cath-lab
"Beyond fluoroscopy"**

Dr. Hani Mahmoud-Elsayed

MBBCH, MSc, FASE
EACVI/HIT Committee member
Associate Consultant, Director of Echocardiography Lab
Aswan Heart Centre, Magdi Yacoub Foundation



Nothing to disclose

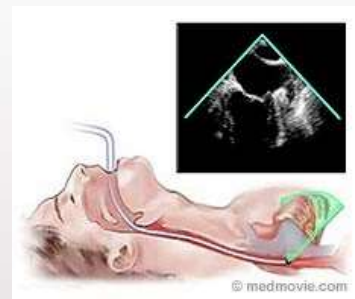
Introduction

- ❑ Within the past decade, we have witnessed the exponential growth of novel percutaneous trans-catheter therapies for the treatment of valvular and congenital heart disorders.
- ❑ Consequently, a new field has emerged in the world of adult cardiovascular medicine known as "structural cardiac interventions".
- ❑ Percutaneous MitraClip, LAA closure, ASD closure, Mitral annuloplasty, TAVI etc. have become important alternative therapies to conventional surgery in a particular group of patients.

[Cubeddu RJ et al. J Invasive Cardiol. 2009 Sep;21\(9\):478-82](#)

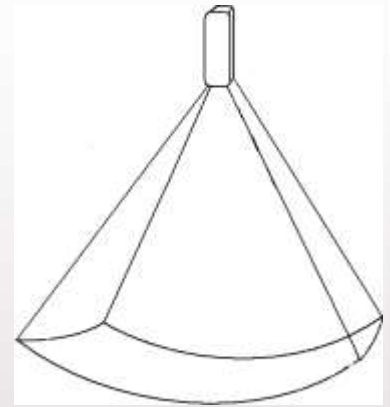
Introduction

- ❑ Fluoroscopy with or without two dimensional trans-esophageal echocardiography is the widely used method for guidance during these kind of procedures.



[Clements F t al. J Cardiothorac Vasc Anesth 1998;12:96-101](#)

Introduction

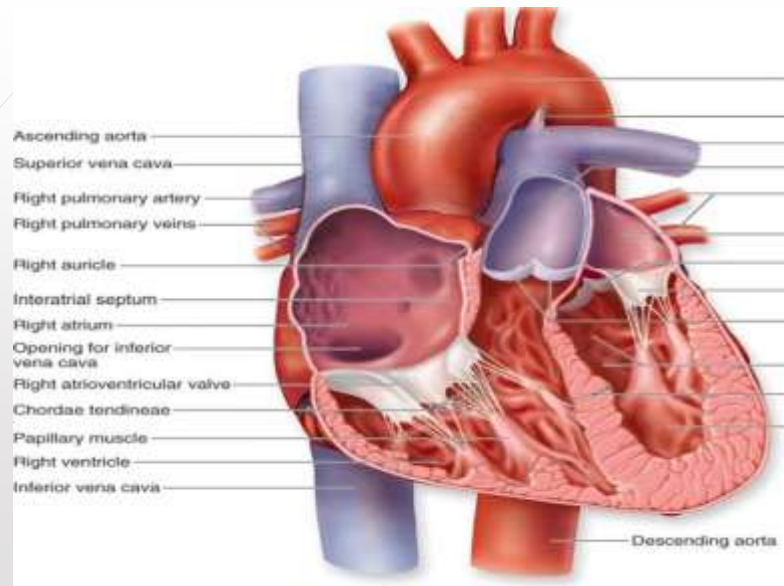


European Heart Journal
Cardiovascular
Imaging

Added values of 3D-TEE

- ❑ Live/real-time wide sector en-face views (monitoring live events e.g. septal puncture, Mitral Clip positioning, catheter&/ wire motion,,,,)
- ❑ Full volumes (cropping & MPR to get measurements in extraordinary axes not possible by 2DTEE e.g. Aortic Annular dimensions, annulo-osteal distance, LAA ostium ,,,)

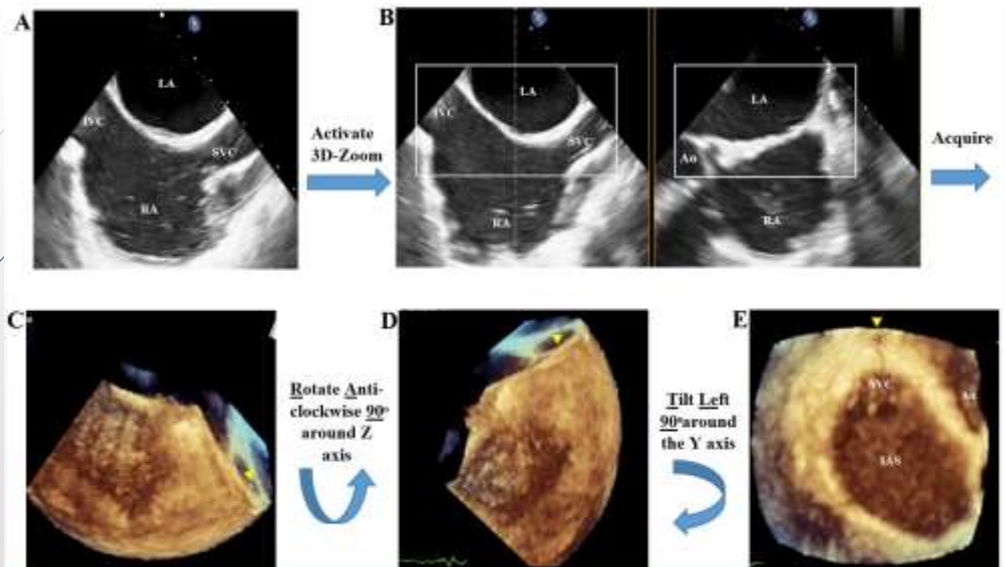
Imaging of the IAS



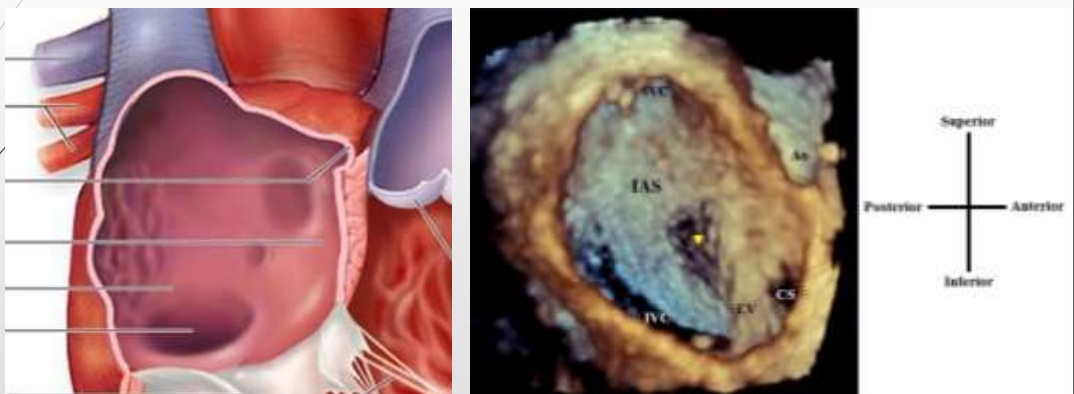
3D-TEE guided Septal Puncture

RATLe-90 maneuver

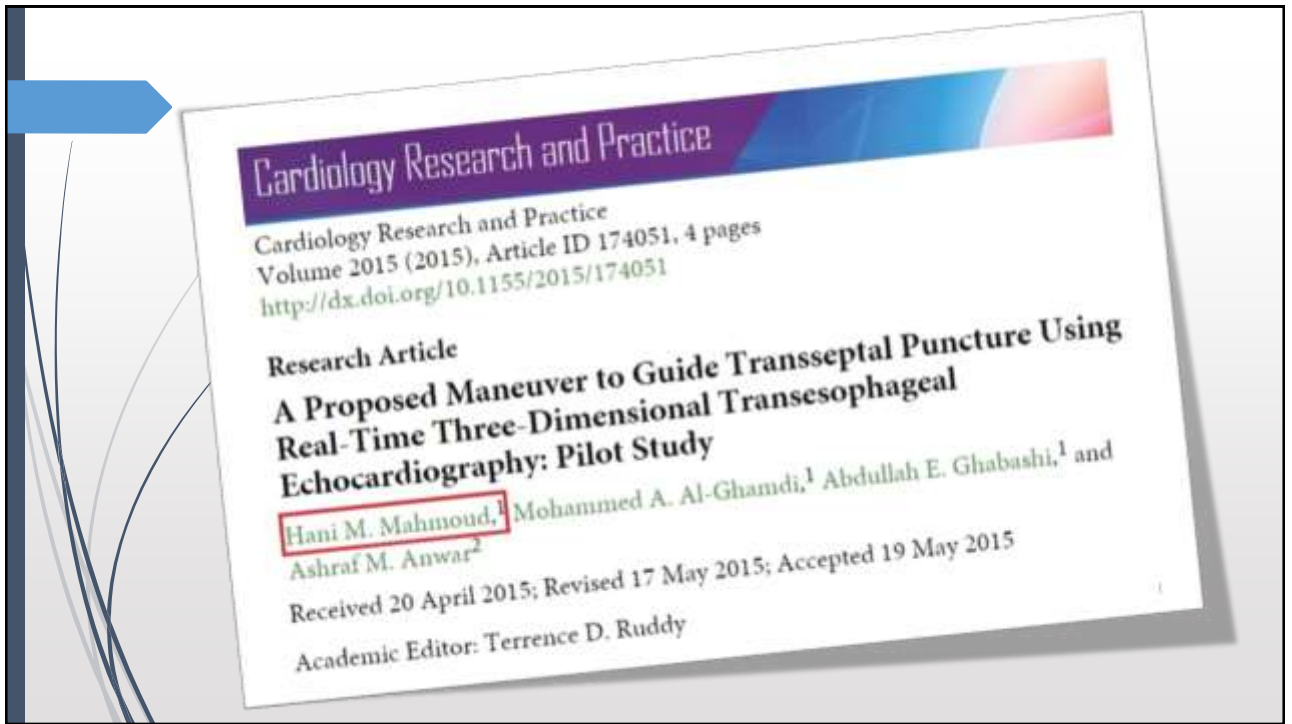
RATLe-90 maneuver



H. Mahmoud et al. *Cardiol Res Pract*, 2015. doi:10.1155/2015/174051



H. Mahmoud et al. *Cardiol Res Pract*, 2015. doi:10.1155/2015/174051



3D-TEE guided CS cannulation

- ▶ After insertion of the coronary sinus catheter through the right internal jugular vein, multiple trials for coronary sinus cannulation guided by fluoroscopy and two-dimensional trans-esophageal echocardiography were unsuccessful.
- ▶ Real-time three-dimensional zoom mode was used.
- ▶ Then, the volume was rotated to have the anatomically oriented enface view of the inter-atrial septum from the right atrial perspective. (RATLe-90 maneuver)

H. Mahmoud et al. Echocardiography. 2015 Jan;32(1):181-3

Real Time Three-Dimensional Transesophageal Echocardiography Guided Coronary Sinus Cannulation during CARILLON Mitral Annuloplasty Device Therapy for a Patient with Chronic Severe Mitral Regurgitation

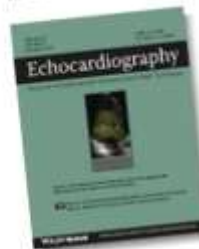
Hani M. Mahmoud M.B.B.Ch., M.Sc.,
F.A.S.E.^{*}, Mohammed A. Al-Ghamdi M.D.,
S.B.M., S.B.C. and Abdullah E. Ghabashi
M.D., F.R.C.P.C., F.A.C.C.

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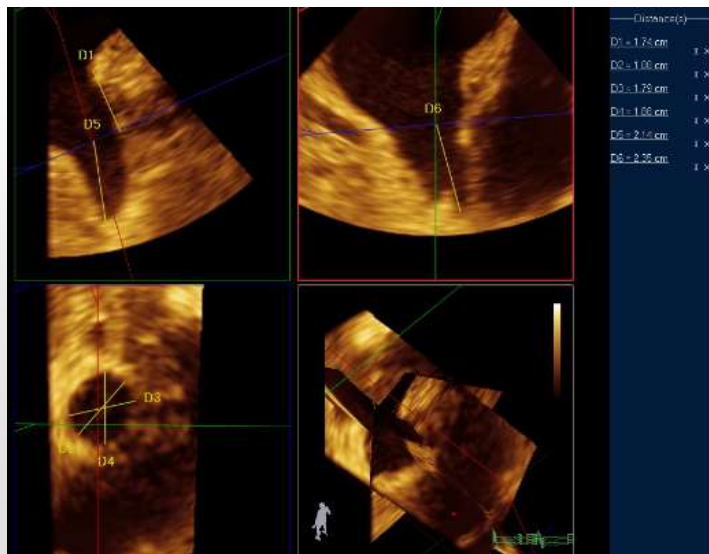
Issue



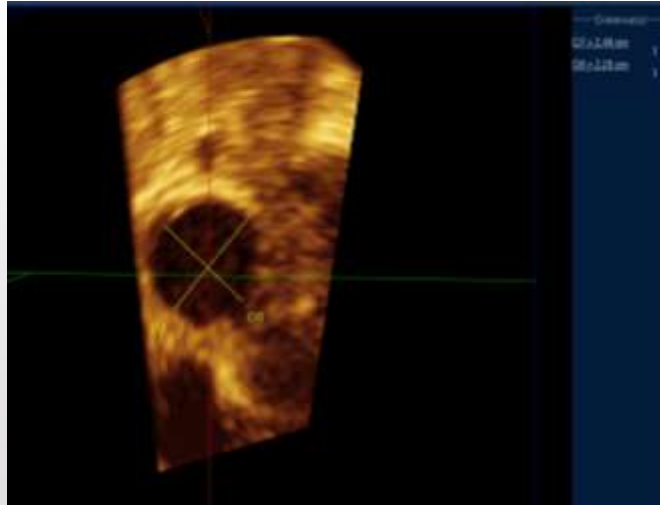
Echocardiography
Volume 32, Issue 1, pages
181-183 January 2015

LAA assessment for percutaneous closure

Assessment of the LAA



Assessment of the LAA



Circulation

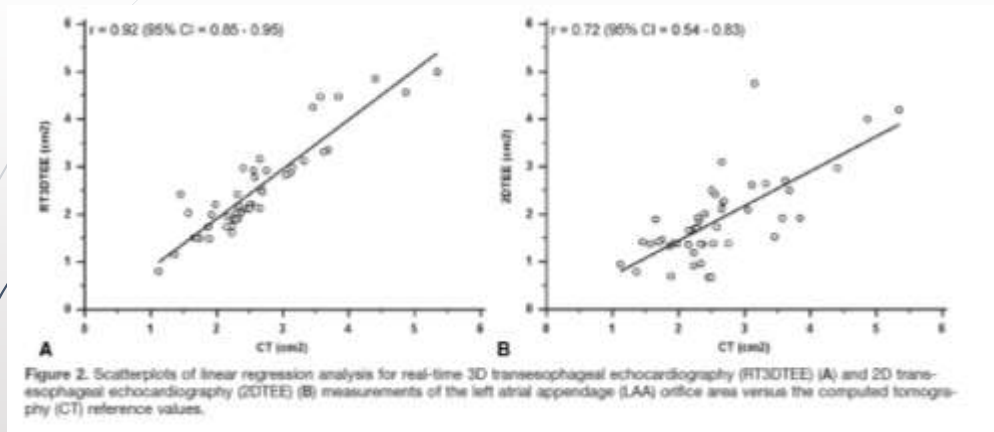
Cardiovascular Imaging



Evaluation of the Left Atrial Appendage With Real-Time 3-Dimensional Transesophageal Echocardiography: Implications for Catheter-Based Left Atrial Appendage Closure
Gaetano Nucifora, Francesco F. Faletta, François Regoli, Elena Pasotti, Giovanni Pedrazzini, Tiziano Moccetti and Angelo Auricchio

Circ Cardiovasc Imaging. 2011;4:514-523; originally published online July 7, 2011; doi: 10.1161/CIRCIMAGING.111.963892

Assessment of the LAA

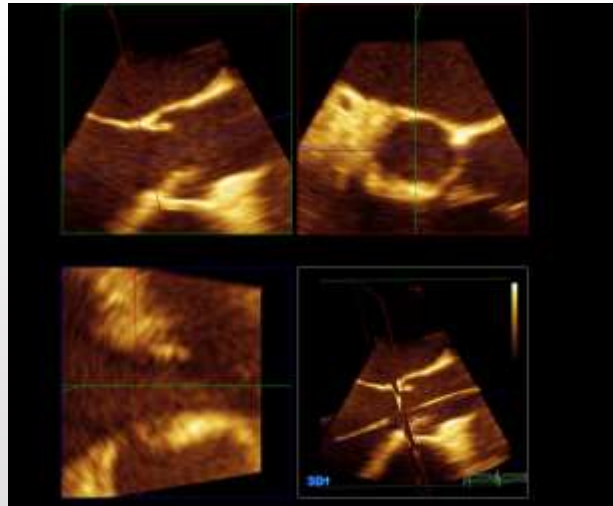


Nucifora et al RT3DTEE Imaging of LAA Circ Cardiovasc 2011;4:514-523

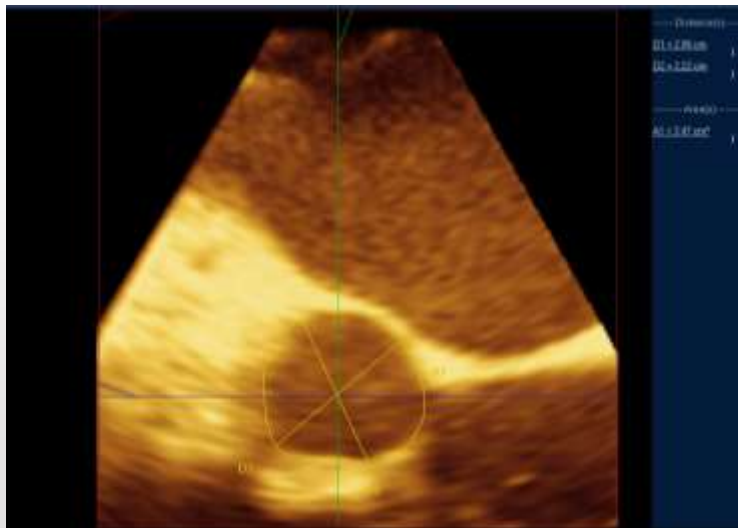
TAVI

Annulus dimensions

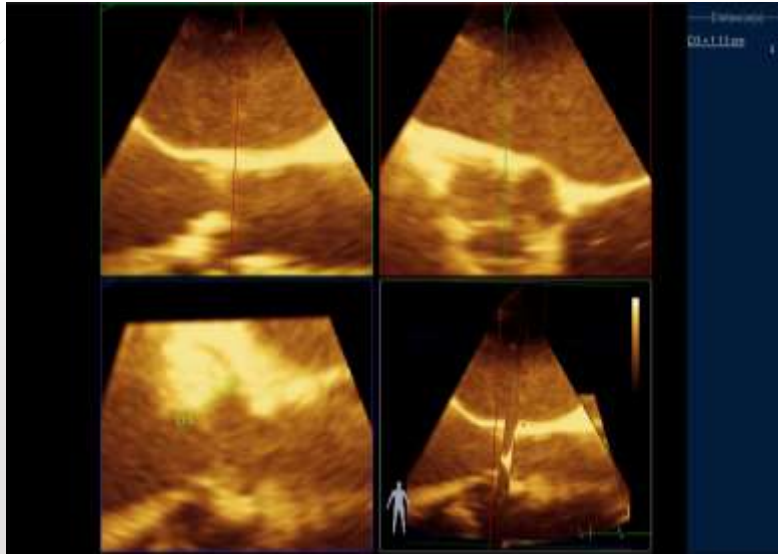
➤ 3D-TEE



Annulus dimensions

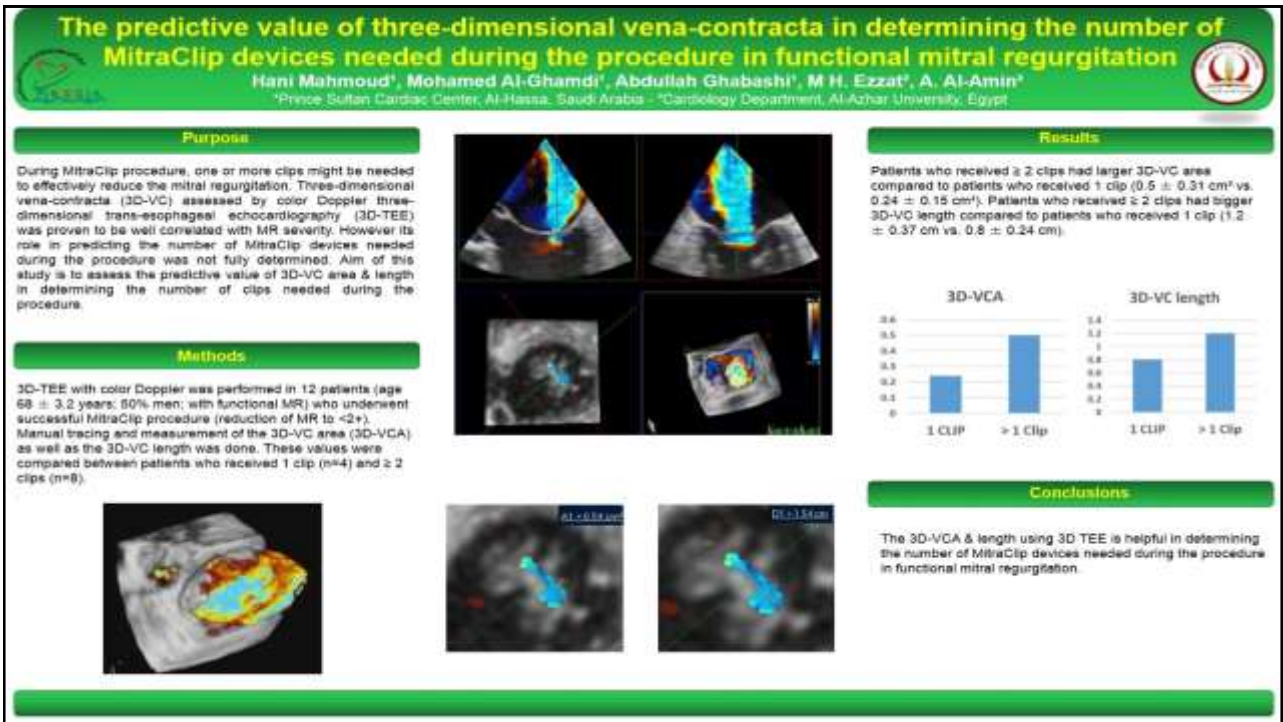


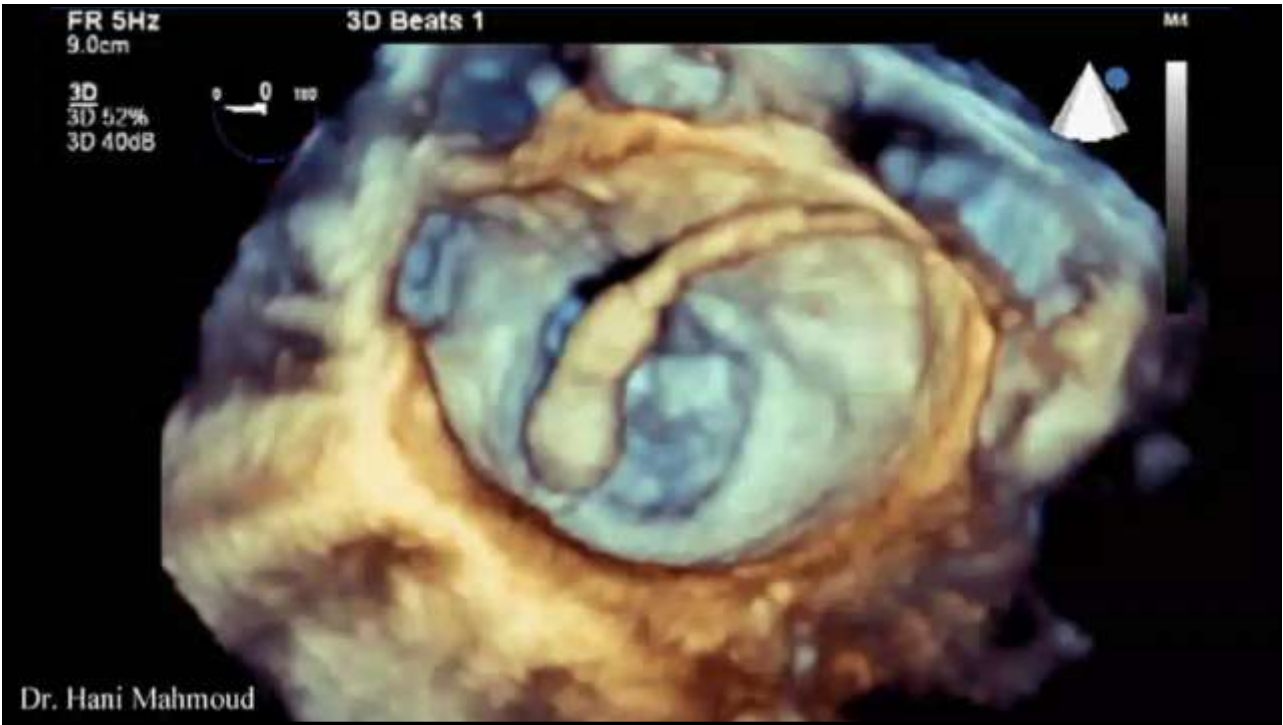
Annulo-Osteal Distance

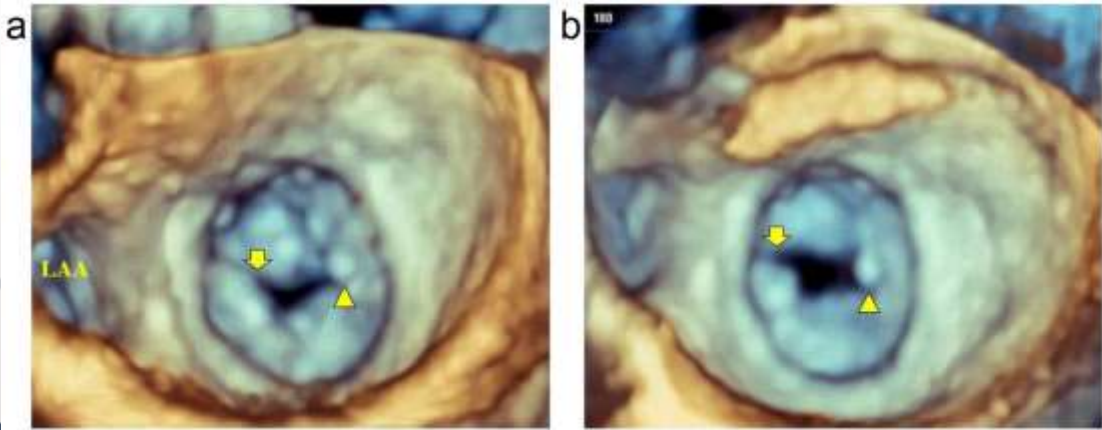


LEFT ATRIAL VIEW WIRE & catheter manipulation









Conclusion

- ❑ Three-dimensional TEE has an incremental role during Structural cardiac interventions such as TAVI, LAA closure, PMBV& MitraClip percutaneous therapy.
- ❑ It provides Live/real-time wide sector images (monitoring live events e.g. septal puncture, Mitral Clip positioning, catheter&/ wire motion,,,,)
- ❑ Full volumes (cropping & MPR to get measurements in extraordinary axes not possible by 2DTEE e.g. Aortic Annular dimensions, annulo-osteal distance, LAA ostium ,,,)
- ❑ It can create a common language between the echocardiologist & the interventionist by providing anatomically oriented & en-face views of the cardiac structures.
- ❑ It really saves time, can reduce the radiation exposure “fluoroscopy time”.
- ❑ It reduces the need to get trans-gastric 2D-TEE views.



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The image is a promotional banner for the HIT (Heart Imagers of Tomorrow) network. On the left, there is a white logo featuring a stylized heart shape with the letters 'HIT' inside. Below the logo, the text reads 'EACVI's Heart Imagers of Tomorrow'. To the right of the logo, the text 'Join us at Facebook and LinkedIn' is displayed in white, followed by 'Young Network of Cardiovascular Imaging' in yellow. Below this text is a group photograph of approximately 20 young professionals, mostly in business attire, standing in two rows. The background of the banner is dark grey.