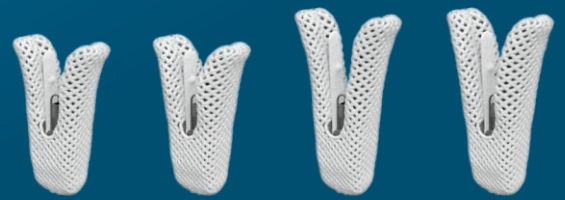
MitraClip™
Transcatheter Mitral Valve Repair

# TOE ACQUISITION CONSIDERATIONS

## TOE SCREENING FOR THE MITRACLIP™ PROCEDURE

All information contained within this presentation is being provided courtesy of Thomas Smith, M.D., unless otherwise noted.

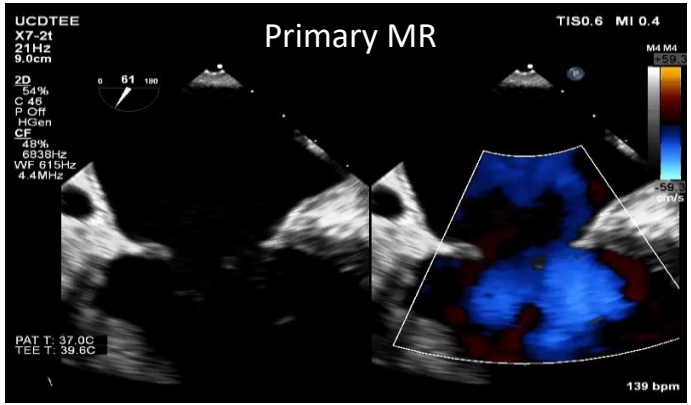


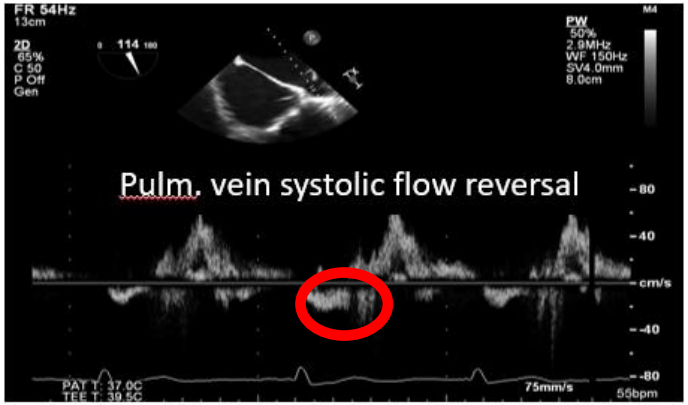
# PERFORMING SCREENING TOE
## BASIC QUESTIONS

- What in the MV apparatus is causing the valve to leak?
  - Etiology (TOE superior to TTE)
- How severe is the leak?
  - Quantification
- Is there reasonable likelihood that a transcatheter valve repair can be safely performed? Interatrial septal evaluation.
  - Safety (TOE is superior to TTE)

# TOE GOALS: ASSESS MR

- Determine etiology of MR.
  - Primary vs. Secondary
    - Specific apparatus abnormality
- Objectively quantify MR.
  - Colour jet, vena contracta, PISA
  - Pulmonary vein flows
    - Right and left
- Evaluate LV size and function.



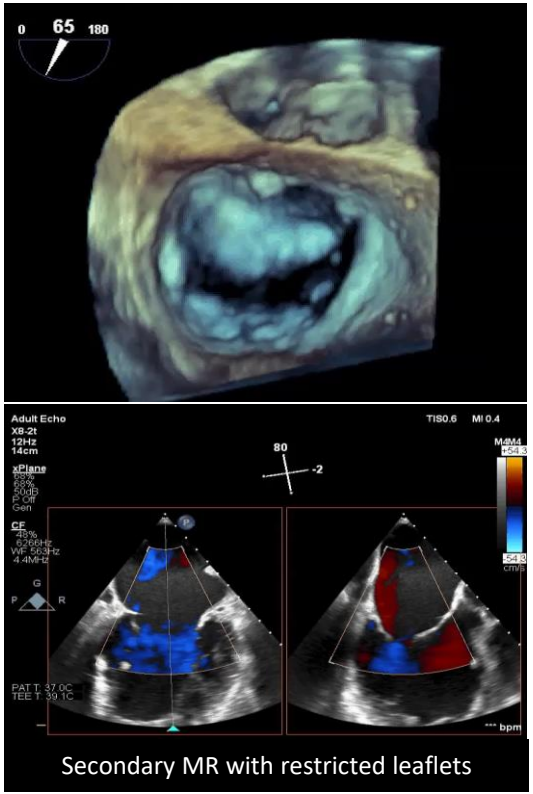
# PRIMARY MR

- Abnormal pathology of at least 1 of the MV components:
  - Leaflets, chordae tendineae, papillary muscles or annulus (MV & the MR is the disease)
  - MV prolapse most common form in developed countries
    - Younger with myxomatous degeneration, bileaflet disease, Barlow's (leaflet)
    - Older patients with fibroelastic deficiency disease leading to chordal rupture (chordal)
    - Less common: i.e. connective tissue disease, rheumatic, cleft, & radiation


*J Am Coll Cardiol*. 2014;63(22):e57-e185. doi:10.1016/j.jacc.2014.02.536

# SECONDARY MR

- MV is structurally normal for age.
- Severe LV dysfunction (ischemia, myocardial disease).
  - Results in leaflet tethering with annular dilation and impaired coaptation
  - Papillary muscle displacement, leaflet tethering, annular dilation and malcoaptation
  - Focus on fixing underlying disease
  - Severity is difficult to assess and echo may underestimate regurgitation

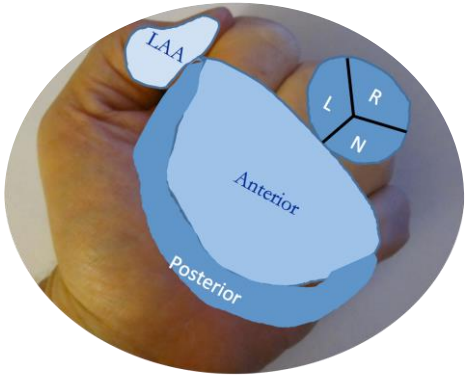


Secondary MR with restricted leaflets

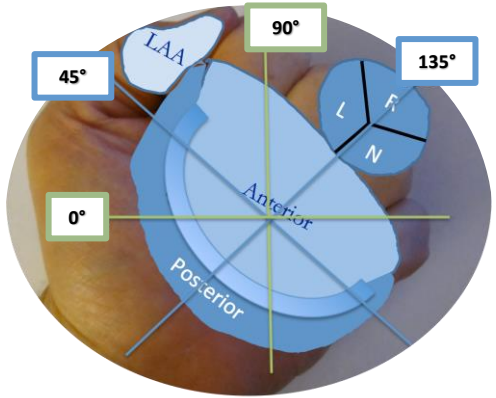
# BASIC TOE APPROACH

- While performing the transoesophageal echocardiogram, it is imperative to evaluate all parts of the MV and develop a complete understanding of the valve apparatus.
- This requires non-standard views and becomes more a process of looking at and sweeping through the valve, instead of just capturing individual stereotypical TOE views.

# LEFT HAND MODEL

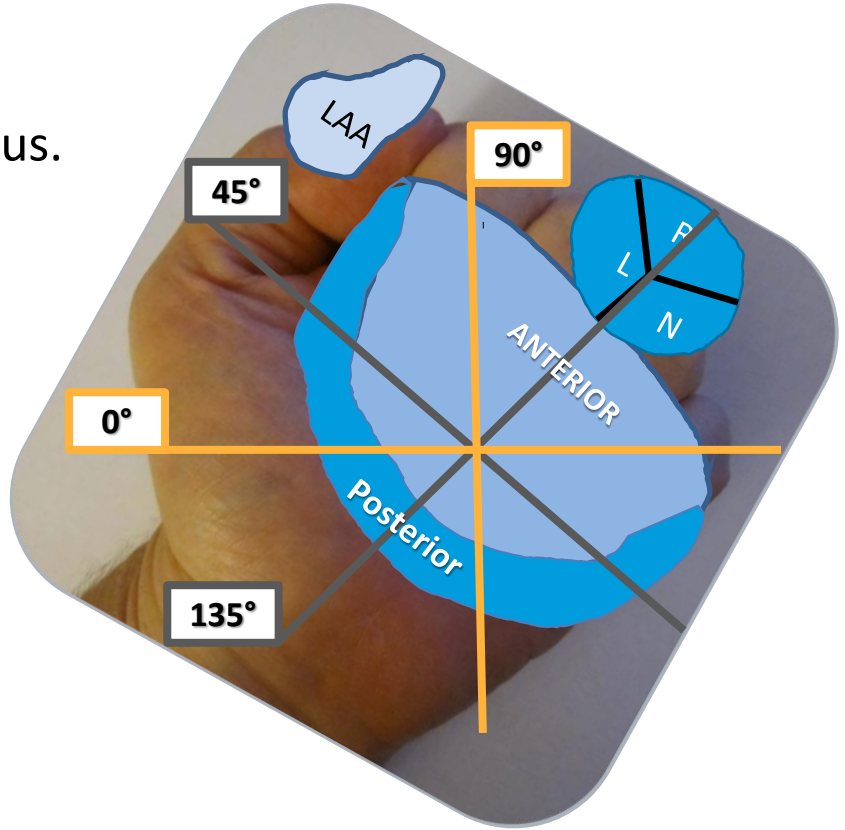



- A simple model for the MV using the supinated left hand. The right hand may be used as an omniplane to rotate around the “valve.”



# LEFT HAND MODEL

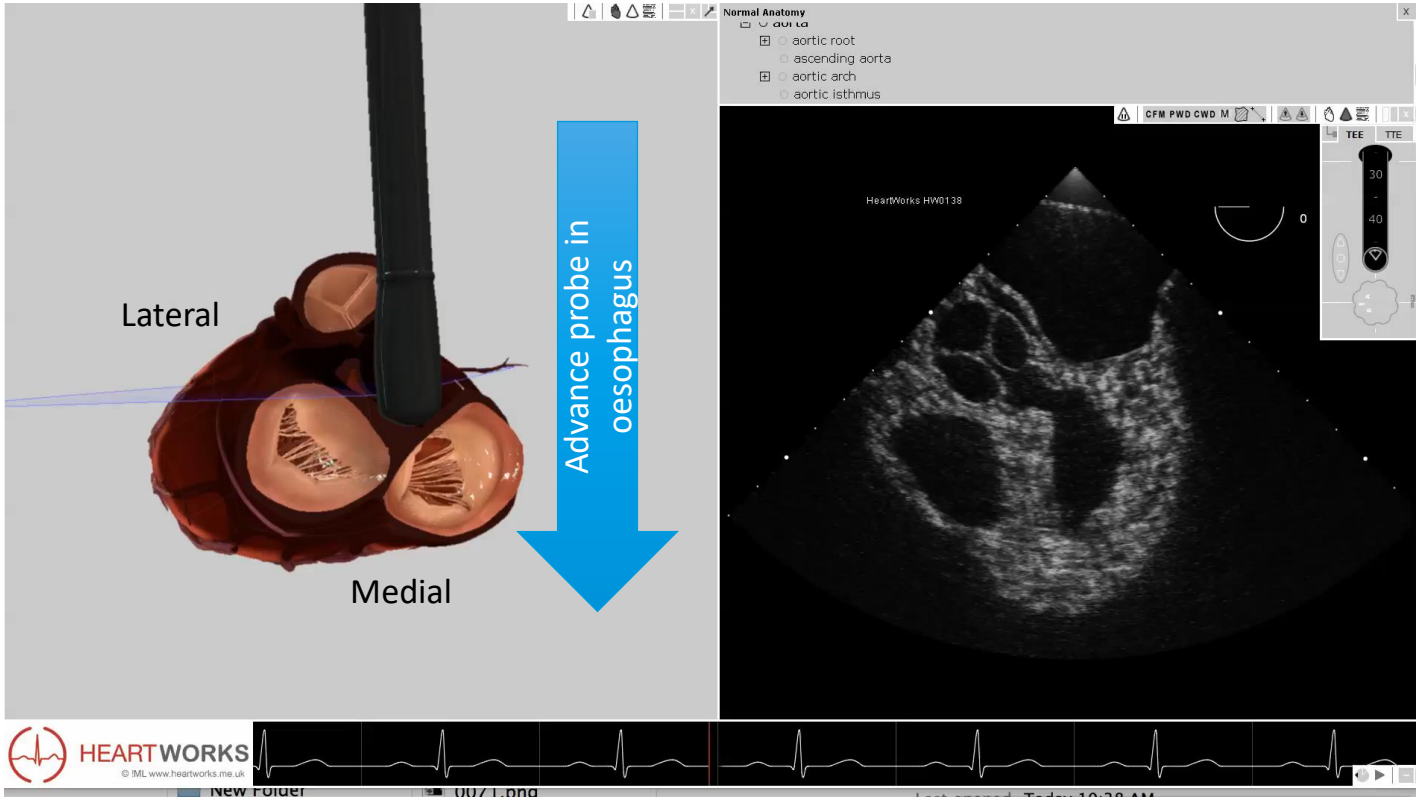
- Orientation of MV as viewed from oesophagus.



# BASIC IMAGING STRATEGY

- Sweep through the entire valve from three different orientations to understand the pathology in *each* view.
  - 0° (lateral to medial)
    - From high to deep in oesophagus
  - Intercommissural (45°-65°) – P1/A2/P3
    - Use biplane imaging to sweep through the MV
    - Rotate probe from counter-clock (posterior) to clock (anterior)
  - Long axis (130°-150°) – A2/P2
    - Rotate probe from counter-clock (lateral) to clock (medial)
- Sweep first with 2D and then colour Doppler.
- Obtain 3D end face view.
- Assess IAS, LAA, pulmonary veins.

# ADVANCING PROBE MOVES AT 0°
## FROM LATERAL TO MEDIAL



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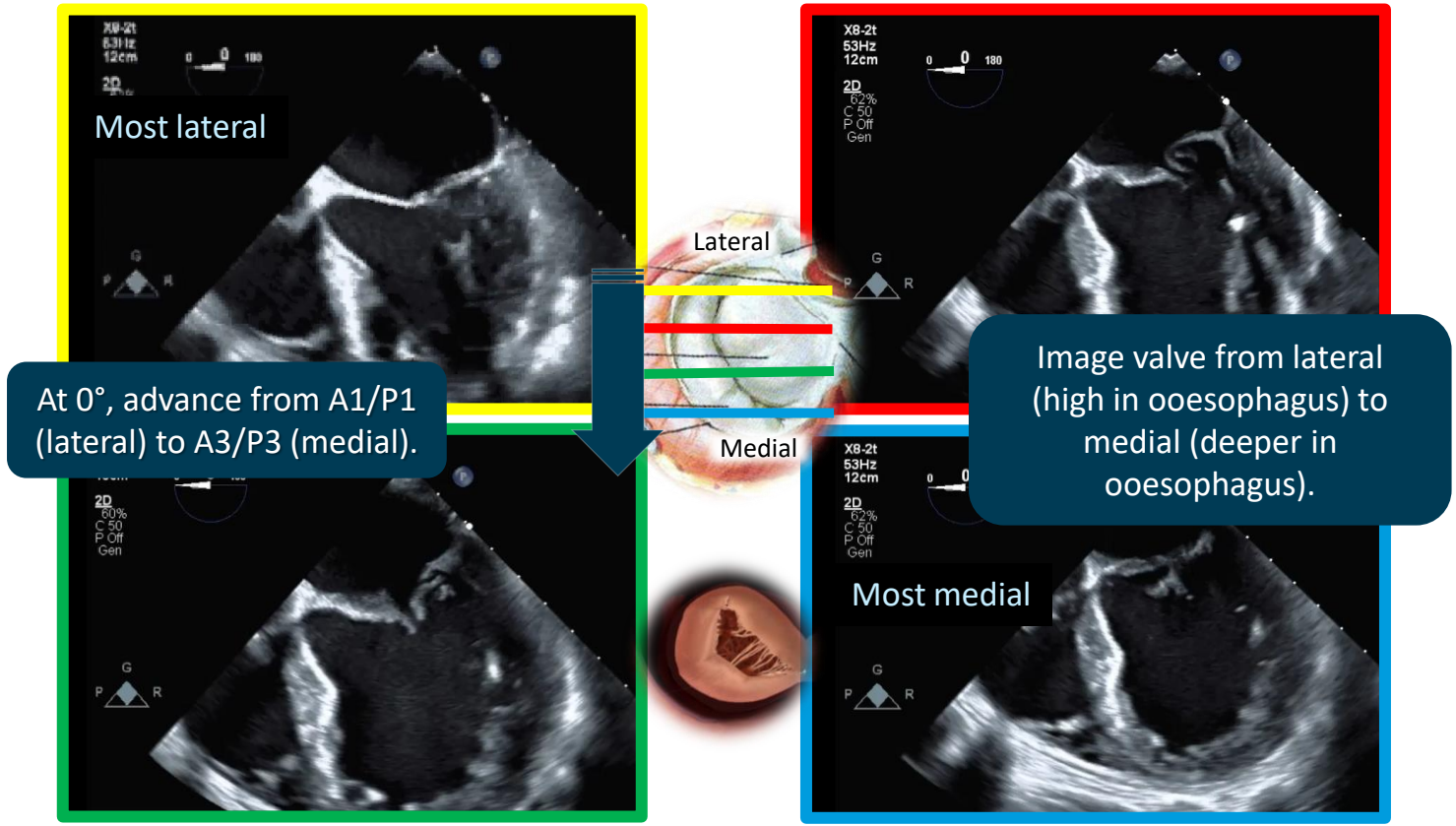
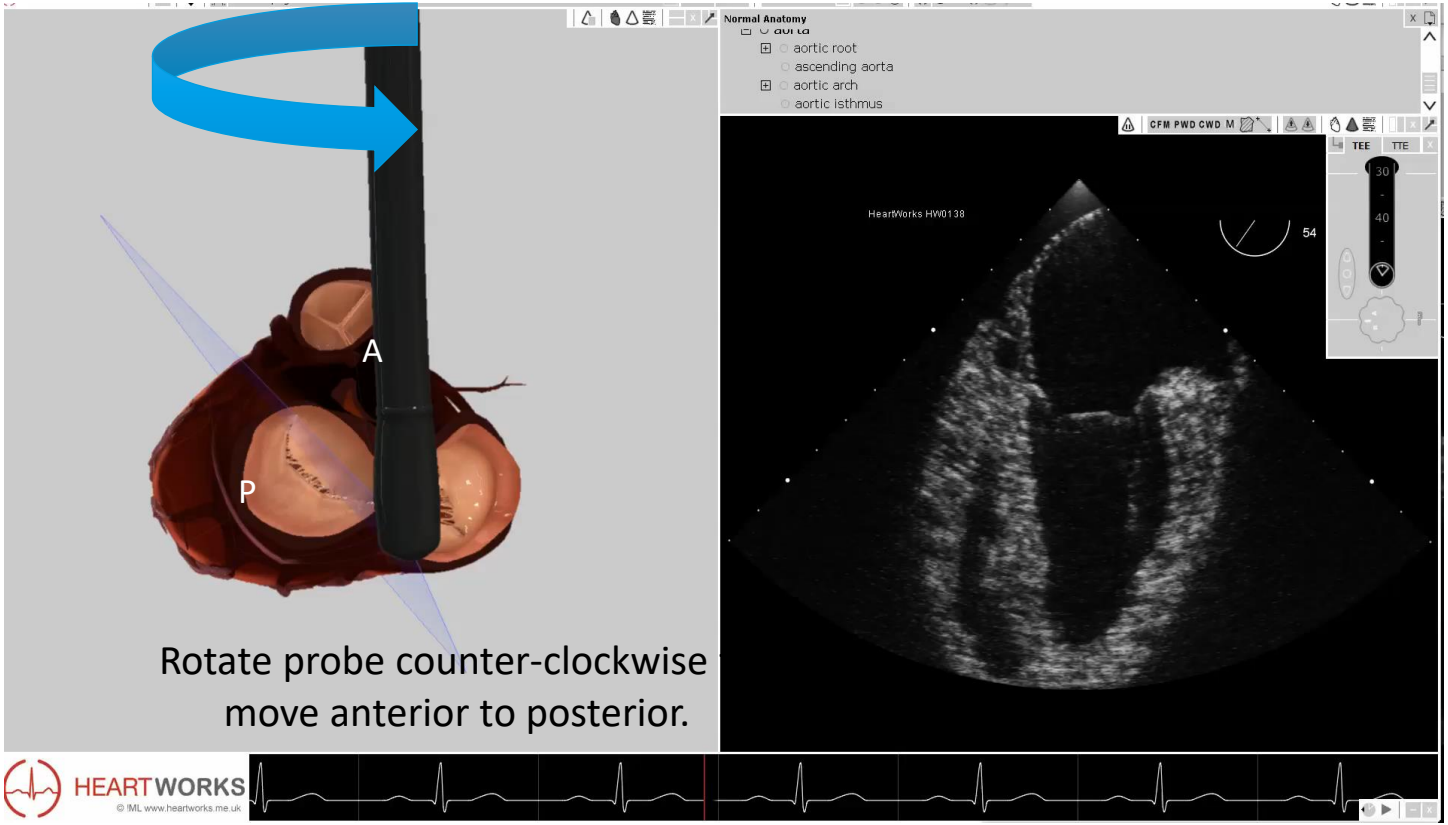


# INTERCOMMISSURAL (IC) VIEW (45°-65°)

## P3/A2/P1



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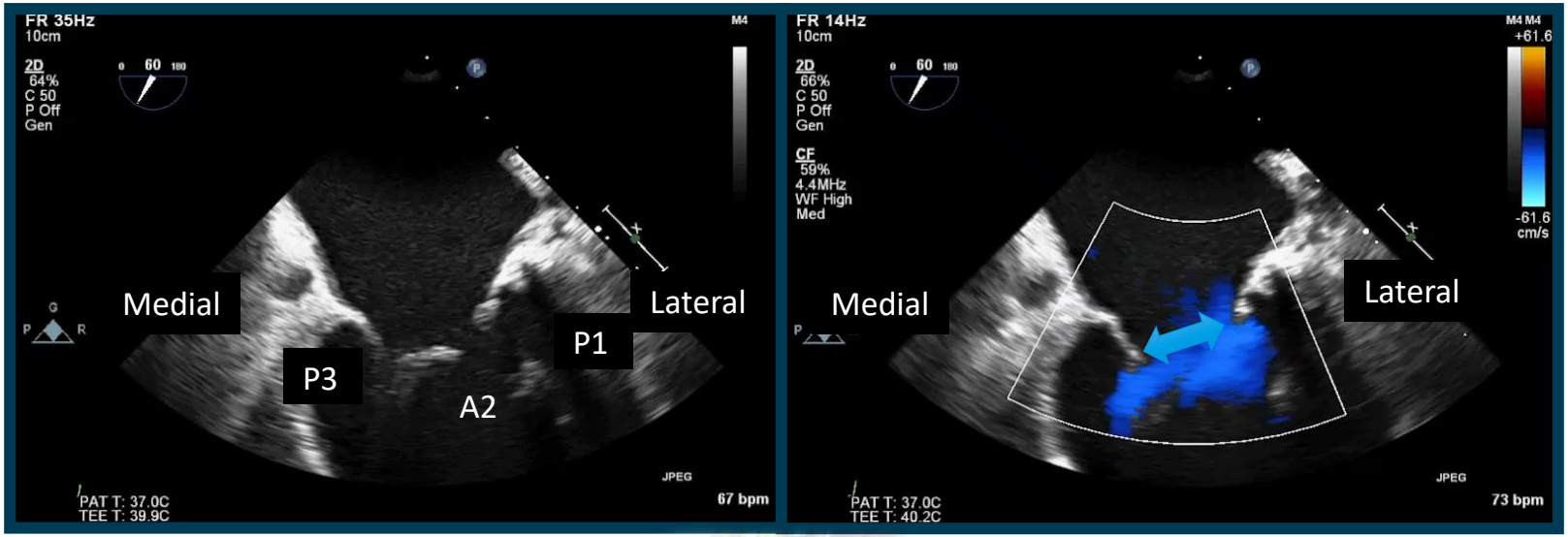
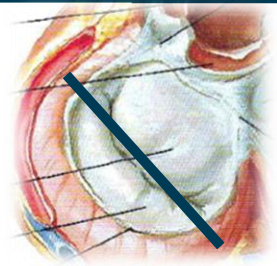


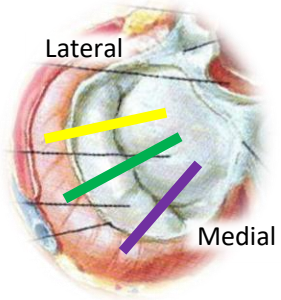

- Assess jet width in IC view. Rotate to maximize width.

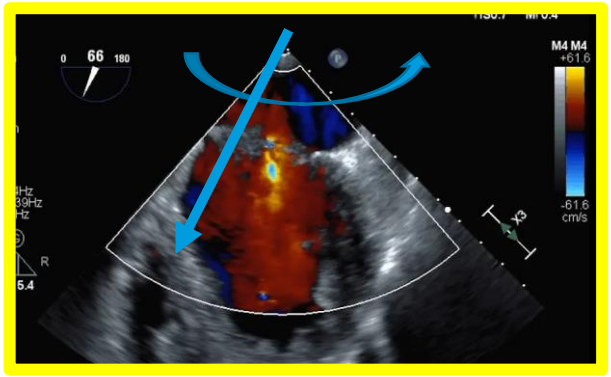


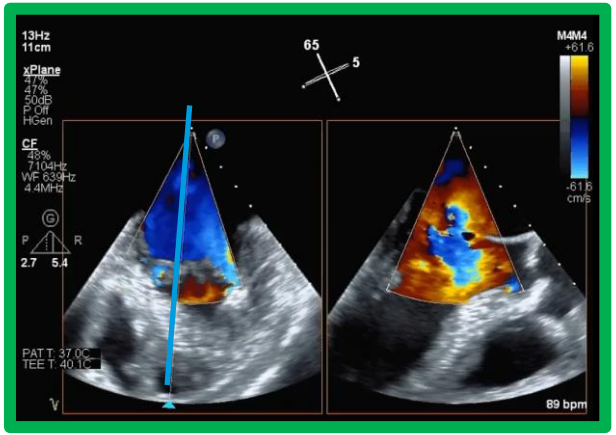
- Wider jets may require more than one Clip for successful repair.

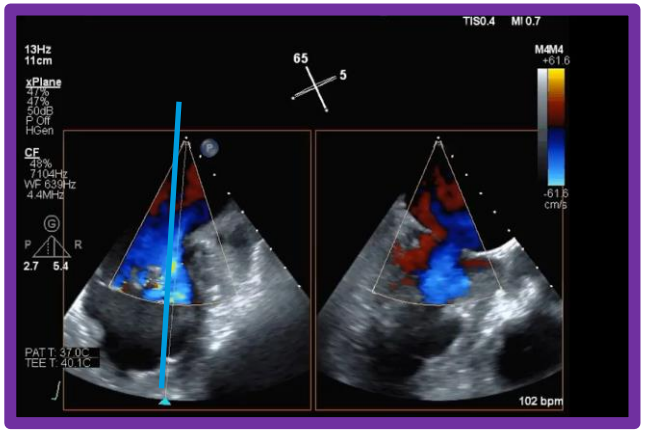
# IC VIEW: BIPLANE SWEEP

- Sweep biplane across valve to visualize jet in long-axis LVOT view.



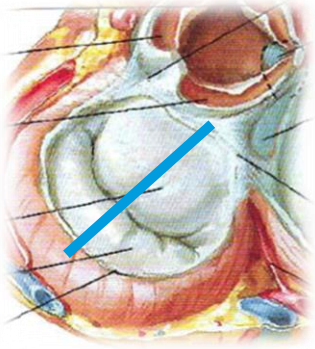



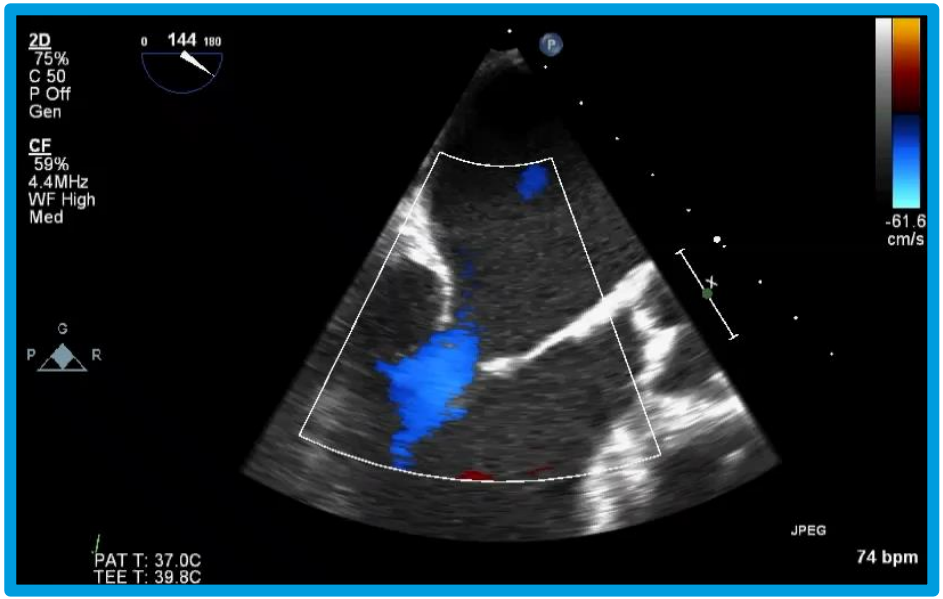



# LONG-AXIS VIEW (130°-150°)
## A2/P2

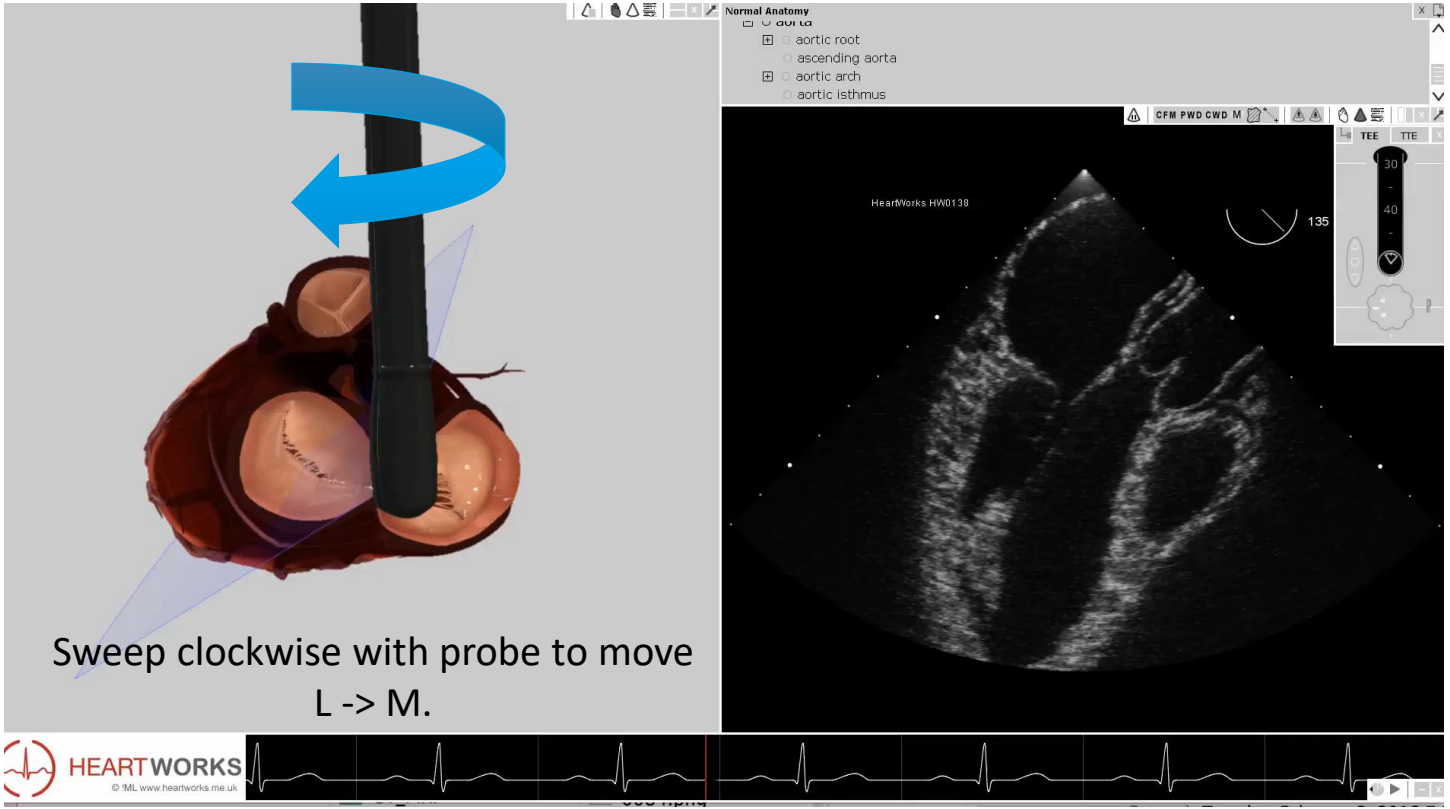
- Grasp angle: In the long-axis view, predict the favourable grasp omniplane.
- Identify any significant calcification in the grasp angle.





# ROTATION IN LONG-AXIS VIEW

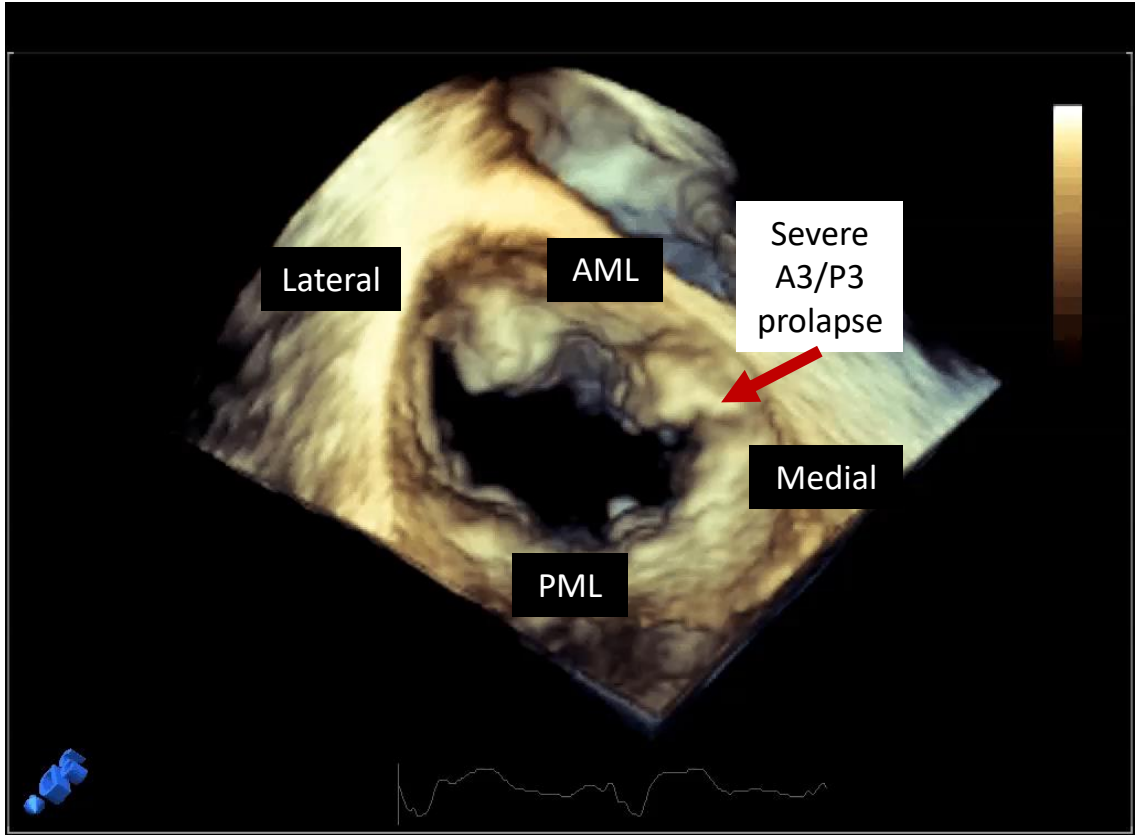
## LATERAL TO MEDIAL



# 3D EN FACE VIEW

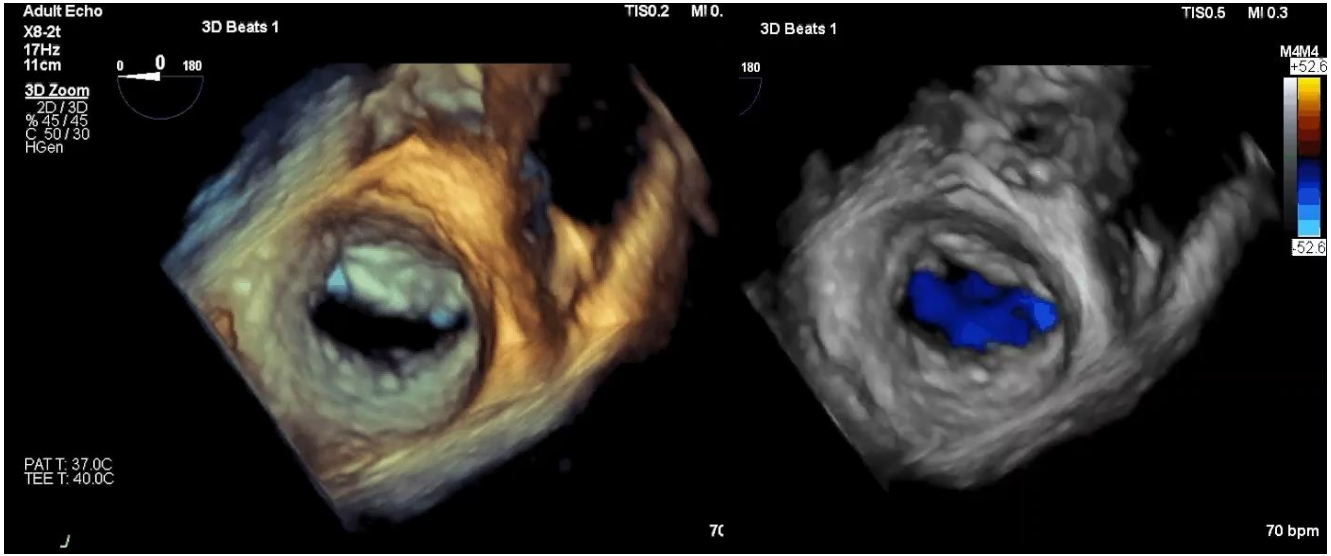
## PUTTING TOGETHER YOUR VALVE UNDERSTANDING

- 3D provides a global view of MV leaflet anatomy.
- Use 3D in conjunction with 2D to understand the valve, but not instead of 2D.
- 3D may miss subtle leaflet abnormalities.

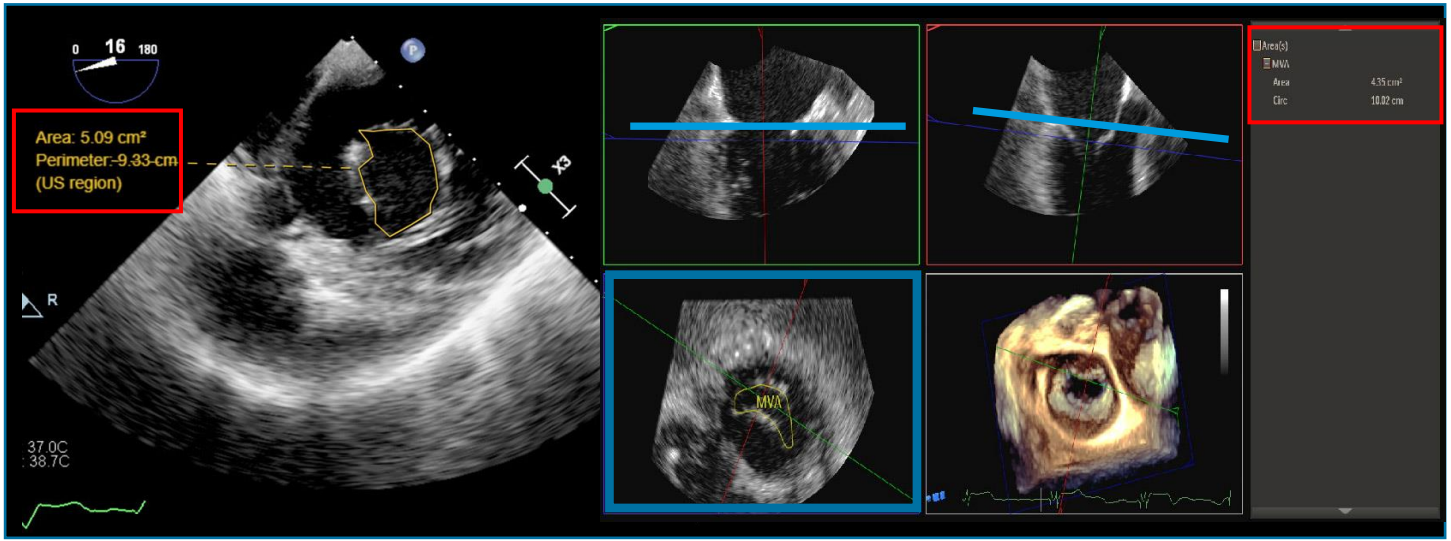


# 3D SECONDARY MR

- Optimize your 2D views before acquiring 3D.
- Decrease sector to focus on MV.
- Acquire multiple beats to improve frame rate.

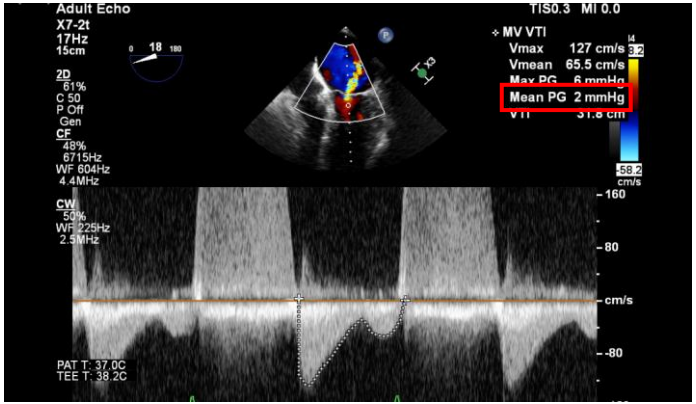


# MITRAL VALVE AREA (MVA)




- Obtaining measurement of MVA using planimetry.
- Examples of MVA calculations using 3D & Multiplanar Reconstruction (MPR).

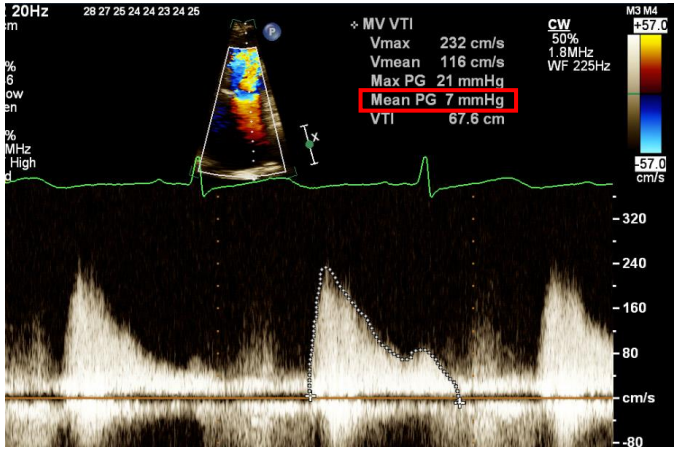
# MEAN DIASTOLIC GRADIENT




- A transmitral gradient is an important metric to assess MVA and to exclude potential for MS after a MitraClip™ G4 implant.

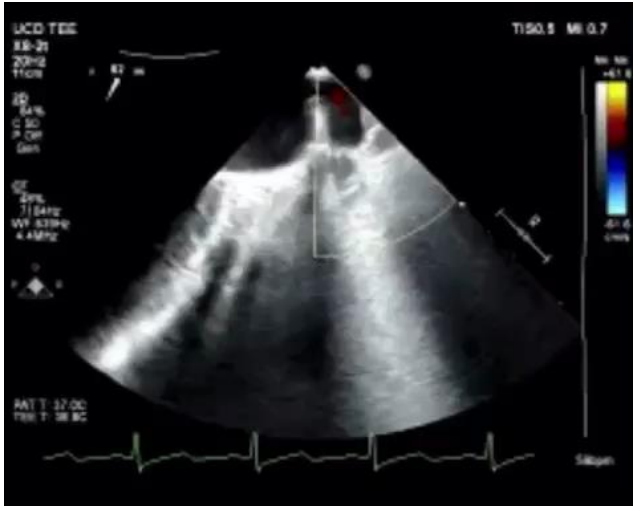
**NOTE:** An elevated transmitral gradient may be “falsely” elevated due to the MR flow. The transmitral gradient should correlate with other MVA assessments.

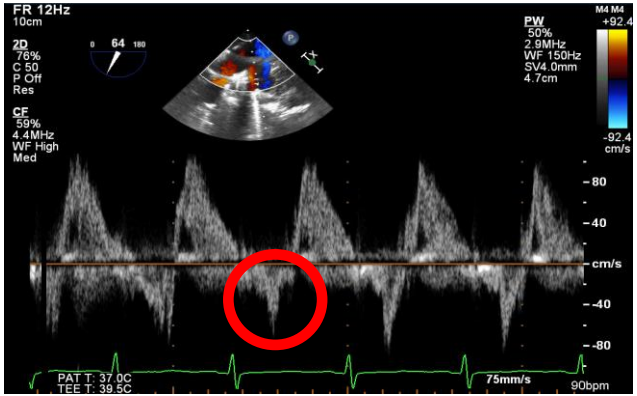
- If the transmitral gradient is ≥ 4 mmHg at baseline, the valve may be too small to accommodate MitraClip G4 implant(s).

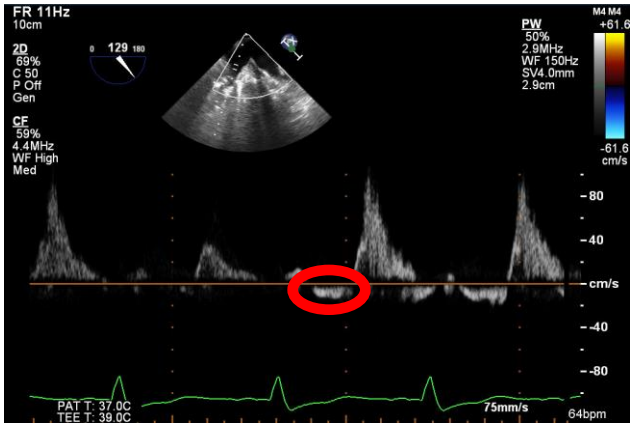


# PULMONARY VEIN FLOW

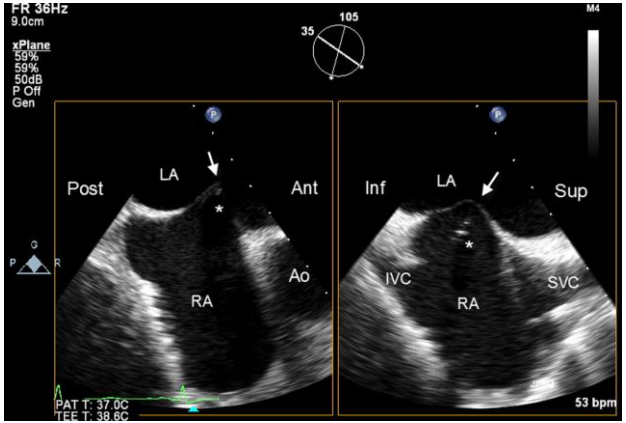
- Evaluate pulmonary vein inflow to assess for systolic blunting or flow reversal.

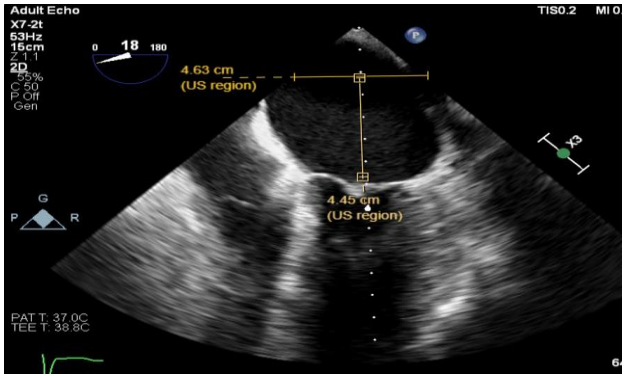




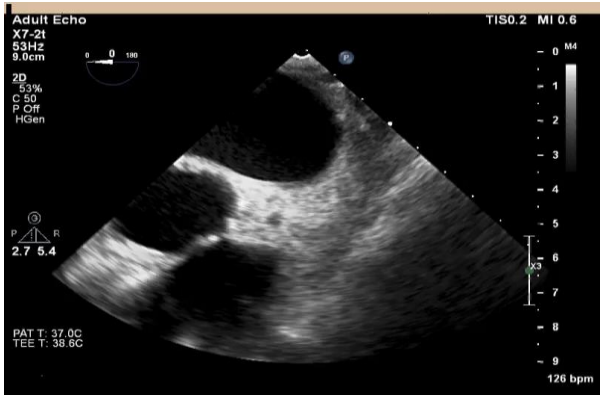
# EVALUATE INTERATRIAL SEPTUM

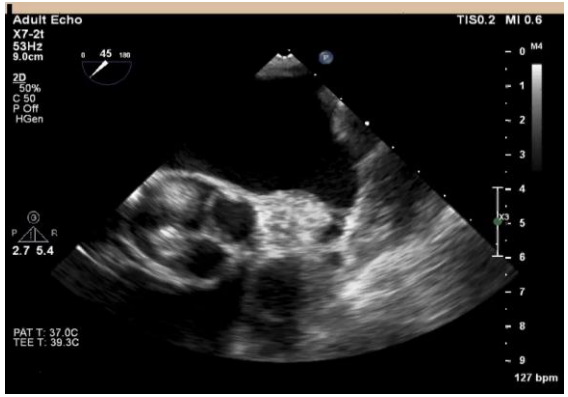


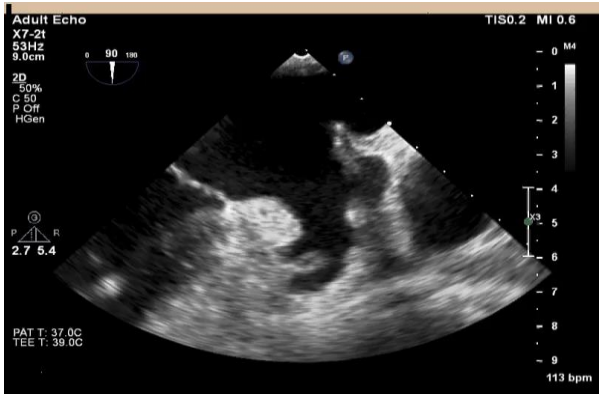



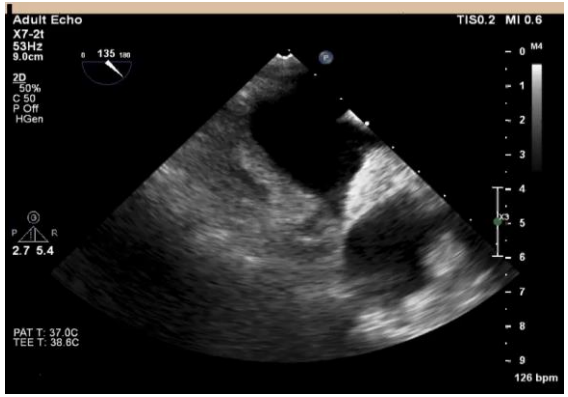

- Careful evaluation of the interatrial septum is key for transseptal puncture and procedural planning.
- Identify PFO, ASD, aneurysm and thickening if present.
- An LA height assessment is helpful to determine if the atrium is large enough to accommodate the MitraClip™ G4 System and to ensure an adequate transseptal puncture.

# EVALUATE LAA FOR THROMBUS



# TOE FINDINGS THAT *MAY* LIMIT SUCCESS

- Risks of mitral stenosis.
  - MVA < 4 $cm^2$
  - Thickened, non-pliable leaflets
  - Severe MAC
  - Significant leaflet calcification at grasp position
  - Previous surgical repairs
- Anticipates TOE ring challenges: enlarged LA, small LA, interatrial septal aneurysm/hypermobile septum.
- Patient position and clinical condition matter.
  - Imaging may vary when patient is supine
  - Anesthesia can impact hemodynamics, thus MR severity
- Short posterior leaflet may limit ability to grasp.
  - Measure leaflet (mobile portion) length

# TOE SCREENING KEY POINTS

- Sweep through the valve using biplane imaging in the IC views, from medial to lateral with and without colour.
- Capture multiple beats (at least 3) with and without colour in standard views as well as while sweeping.
  - Standard Views: 0°, intercommissural and long-axis
  - At all locations of MV pathology
- Use multiple echo tools to quantify MR and MS.
  - PISA, Pulmonary veins, P½t, mean diastolic gradient
- Review studies and imaging requirements with referring centres to reduce the need to repeat TOE studies.
- The MitraClip™ G4 System is primarily TOE guided. Ensuring a patient's future procedural success requires a thorough understanding of the valve based on TOE.


CAUTION: This product is intended for use by or under the direction of a physician. Prior to use, reference the Instructions for Use, inside the product carton (when available) or at eifu.abbottvascular.com or at medical.abbott/manuals for more detailed information on Indications, Contraindications, Warnings, Precautions and Adverse Events. Information contained herein for **DISTRIBUTION in Australia and New Zealand ONLY.**

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