Anatomy and Assessment of Left Atrial Appendage for Percutaneous LAA Closure

Maiko Hozawa[*1] Yoshihiro Morino[*1] Kyohei Nagata[*1] Yuki Matsumoto[*1]
Michiko Yoshizawa[*1] Yoshifumi Nakajima[*1] Akiko Kumagai[*1]
Atsushi Tashiro[*4] Akio Doi[*3] Kunihiro Yoshioka[*2]

Division of Cardiology, Department of Internal Medicine, Iwate Medical University[*1]
Department of Radiology, Iwate Medical University[*2]
Software and Information Science, Iwate Prefectural University[*3]
Department of Laboratory Medicine, Iwate Medical University[*4]

Iwate Medical University

The Japanese Circulation Society

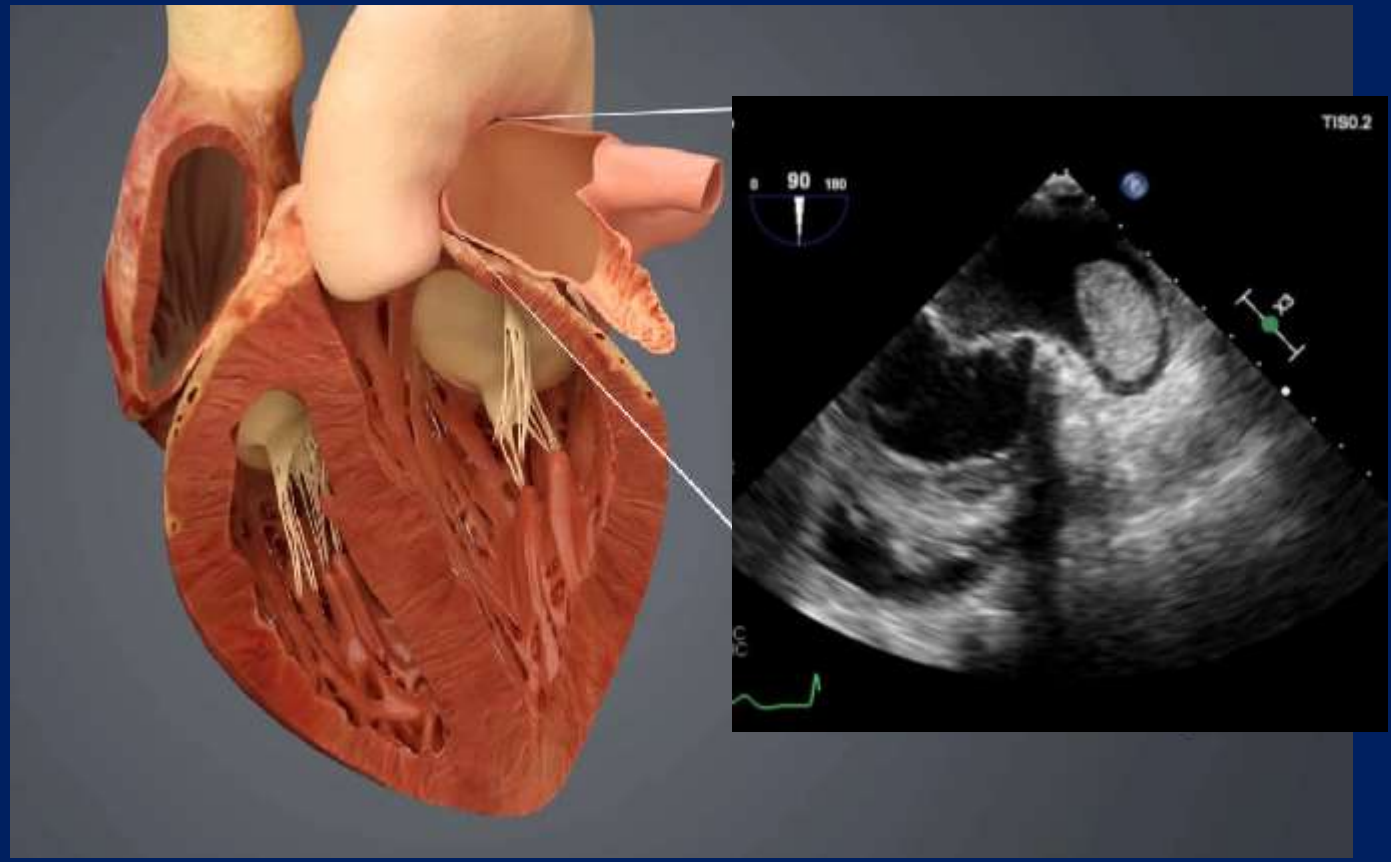
COI Disclosure

Maiko Hozawa

The author has no financial conflicts of interest to disclose concerning the presentation.

Iwate Medical University

Percutaneous Left Atrial Appendage Closure



Joseph L. Blackshear; Ann Thorac 1996;61:755-9

Iwate Medical University

Percutaneous Left Atrial Appendage Closure

Pre Procedural Assessment

Key : Characteristics LAA

1. LAA Morphology, Axis
2. Surrounding structures of LAA
   PV ridge, Left circumflex artery, Mitral valve
3. LAA ostium diameter and depth

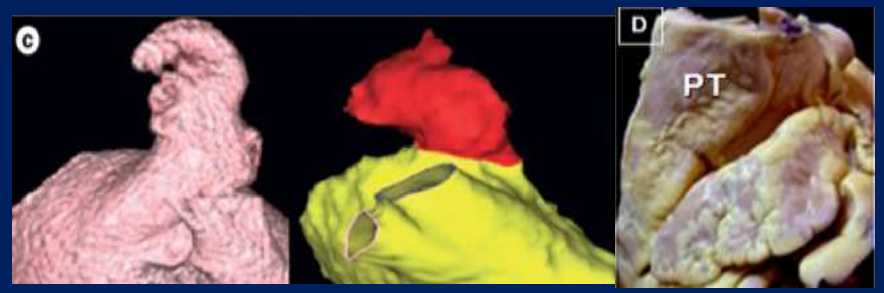
Iwate Medical University

1. Left Atrial Appendage Morphology

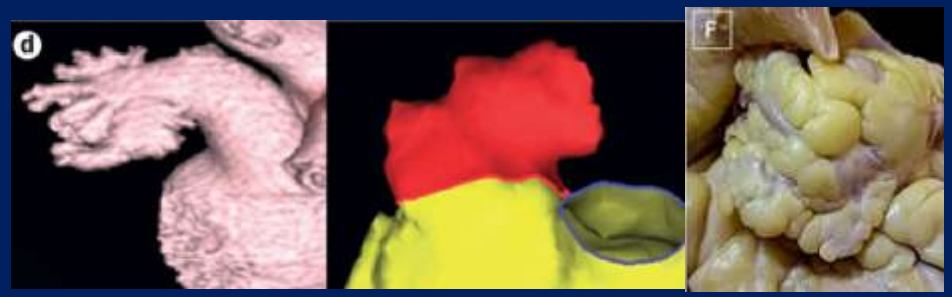
Chicken Wing (48%)

Cactus (30%)

Windsock (19%)



Cauliflower (3%)

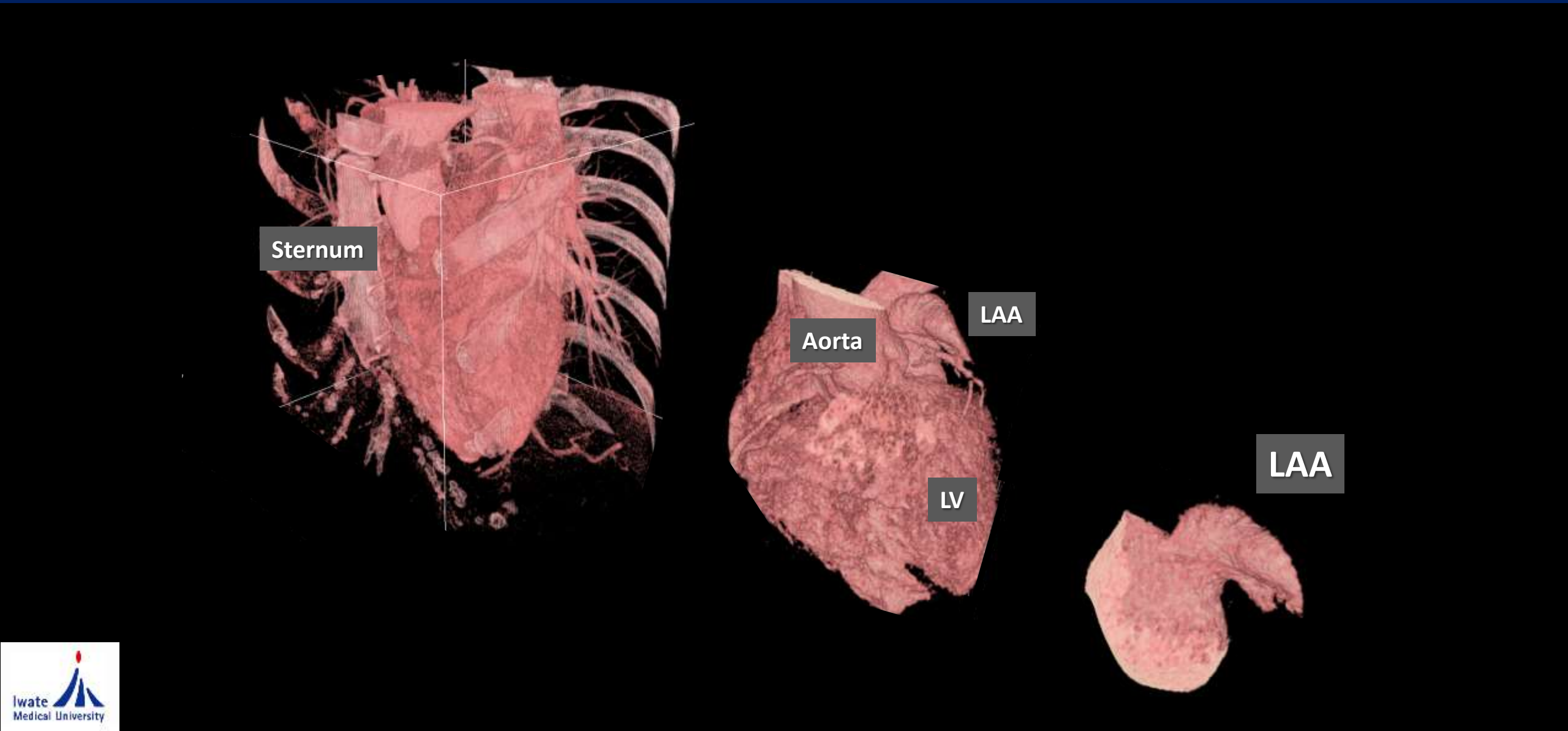


Iwate Medical University

Jose Angel Cabrera ; Heart 2014; 100:1636-1650
Di Biase ; Journal of the American College of Cardiology 2012; 50:531-538

2. Surrounding structure

with three dimensional cardiac CT

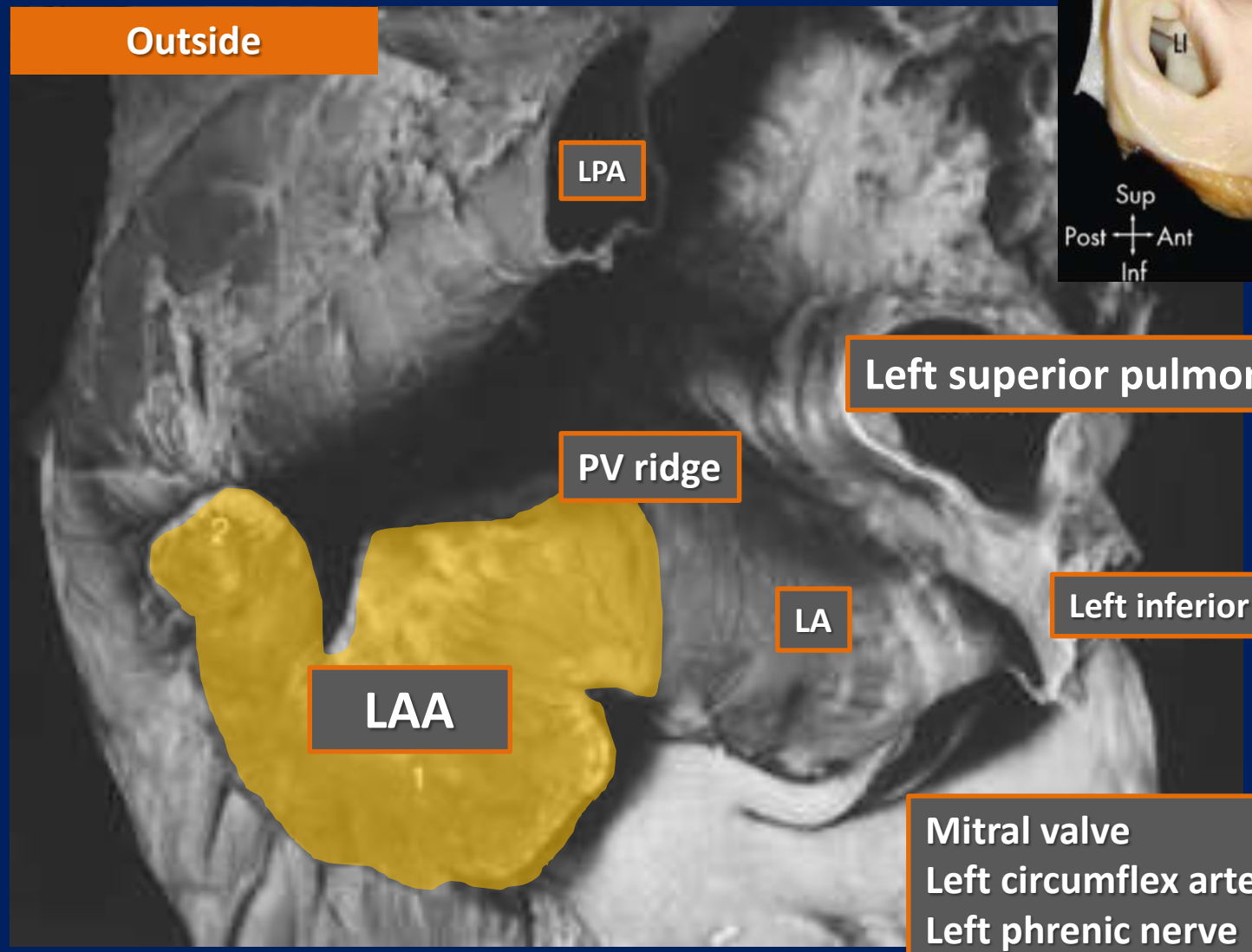


Iwate Medical University

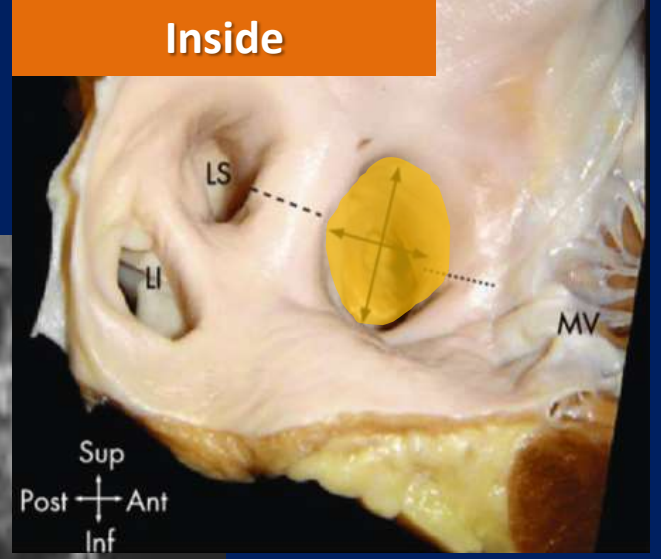
2. Surrounding structure

Landmarks for procedure

Outside



Inside



Left superior pulmonary vein

Left inferior pulmonary vein

Mitral valve
Left circumflex artery
Left phrenic nerve

Iwate Medical University

John P. Veinot ; Circulation. 1997;96:3112-3115
Jose Angel Cabrera ; Heart 2014; 100:1636-1650

Percutaneous Left Atrial Appendage Closure

Pre Procedural Assessment

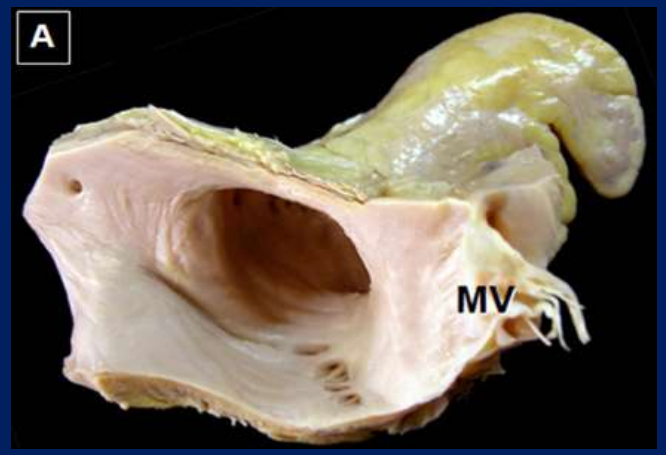
Key : Characteristics LAA

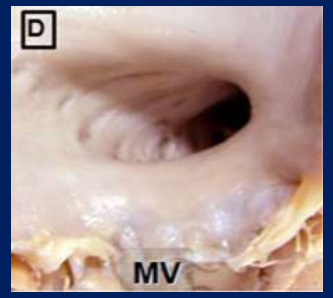
1. LAA Morphology, Axis
2. Surrounding structures of LAA
   PV ridge, Left circumflex artery, Mitral valve
3. **LAA ostium diameter and depth**

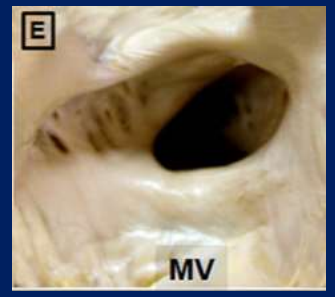
Determine the adaptation for LAA closure

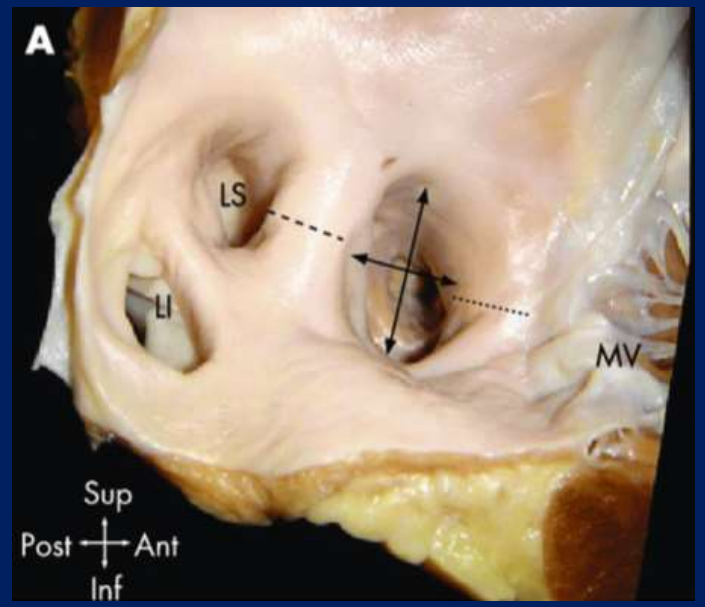
Iwate Medical University

3-1. LAA ostium









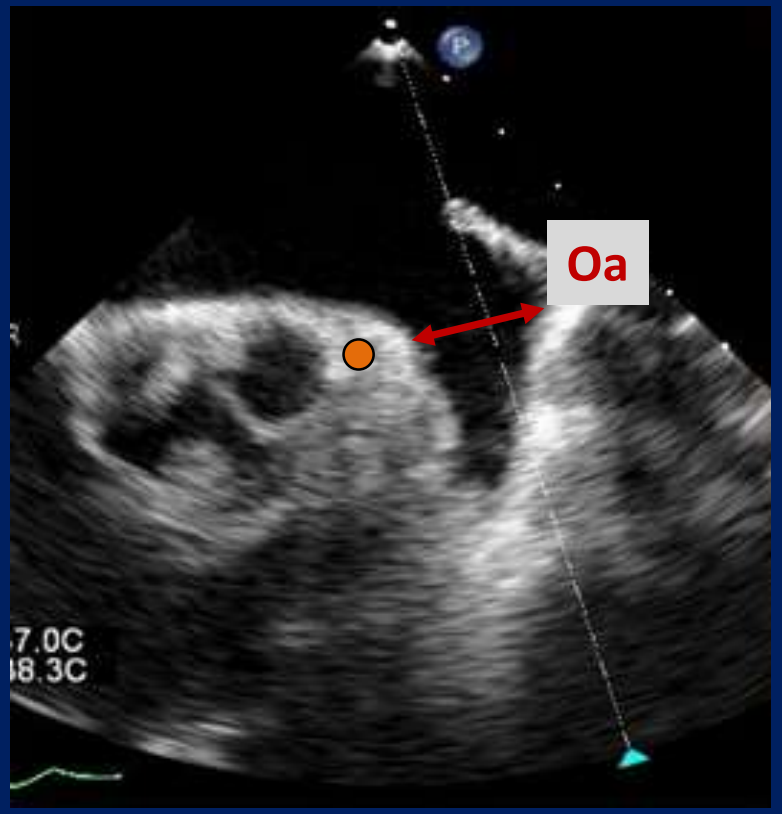
- Elliptical ostium of the LAA: long axis 10-40mm, a short axis 5.2-19.5mm (5.7% round shape)
- A progressive increasing, more round shape in LAA ostium with AF
- Increase with aging, regardless of the gender
- Volume loading leads to enlargement LAA ostium

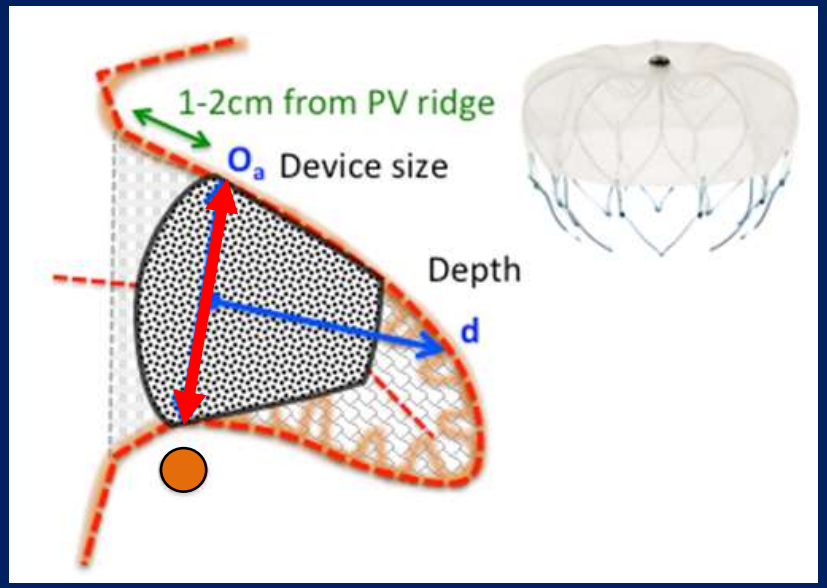
P Su ; Heart 2008; 94: 1166-1170
Jose Angel Cabrera ;Heart 2014; 100:1636-1650
Jose Angel Cabrera ; Anadolu Kardiyol Derg 2013; 13: 566-72
John P. Veinot ; Circulation. 1997;96:3112-3115 Tabata T : Eur J Echocardiography 2000; 1

3-1. LAA ostium

Watchman device is designed to occlude the Oa

Suitable for LAA closure : 17-31mm





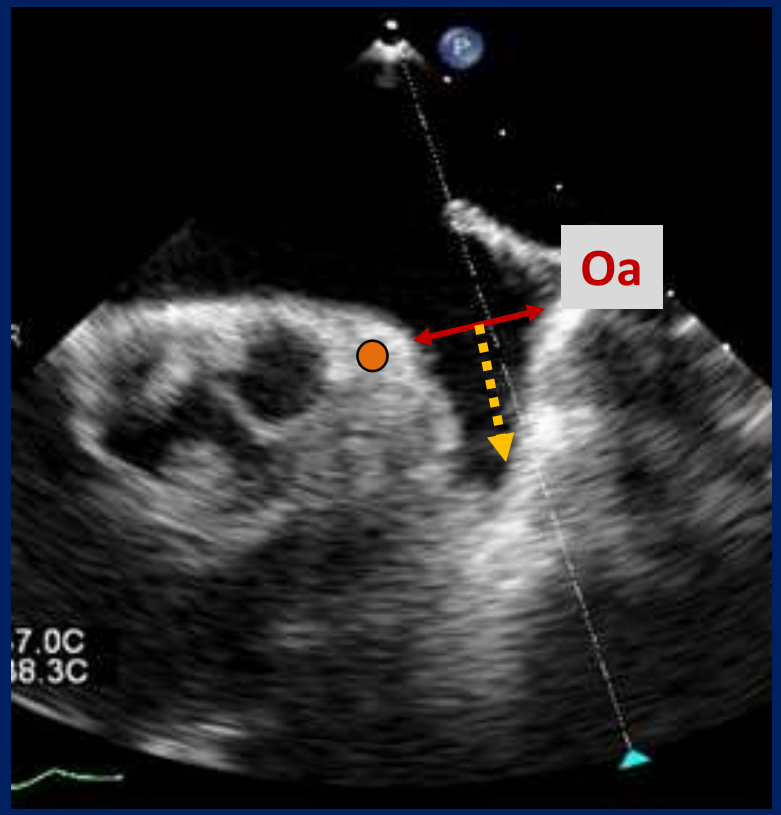
Oa : Anatomical orifice

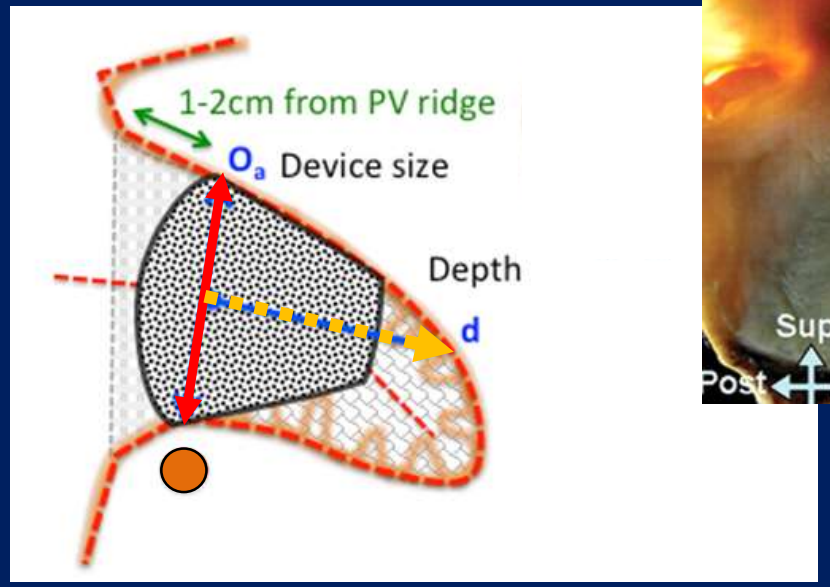
Left circumflex artery

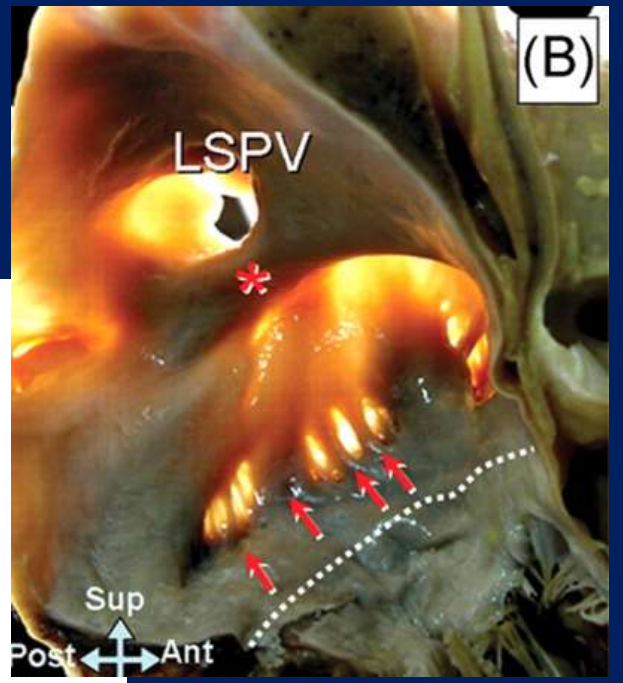
Iwate Medical University

3-2. LAA depth

Determine the adaptation for LAA closure







Oa : Anatomical orifice

Left circumflex artery

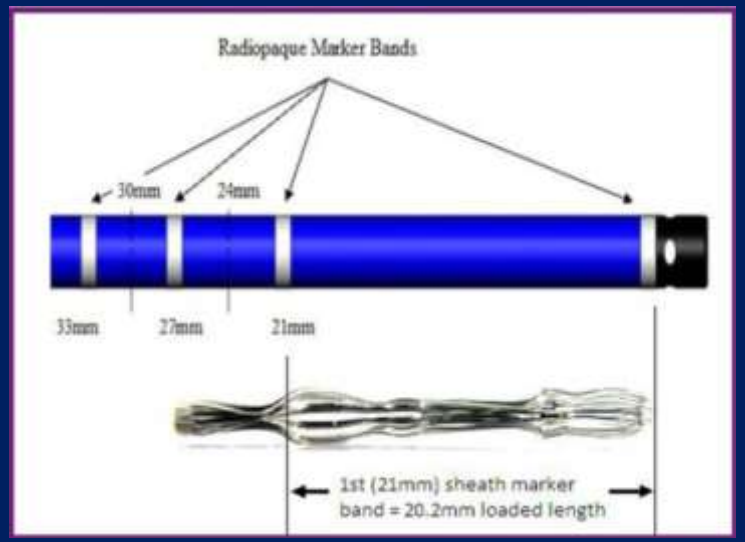
Depth of landing zone

Depth of landing zone should be equal or greater than the ostium

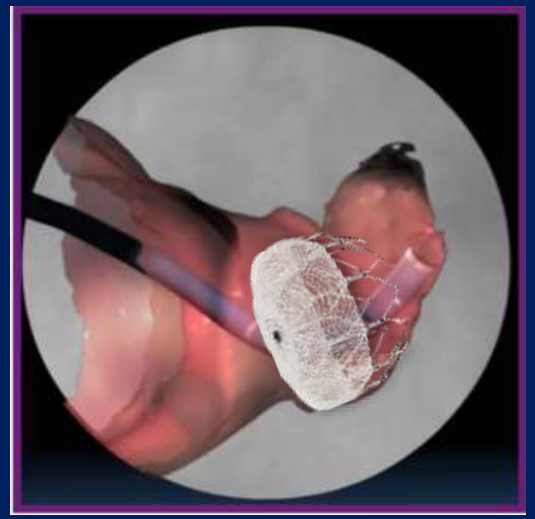
Iwate Medical University

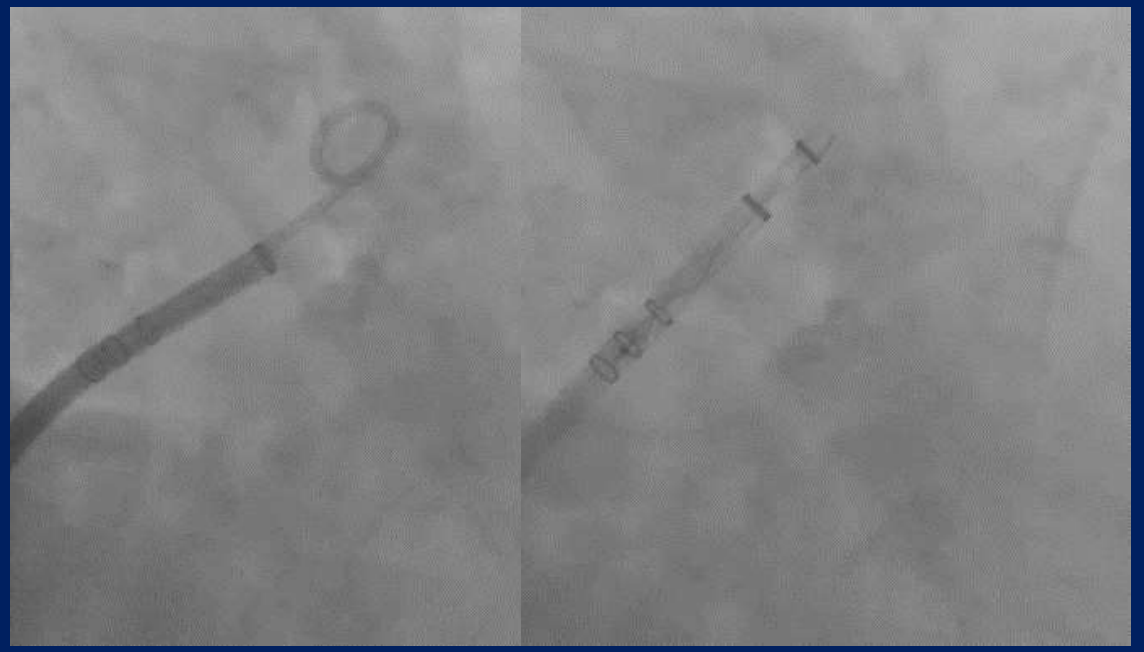
3-2. LAA depth

Depth of landing zone should be equal or greater than the ostium



Access Sheath Marker Band	Loaded Device Length
21mm	20.2mm
24mm	*22.9mm*
27mm	26.5mm
30mm	*29.4mm*
33mm	31.5mm





Iwate Medical University

Percutaneous Left Atrial Appendage Closure

Pre Procedural Assessment

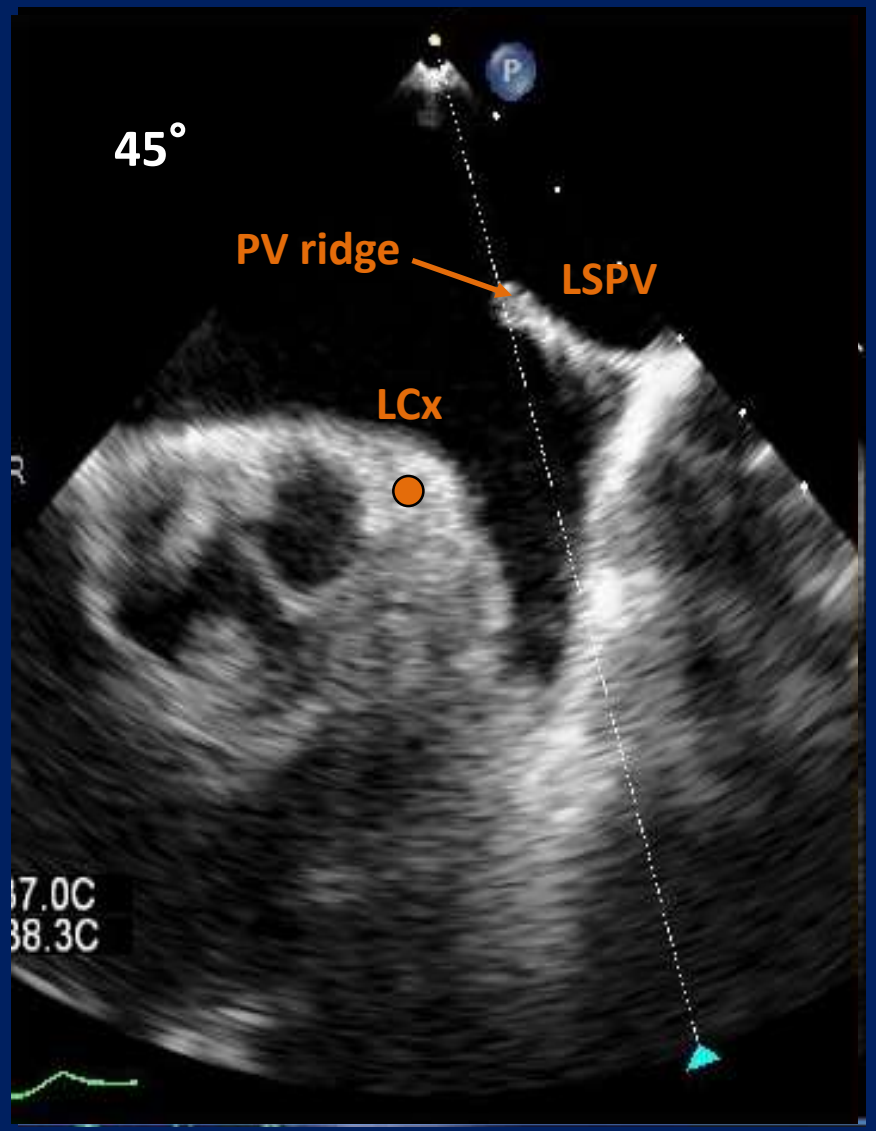
Key : Imaging for LAA

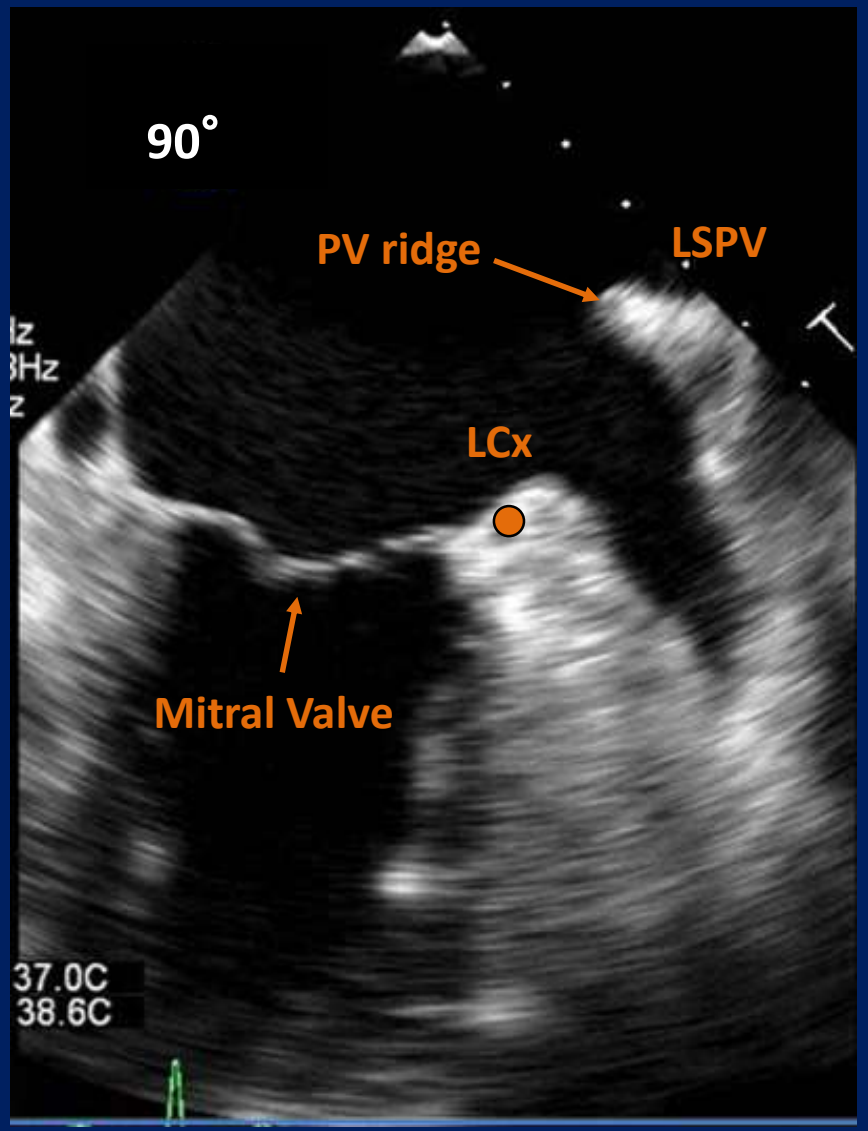
1. LAA Morphology, Axis
2. Surrounding structures of LAA
   PV ridge, Left circumflex artery, Mitral valve
3. LAA ostium diameter and depth

Iwate Medical University

Imaging Assessment for LAA closure

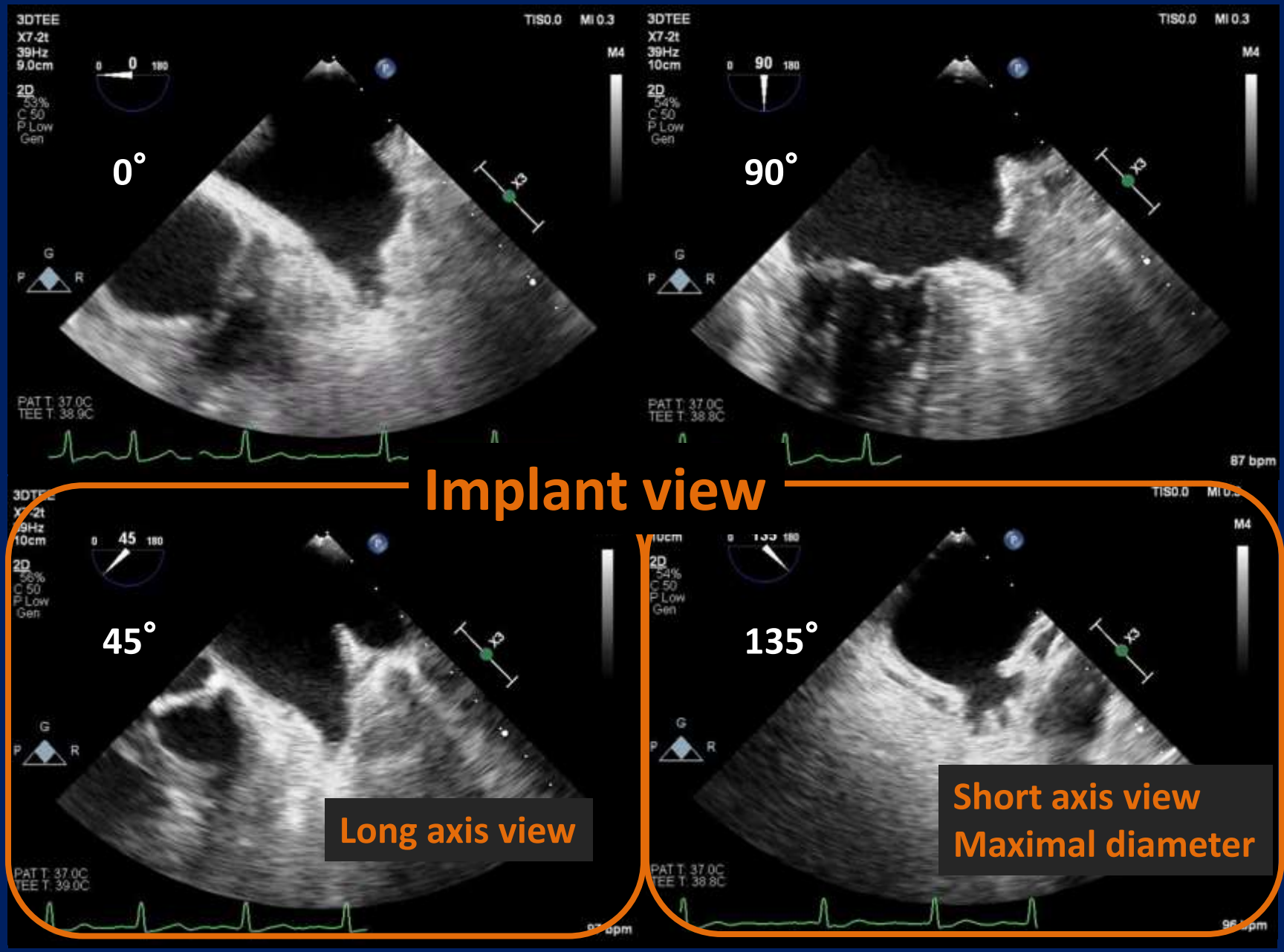
Transesophageal Echocardiography is gold standard





Iwate Medical University

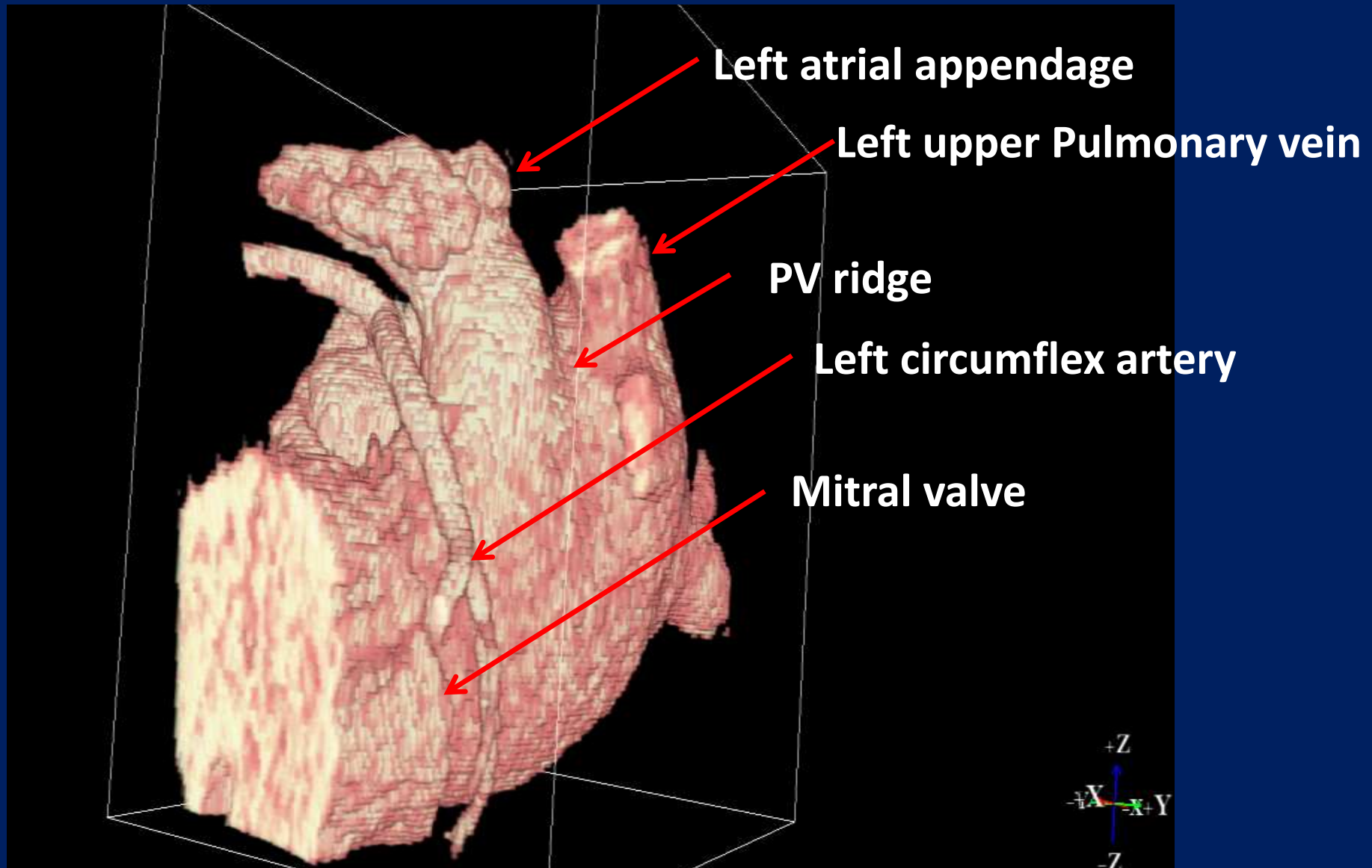
Assessment LAA by TEE in multiple view



Iwate Medical University

Assessment LAA by 3D-CT

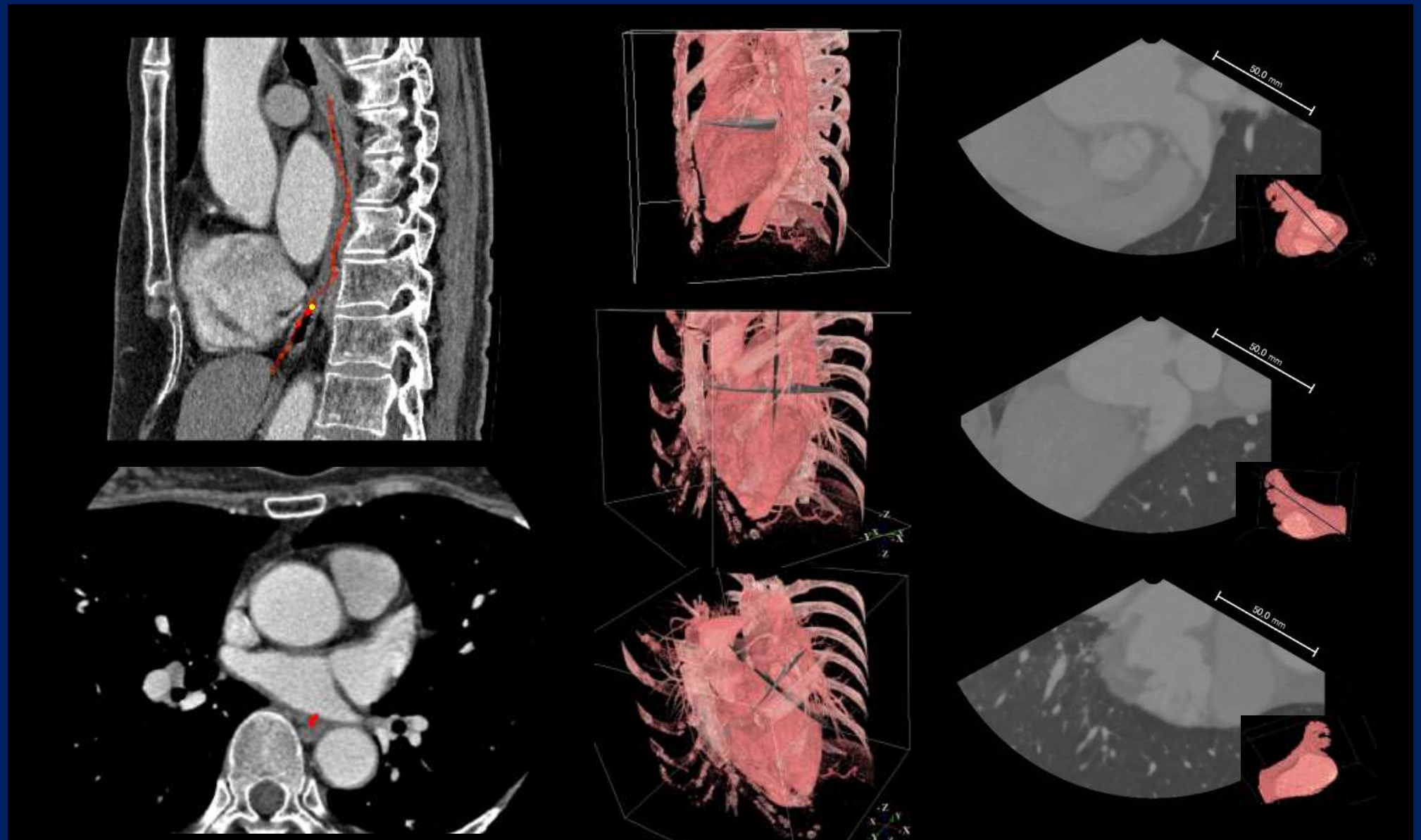
Cardiac CT provides high spatial resolution and structural depiction



Iwate Medical University

Virtual TEE viewer application

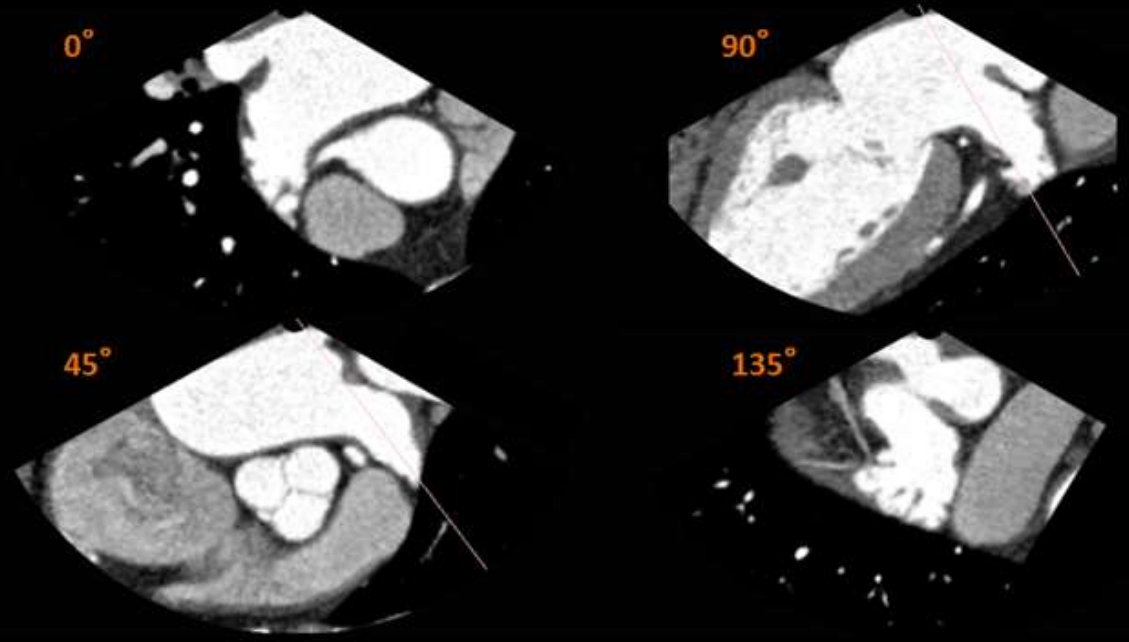
Pre Procedural Assessment with Non Invasive system

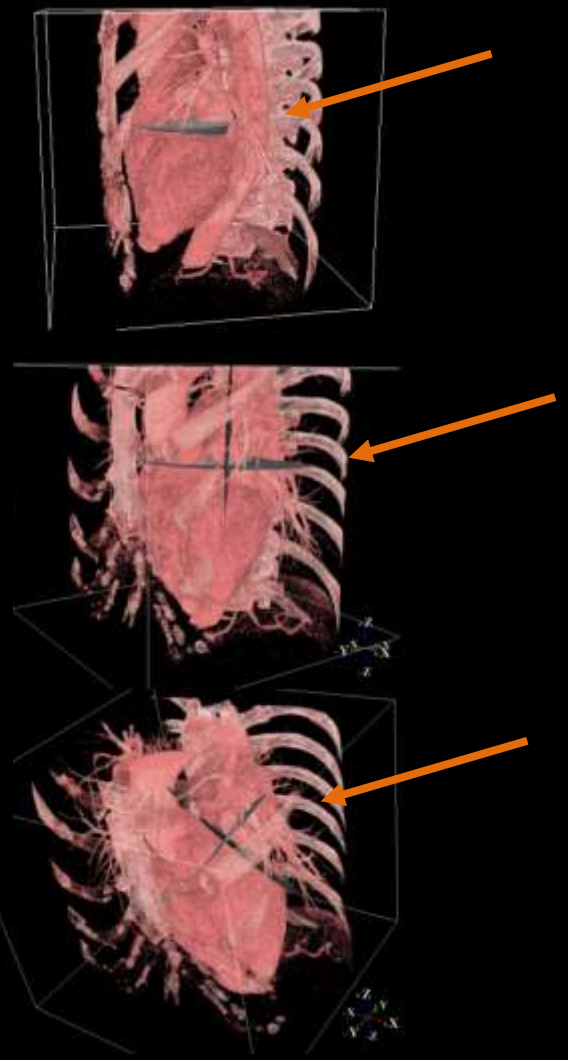


Iwate Medical University

Virtual TEE viewer application

Pre Procedural Assessment with Non Invasive system

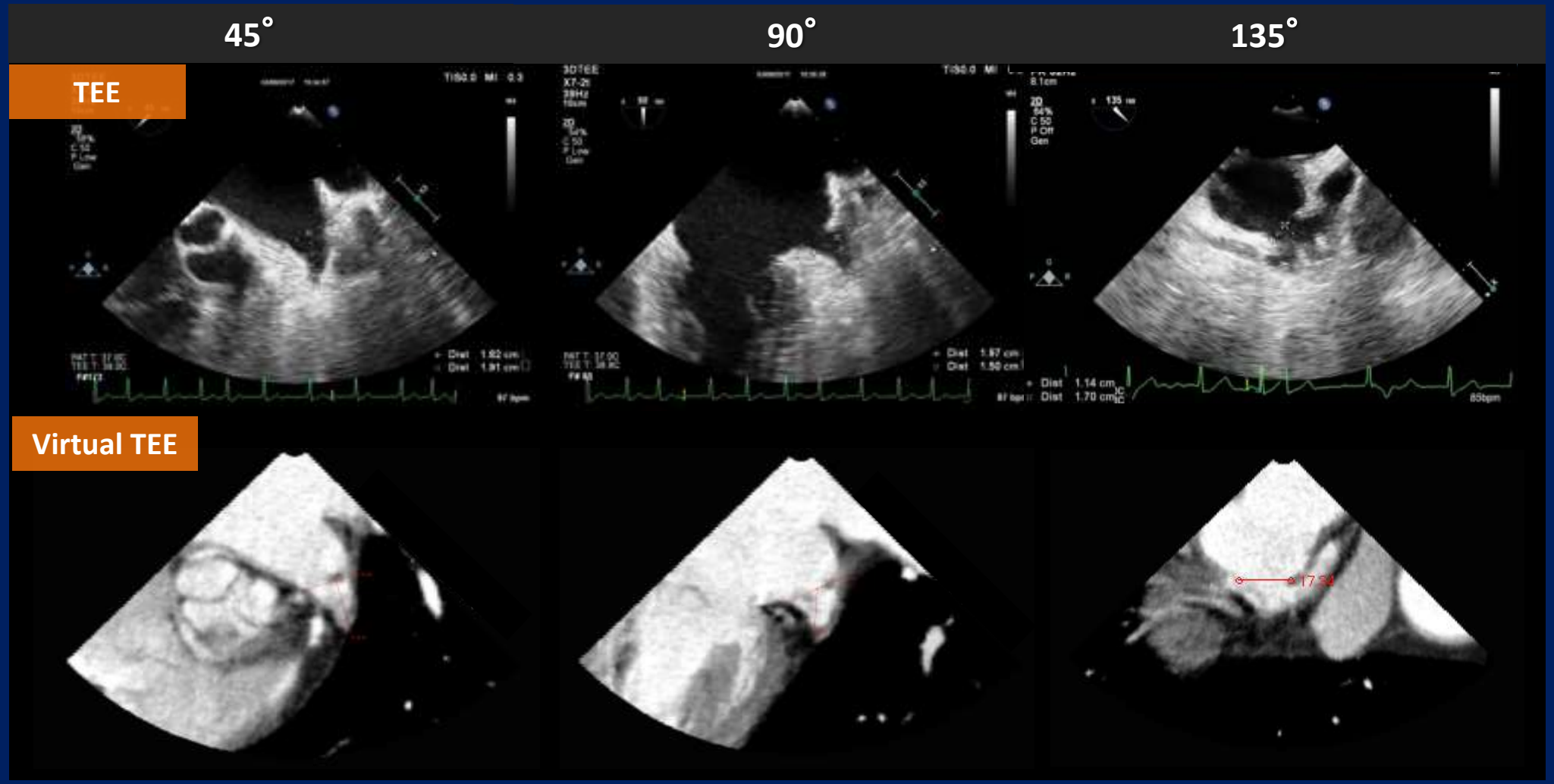




Iwate Medical University

Virtual TEE viewer application

Comparison of TEE and Virtual TEE viewer by CT

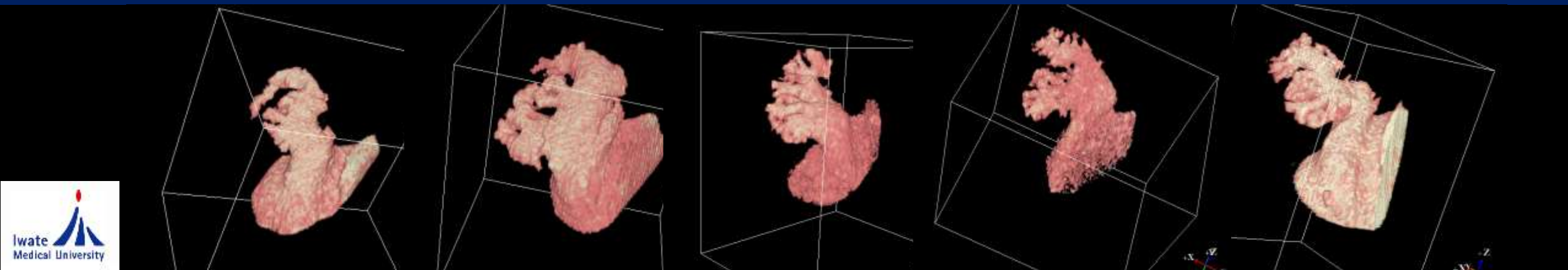


Effective Tool for Patients and Operators

Iwate Medical University

Summary

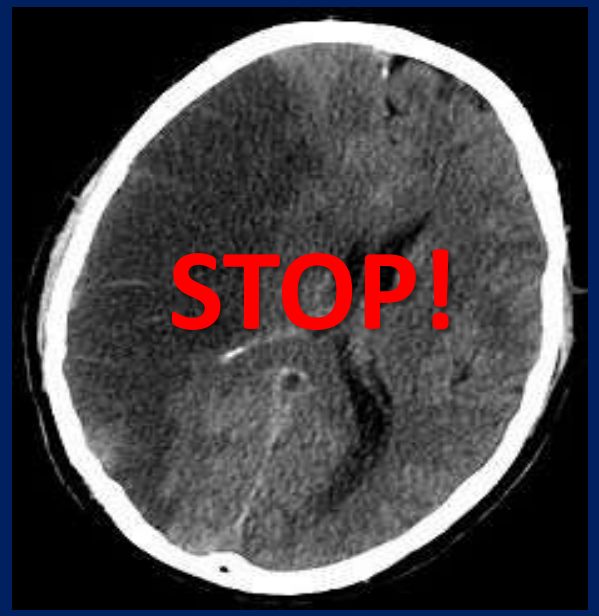
- More than 90% of thrombus in patients with AF locates LAA.
- LAA ostium is usually elliptical.
- Volume loading leads to enlargement LAA ostium.
- Depth of landing zone should be equal or greater than the ostium.
- Multiple view by TEE is common assessment for LAA.
- CT provides superior spatial resolution to evaluate LAA, and can be useful as pre procedural assessment.



Iwate Medical University

Conclusion

- Percutaneous LAA closure is the “focal” treatment and preventive procedure for cardioembolic infarction.
- Understanding LAA anatomy and accurate assessment of the LAA is critically important for percutaneous LAA closure.



Iwate Medical University