TEE prior to (as part of the evaluation for) LAA closure (e.g. WATCHMAN device)

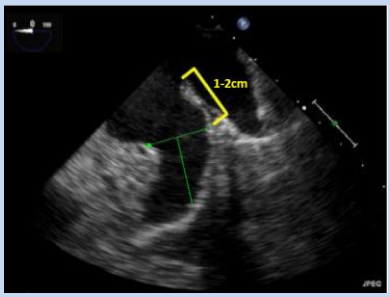
The specific goals of the TEE performed as part of the pre-Watchman evaluation include:

- Obtaining LAA measurements to confirm anatomy conducive for Watchman device implantation and to determine the device size
- Exclude
    - intracardiac thrombus or dense spontaneous echo contrast
    - significant pericardial effusion
    - complex thoracic aortic atheroma with mobile plaque
    - a PFO with an atrial septal aneurysm and/ or large shunt
    - moderate or greater mitral valve stenosis
    - cardiac tumor

LAA anatomy

Left atrial appendage anatomy: divided into 3 parts. 1) The ostium is typically oval and diameters range from 10-40 mm, is well characterized by 3D imaging and is separated from the left upper pulmonary vein by the posterolateral ridge. 2) The neck of the LAA is the tubular junction between the ostium and lobar portions, neighbors the circumflex and LAD coronaries and the sinus node artery in one third. 3) The lobar region is the largest and most variable portion. Two or more lobes are found in >50%.

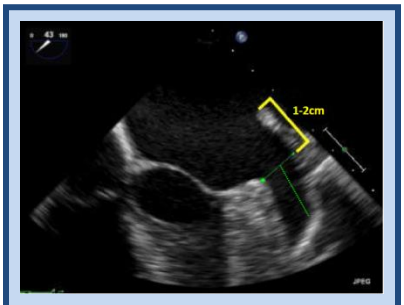
LAA images: Obtain 2D images of the LAA at decreased depth or zoom to optimize LAA assessment.



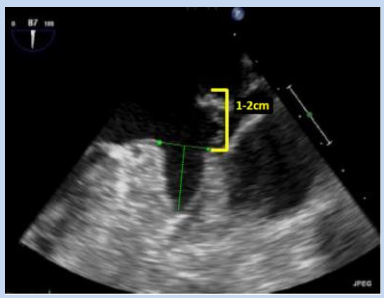
LAA width and height at 0°

Views should be obtained at 0, 45, 90 and 135 degrees
Obtain the maximal measurements of the ostium diameter, width & length of the primary LAA lobe at end ventricular systole. (ostium typically largest at 120-135 degrees)

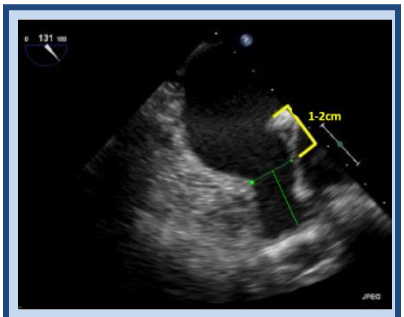
At **0 degrees**, a measurement in the plane from left coronary artery to a point approximately 1-2 cm from the tip of the postero-lateral ridge. (see diagram to the right). *Tips for obtaining LAA images at 0 degrees*: Begin in mid-esophageal view; withdraw the probe until just above the mitral valve; counter clock slightly; flex slightly; adjust the depth of the probe until the LAA is visualized; Adjust the "right-left" wheel to optimize the image.
At **45, 90, 135 degrees** appropriate 2D views such that a measurement in the plane from the top of the MV annulus to a point approximately 2 cm from the tip of the postero-lateral ridge is possible. (See diagrams below)



LAA width and height at 45°



LAA width and height at 90°

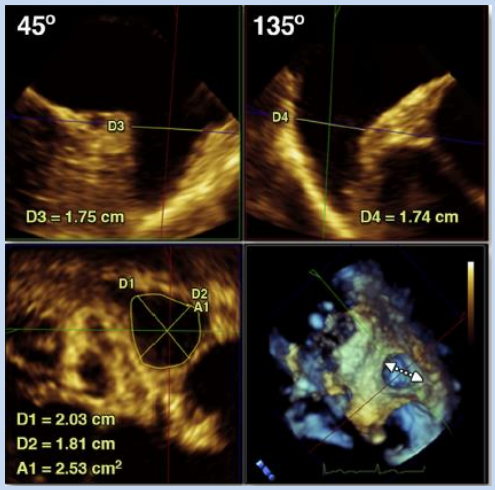


LAA width and height at 135°

TEE prior to (as part of the evaluation for) LAA closure (e.g. WATCHMAN device)

Images to be obtained: ***(measures of the LAA should be performed when LAA size is largest at end ventricular systole)***

- 2D 4 chamber, 2 chamber and 3 chamber views optimizing the LV
- Multiple 2D imaging planes of the LA
- Multiple 2D imaging planes of LAA device at decreased depth or zoom mode (at a minimum record views at 0°, 45°, 90° and 135°) – as described above.
- Color Doppler of the LAA at decreased depth or zoom mode, at best angle visualized. Reduce the Nyquist limit to optimize color flow (include the full width of the LAA ostium surrounding the borders and tip of LAA).
- Pulsed wave Doppler within the LAA (sampled volume at least 1cm into the LAA);
- 3D of the LAA ostium with diameter and area measures. Off-line measures performed in Q-lab with a similar measurement approach to the LVOT diameter measures.
- 2D Mitral Valve w/w'out color in multiple images planes (include views such as 4ch, 3ch and 2ch)
- CW Doppler through the mitral valve for MS
- 2D and color Doppler of Interatrial Septum at 45°, 90° and 135°. If atrial septal aneurysm is present: measure the atrial septal total excursion and the ASA length



3D measurement of LAA landing zone, with diameters and area.

- 2D of agitated saline passage to assess for intraatrial shunt
- 2D imaging from the esophagus and / or stomach to assess for pericardial effusion
- 2D of Ascending Aorta, Aortic Arch and Descending Aorta

Use of echo contrast with low MI imaging (0.1-0.3) should be considered, as appropriate, to differentiate pectinate muscle from thrombus.

LAA Occluder Device Requirements (5 device sizes: 21, 24, 27, 30 and 33 mm)

- **Landing zone** should be measured from the inferior part of the LAA ostium at the level of the circumflex coronary artery to a point 1-2 cm distal to the tip of the posterolateral ridge.
- **Required landing zone diameters:** 17-31 mm.
- **Choice of device size:** 2-4 mm larger than the largest measured diameter.
- **Required depth of main anchoring lobe:** needs to be needs to be ≥ the maximum LAA ostium size to be able to implant any given size device.