Anatomy and Assessment of Left Atrial Appendage for Percutaneous LAA Closure

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The author has no financial conflicts of interest to disclose concerning the presentation.
Percutaneous Left Atrial Appendage Closure

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
1. Left Atrial Appendage Morphology

- Chicken Wing (48%)
- Cactus (30%)
- Windsock (19%)
- Cauliflower (3%)

References:
- 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
2. Surrounding structure

Landmarks for procedure

Outside

Inside

Mitral valve
Left circumflex artery
Left phrenic nerve

Left superior pulmonary vein

Left inferior pulmonary vein

LAA
PV ridge
LPA
LA

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

**Key : Characteristics LAA**

1. **LAA Morphology, Axis**

2. **Surrounding structures of LAA**
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3. **LAA ostium diameter and depth**
   
   **Determine the adaptation for LAA closure**
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

Reference:
- 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
3-2. LAA depth

**Determine the adaptation for LAA closure**

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

- **Oa**: Anatomical orifice
- Left circumflex artery
- Depth of landing zone
3-2. LAA depth

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

<table>
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<th>Access Sheath Marker Band</th>
<th>Loaded Device Length</th>
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<tr>
<td>21mm</td>
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<tr>
<td>24mm</td>
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<tr>
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<td>26.5mm</td>
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<td>30mm</td>
<td>29.4mm</td>
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<td>33mm</td>
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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
Imaging Assessment for LAA closure

Transesophageal Echocardiography is gold standard
Assessment LAA by TEE in multiple view

- Implant view
- Long axis view
- Short axis view
- Maximal diameter
Assessment LAA by 3D-CT

Cardiac CT provides high spatial resolution and structural depiction

- Left atrial appendage
- Left upper Pulmonary vein
- PV ridge
- Left circumflex artery
- Mitral valve
Virtual TEE viewer application
Pre Procedural Assessment with Non Invasive system
Virtual TEE viewer application
Pre Procedural Assessment with Non Invasive system
Virtual TEE viewer application

Comparison of TEE and Virtual TEE viewer by CT

<table>
<thead>
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<th>45°</th>
<th>90°</th>
<th>135°</th>
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<tbody>
<tr>
<td>TEE</td>
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<tr>
<td>Virtual TEE</td>
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Effective Tool for Patients and Operators
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.
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.