

TCTAP 2023

Seoul, Korea, May 6-9, 2023

# Selected New LAA Closure Techniques and Devices

Horst Sievert (FAAC, FESC, FSCAI)

Kolja Sievert, Stefan Bertog, Sameer Gafoor, Markus Reinartz, Bojan Jovanovic, Iris Grunwald, Anja Vogel, Pamela Ilioska, Gerhard Sell, Natalia Galeru, Judith Steffan, Heiko Burger, Andreas Zeiher, Bernhard Winkelmann, Martin Dürsch, Byung-Moon Kim, Maryam Mirzapour

CardioVascular Center Frankfurt - CVC,  
Frankfurt, Germany



# Disclosures

Physician name	Company	Relationship
Horst Sievert	4tech Cardio, Abbott, Ablative Solutions, Adona Medical, Akura Medical, Ancora Heart, Append Medical, Axon, Bavaria Medizin Technologie GmbH, Bioventrix, Boston Scientific, Cardiac Dimensions, Cardiac Success, Cardimed, Celonova, Contego, Coramaze, Croivalve, CSL Behring LLC, CVRx, Dinova, Edwards, Endobar, Endologix, Endomatic, Esperion Therapeutics, Inc., Hangzhou Nuomao Medtech, Holistick Medical, Intershunt, Intervene, K2, Laminar, Lifetech, Magenta, Maquet Getinge Group, Medtronic, Metavention, Mitralix, Mokita, Neurotronic, NXT Biomedical, Occlutech, Recor, Renal Guard, Terumo, Trisol, Vascular Dynamics, Vectorious Medtech, Venus, Venock, Vivasure Medical, Vvital Biomed, Whiteswell	Study honoraria to institution, travel expenses, consulting fees to institution <sup>1</sup>

At one of the recent conferences,  
the moderator introduced me and my talk:

"He has given this lecture before,  
but it is always updated"

He was right!!

We already have very good  
LAA closure devices



Watchman FLX



Amulet



LAmBRE

So why new devices?

# There are remaining Challenges of LAA closure

- Current LAA closure device have limitations
  - Conceptual limitations – some leave a pouch, others a gap
  - Anatomy (length of LAA, landing zone, orientation, .....
- LAA closure is safe – but it could be safer
  - Pericardial effusion, tamponade
  - Device embolization
  - Device related thrombus
  - Erosion
- Results of LAA closure are good – but they could be better
  - Technical success rate is < 100%
  - Residual leaks
- Imaging is not straight forward
  - would be great to have a device with one size fits all!
- Many patients just do not like piercing – even if it is internal piercing only

# LAA Closure Devices (in humans or on the horizon)

- Endocardial

- ~~PLAATO~~
- ~~Watchman, FLX, FLX PRO~~
- ~~ACP, Amulet~~
- ~~Gore~~
- ~~WaveCrest~~
- ~~pfm~~
- ~~Prolipsis~~
- ~~Occlutech Plus~~
- ~~Occlutech Vario~~
- Lambre
- Cardia
- SeaLA

- Aurigen
- Conformal
- Endomatic
- Append Medical
- Cormos
- ~~CardioCorX~~
- ~~Flow Medtech~~
- IrisSeal
- OMEGA
- Laminar
- LEFTEAR
- Lepu
- Triniti

- Epicardial

- ~~Epitec~~
- Lariat
- ~~AEGIS~~

- Surgical

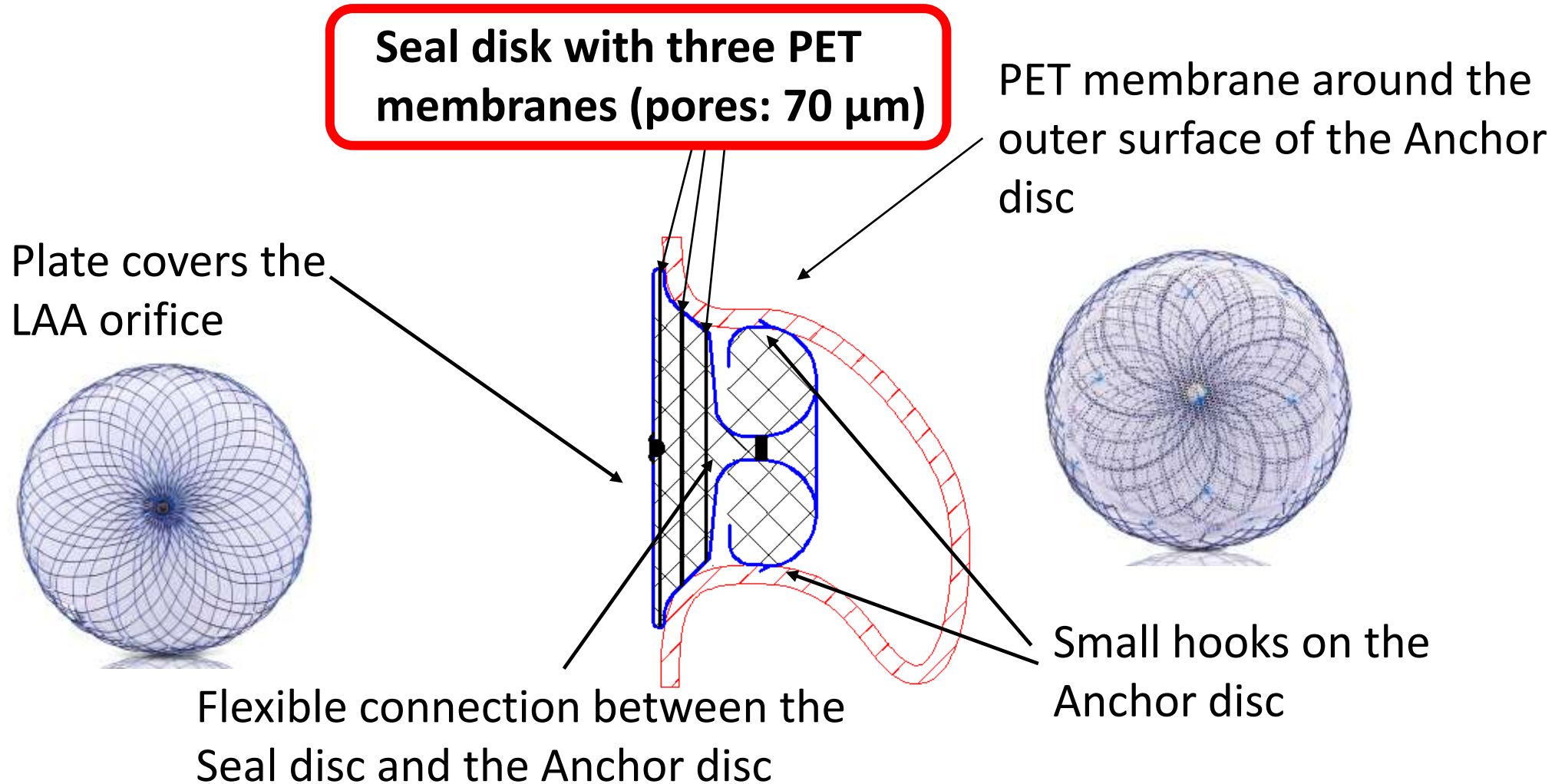
- AtriCure
- Medtronic
- Maquet
- LAA clip (Med-Zenith)
- Tigerpaw

New devices



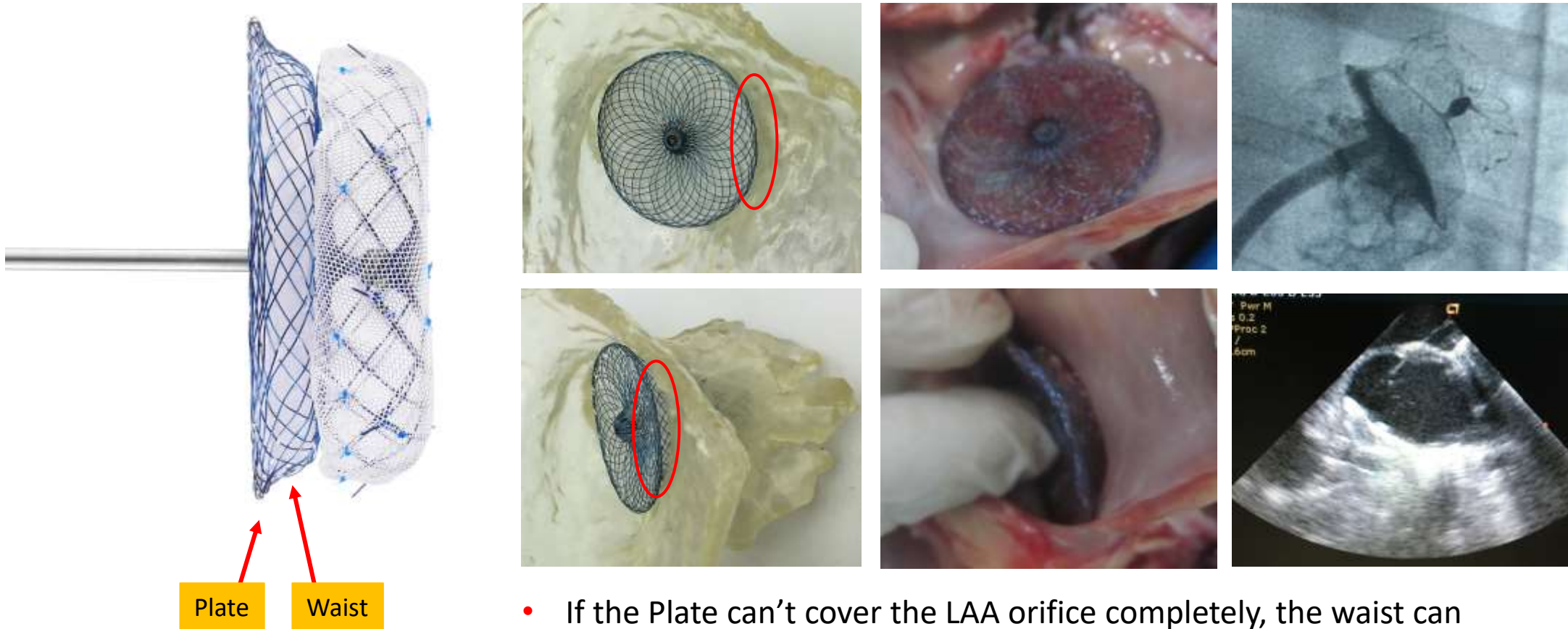
# SeaLA LAA Occluder – provides gap sealing

combines advantages of "ball design" and "disk design"



# SeaLA LAA Occluder – a device which provides gap sealing

- The Seal disc consists of a plate and a waist , which assures better sealing ability



- If the Plate can't cover the LAA orifice completely, the waist can provide the second sealing line.

# Conformal LAA Seal

– a device which requires less pre-procedural imaging

Smooth, non-thrombogenic  
ePTFE LA Surface



No Attachment Screw

Conformable Foam  
Matrix

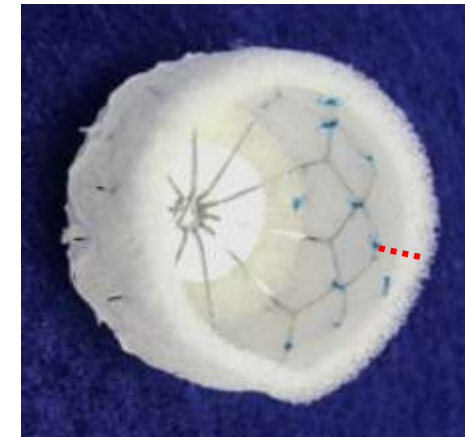
2 rows, 20 Anchors

Removable  
Tether



10mm Landing Zone

Compliant Nitinol  
Endoskeleton



Distal Foam  
Bumper

Only 2 Sizes  
Off Axis Placement  
No Thrombus Attachment Site  
Accommodates Short LAA Depths

# IrisSeal™ – less need for pre-procedural imaging



- Inner and outer delivery cable
- Allows adjustment of device diameter inside of the LAA

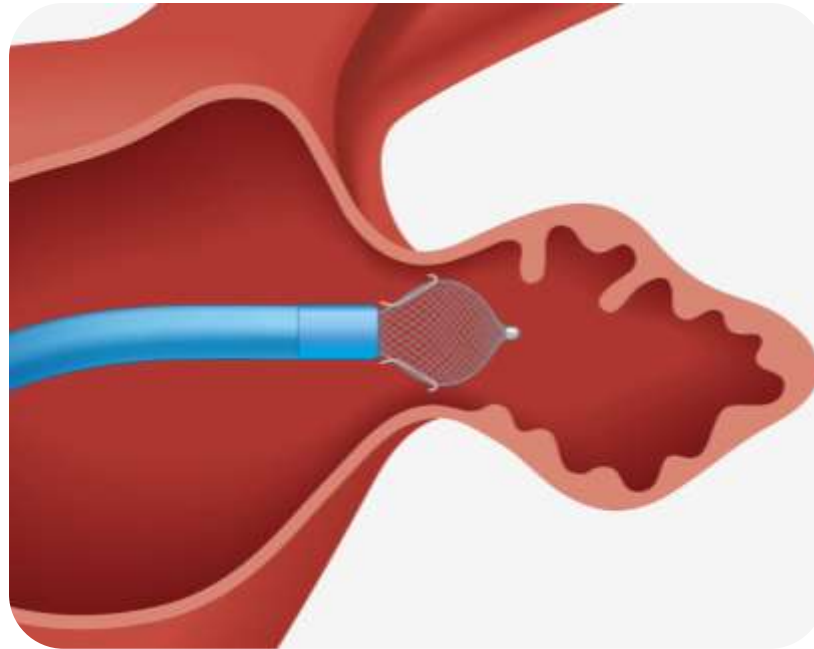




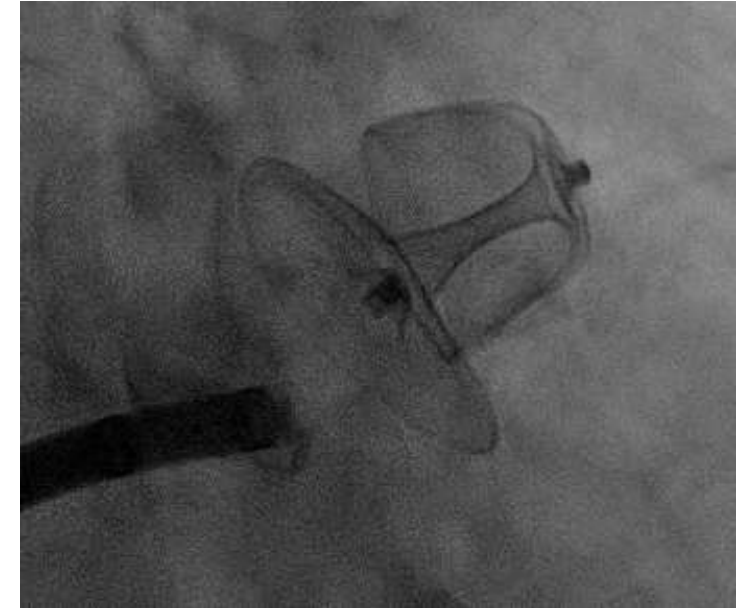
# OMEGA Eclipse – less gap -leak



- Platinum coated nitinol mesh



- Anchor is fixed to the distal end of the device
- Pulls disc into place
- Cup and disk adjust to the anatomy



CE Mark

Potentially disruptive concepts

**"Occlusion and ablation"**

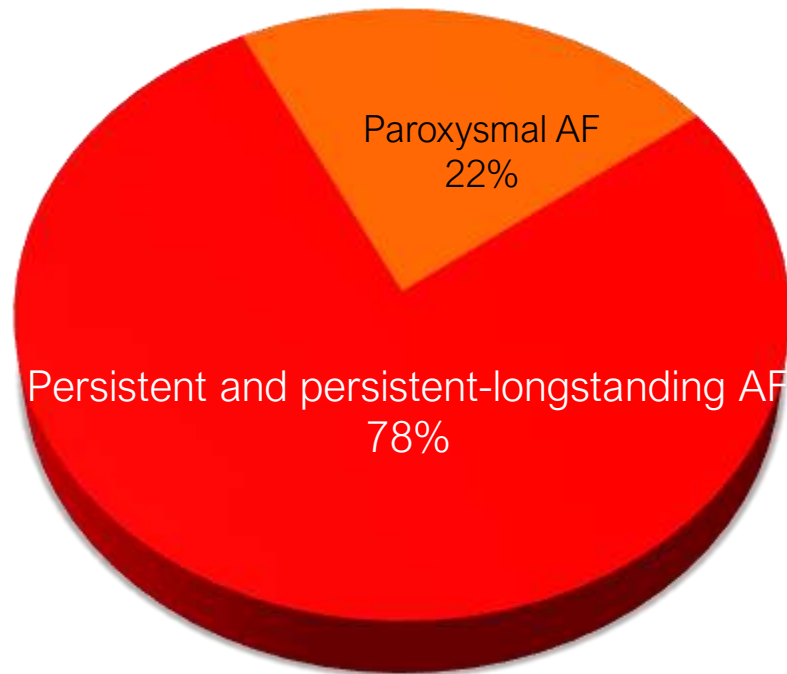


# Why to ablate the LAA?

The results of ablation in patients with persistent Afib are poor

The LAA has been identified as a mechanism in the maintenance of persistent Afib<sup>3</sup>

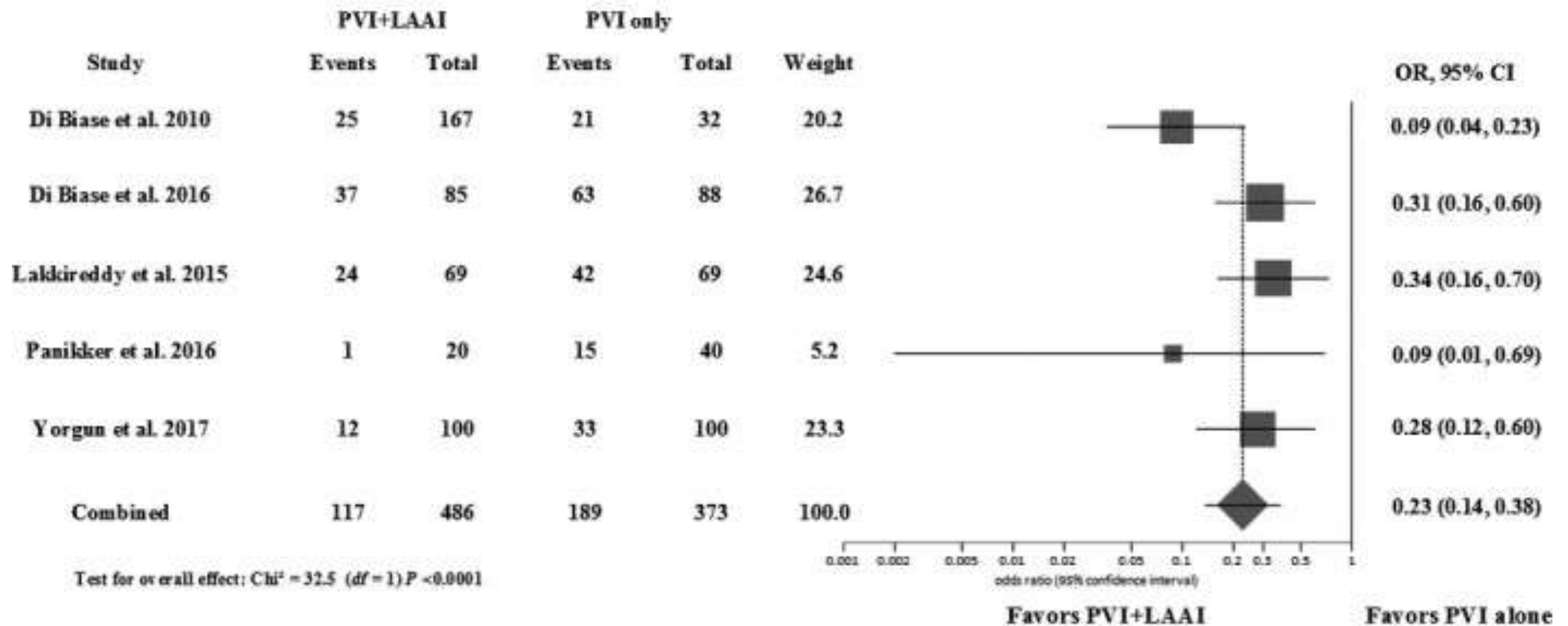
The combination of **LAA closure** and **LAA ablation** may be beneficial in those patients in whom rhythm control is the goal





# The addition of LAA isolation to pulmonary vein isolation was associated with a significant decrease in AF recurrence in patients with persistent AF

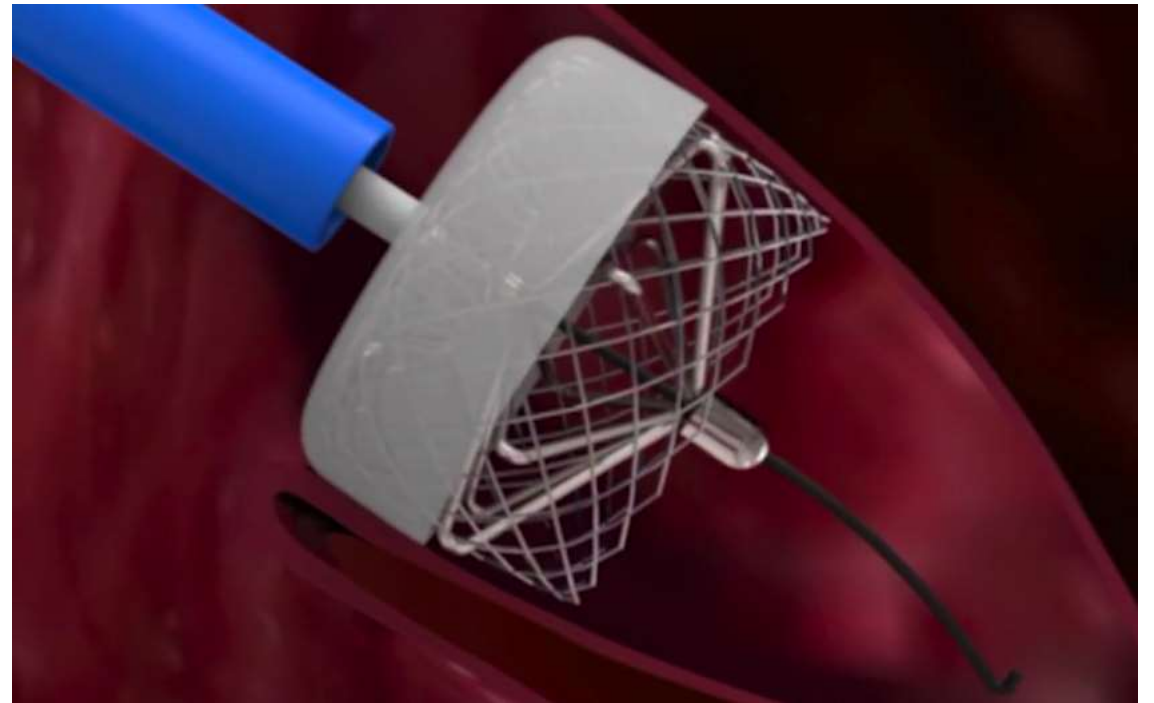
**Recurrence of atrial fibrillation after catheter ablation in persistent atrial fibrillation**



However, there is a very high stroke risk after successful LAA ablation!

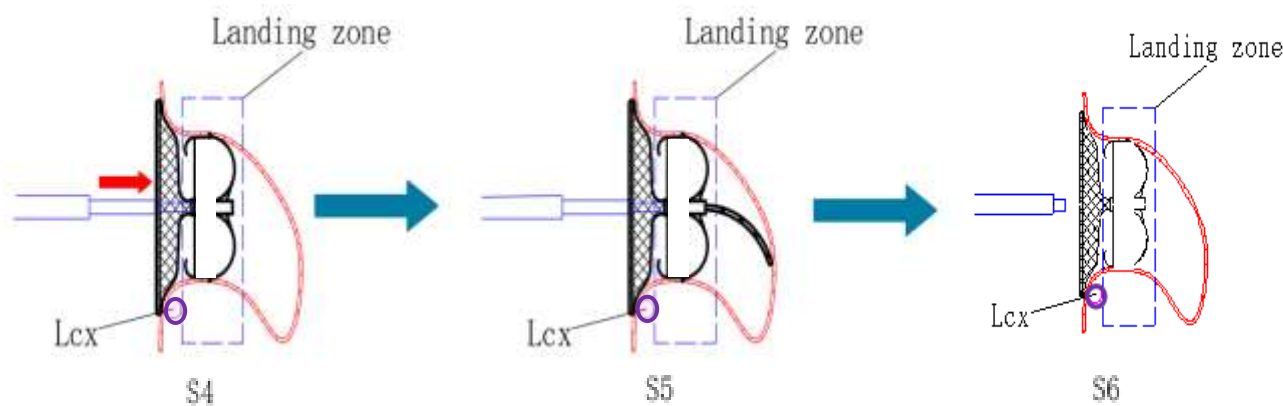
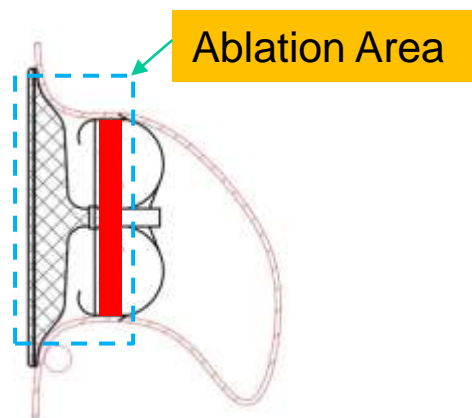
# Aurigen

- Looks like one of the other devices
- But it can do afib ablation



# ESeaLA: LAA Closure and Pulsed-field ablation (PFA)

- ✓ Based on the SeaLA device
- ✓ Ablates the LAA orifice and neck using pulse energy



- Mapping catheter with very soft tip



# FIM study in China – Prof. Tang Min, Beijing

## The first case:

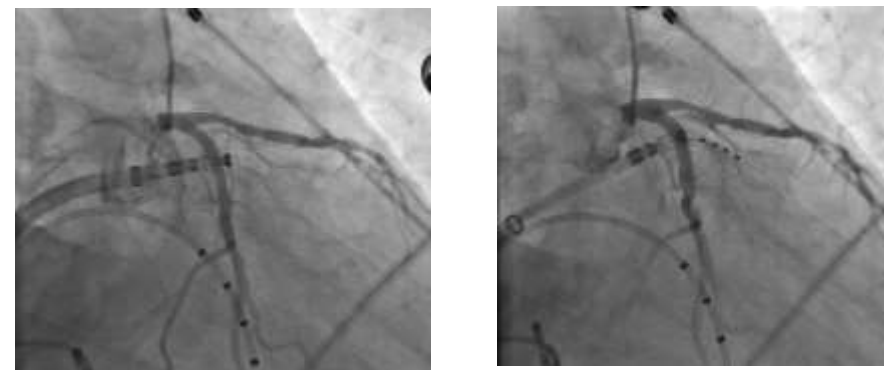
- After ablation, LAA inner potential disappear (Picture 1)
- Coronary artery has no change and spasm (Picture 2)
- Angiography: good occlusion
- TEE: no residual shunt



Before LAA ablation

After LAA ablation

Picture 1



Before LAA ablation

After LAA ablation

Picture 2

Leaving less behind

# Laminar

- Completely new concept of LAA closure
- Largely independent from size and shape of the LAA
- Rotation of the device closes the appendage
- Only a very small part of the device is exposed to the blood



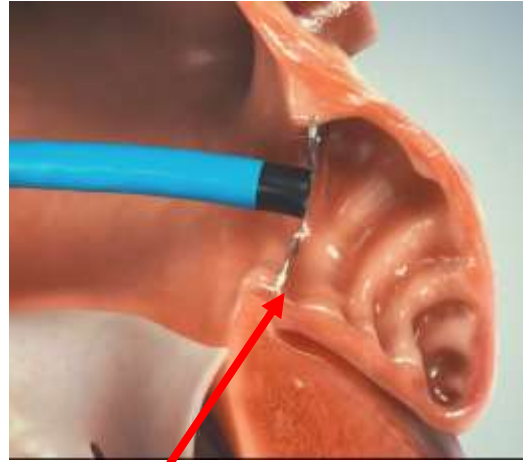
# Sepiola - Endomatic

- The device closes the LAA from inside the LAA
- No foreign material is exposed to the blood stream
- Fits all anatomies

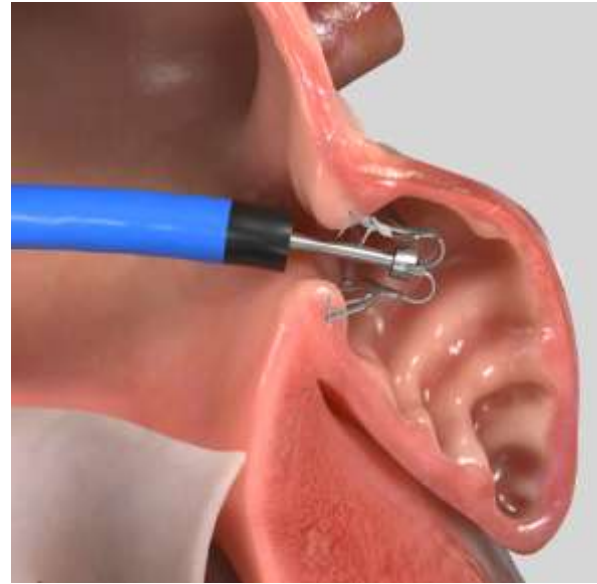




# ENDOMATIC - Procedure

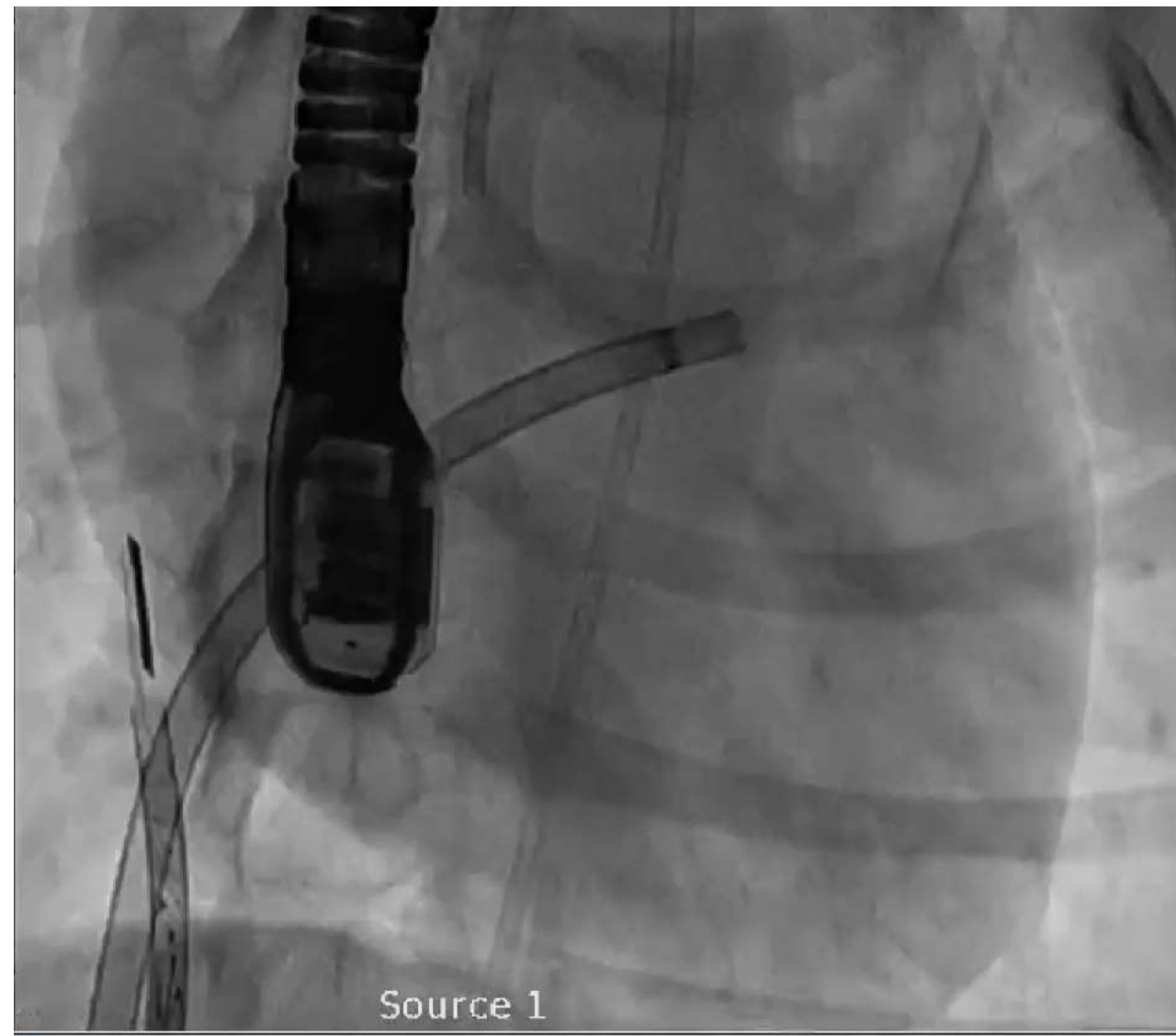


Implant



No foreign material is exposed to the left atrium (the whole device is implanted inside the completely excluded LAA)

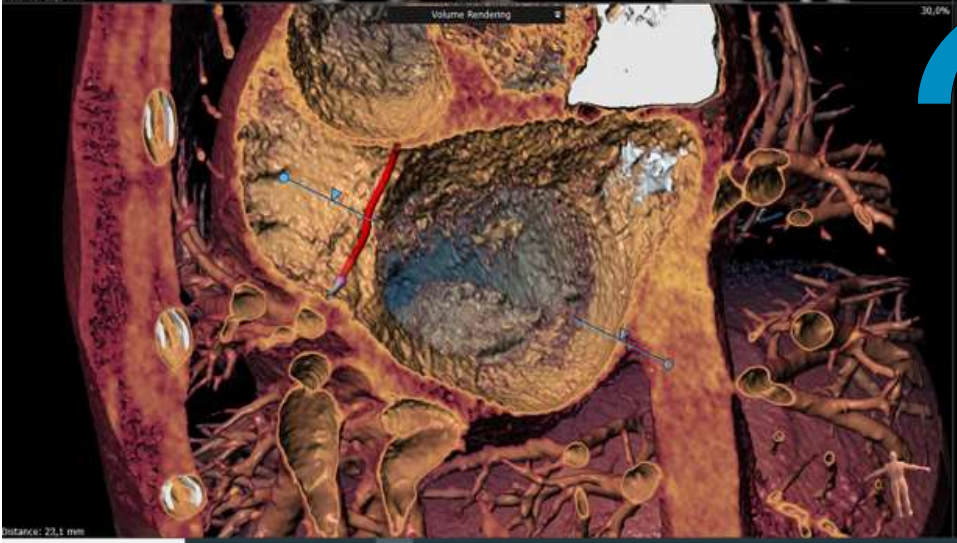
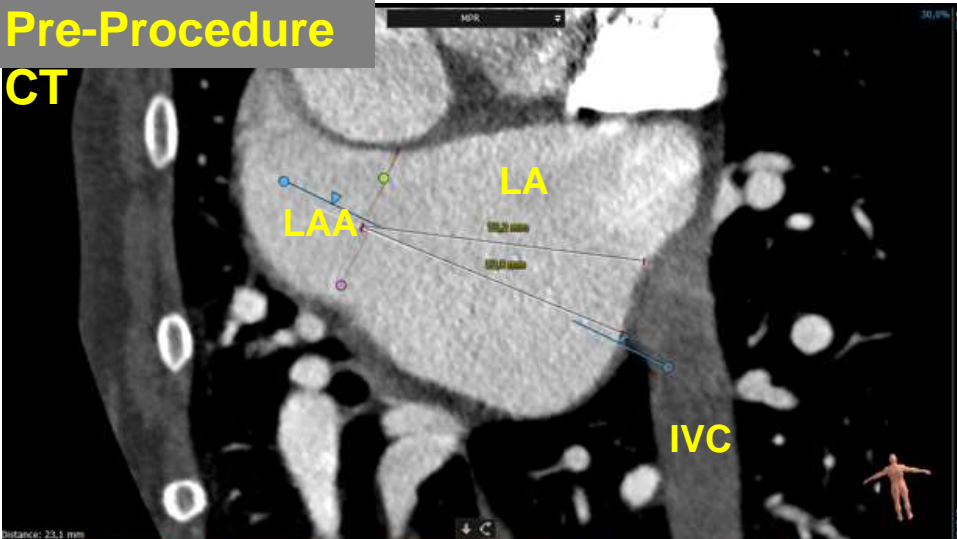
# Sepiola – 90 day Sub-Chronic Dogs



# ENDOMATIC – 90 day Sub-Chronic Dogs

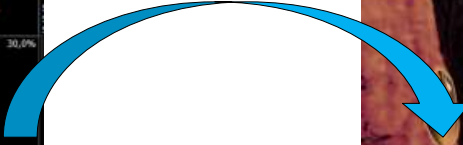
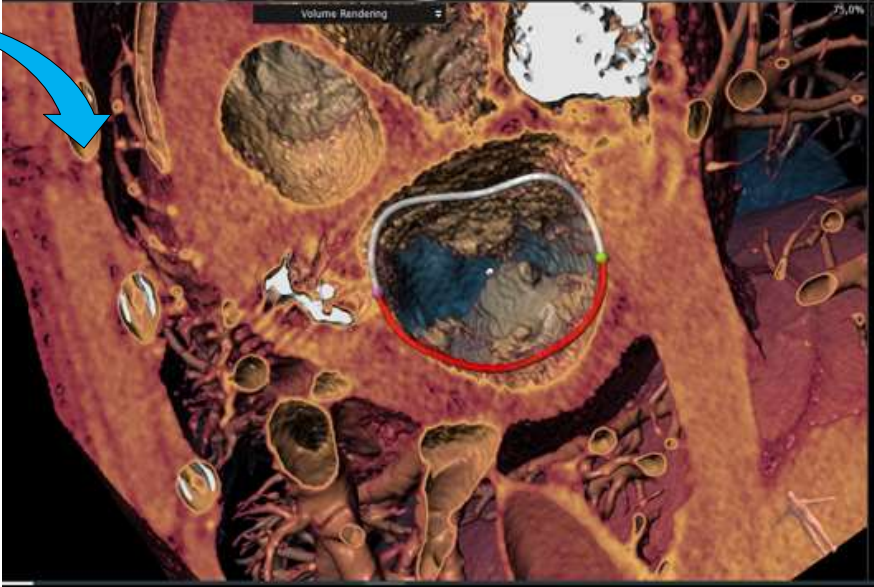
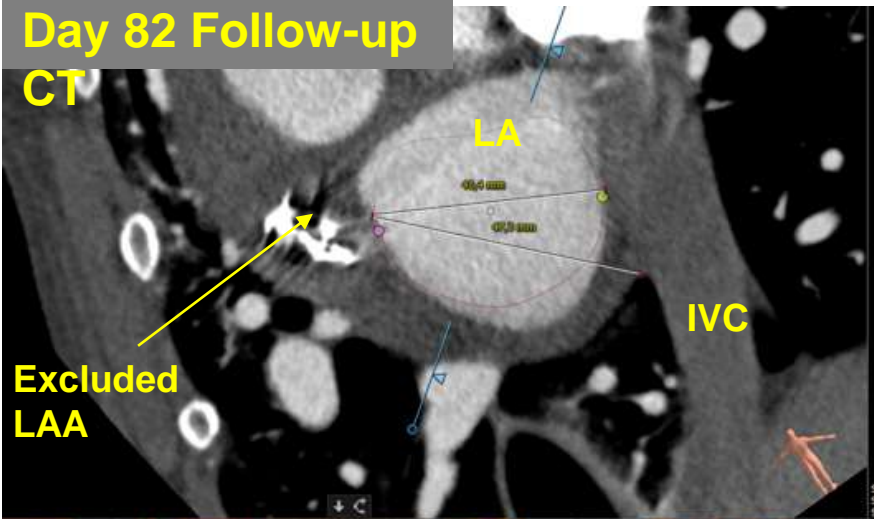
Pre-Procedure

CT



Day 82 Follow-up

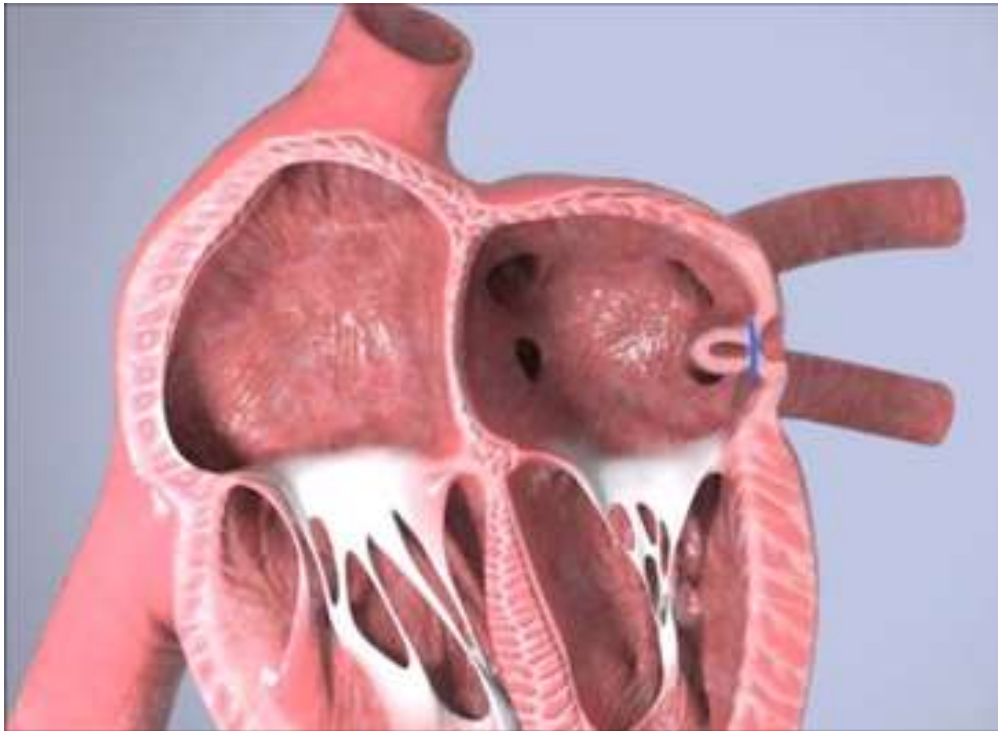
CT





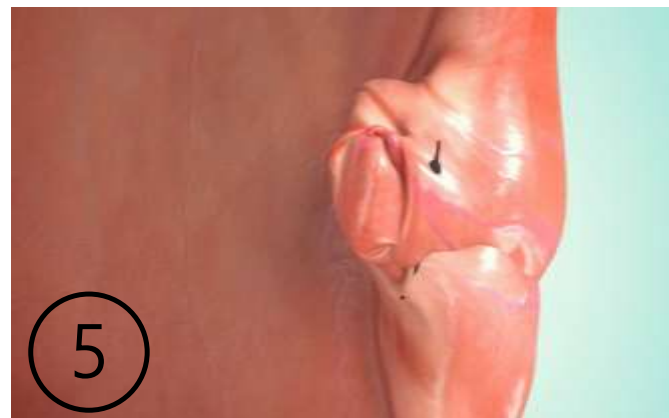
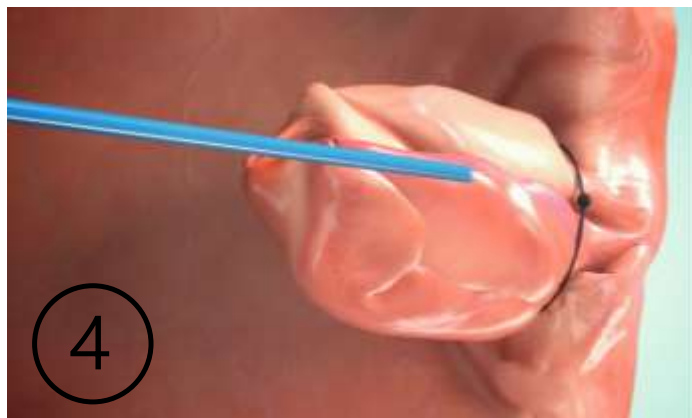
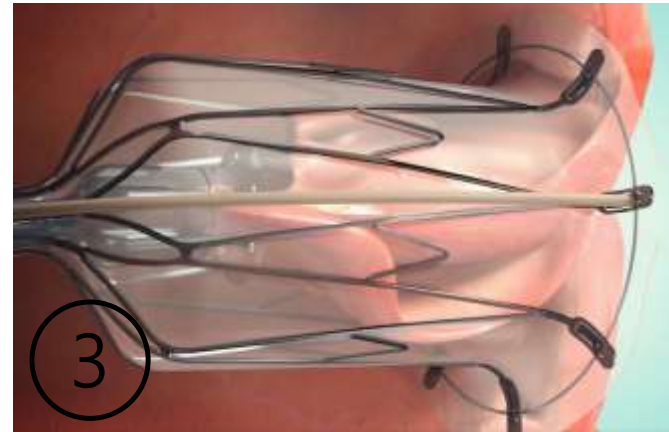
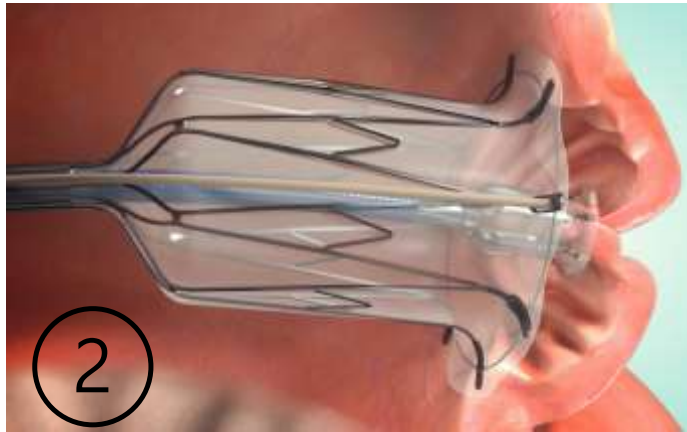
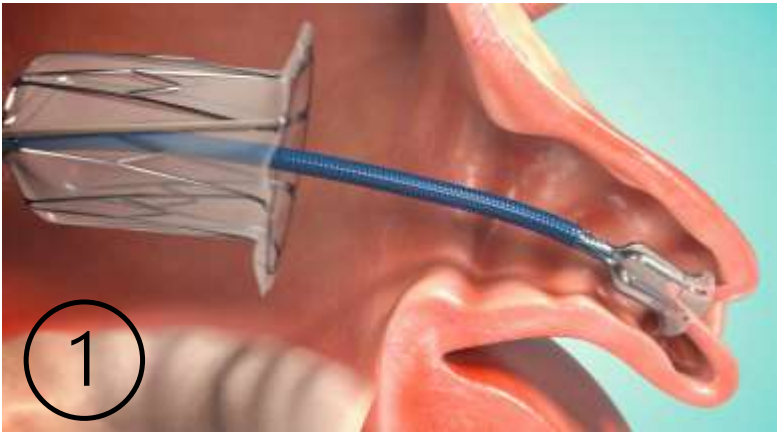


# The Appligator™



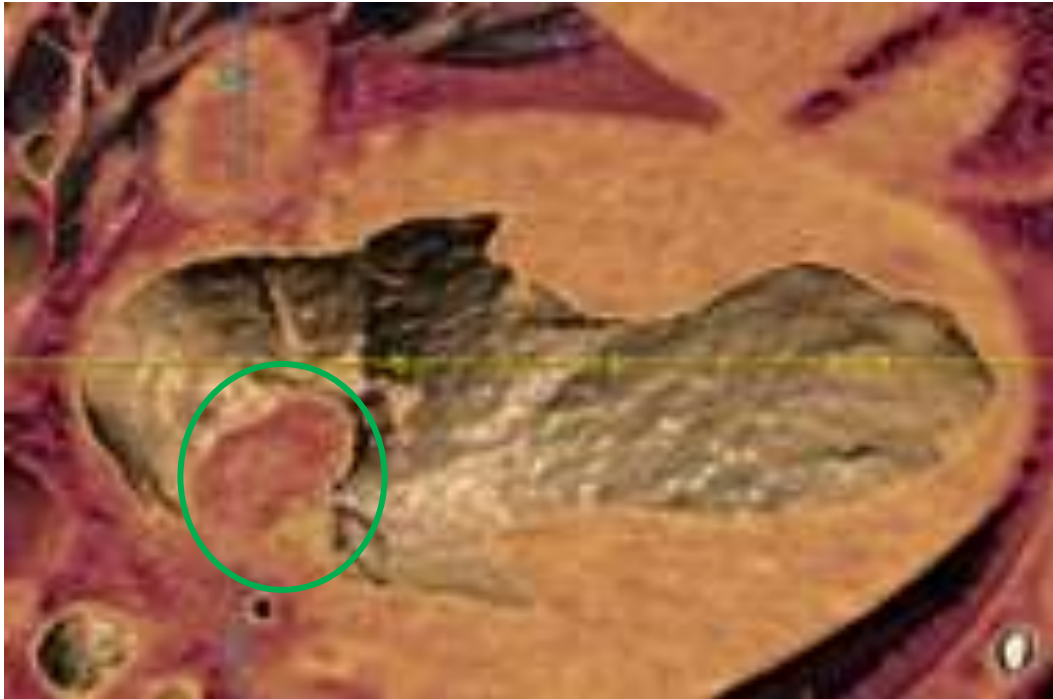
- LAA closure without leaving an implant behind
- Transfemoral access
- Complete sealing by invagination
- Closing the LAA independent from size and shape
- Making exact pre-procedural measurements unnecessary

# Transfemoral procedure

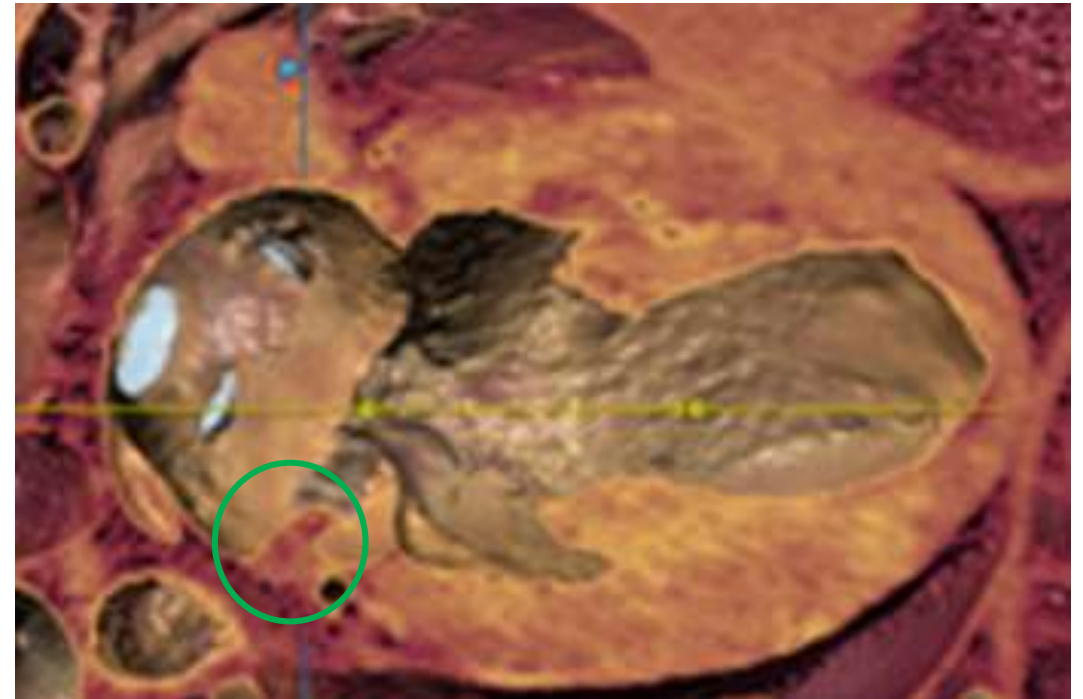


# CT Follow-up

Day 3 post invagination



5 Months post invagination




- ✓ The inverted tissue had no inflammatory reaction.
- ✓ No thrombus formation was observed.
- ✓ The original internal surface of the invaginated LAA tissue was minimally covered by endocardial cells, whereas the external surface was fully lined by mesothelial cells.

Other new devices  
in very early stage

You may have seen this slide before,  
but it is always updated




Still  
confidential



Too early  
to tell!



Early  
stage



This video  
just does  
not play



# Thank you for your time

A red poster for the CSI FOCUS LAA event. The text is white and blue. A blue speech bubble in the top right corner says 'LIVE CASES'. The background features a faint, stylized illustration of a dandelion seed head.

**CSI FOCUS LAA**

**LIVE CASES**

**HOW TO CLOSE THE LEFT ATRIAL APPENDAGE**

NOVEMBER 10-11, 2023  
FRANKFURT, GERMANY

[www.csi-congress.org/laa](http://www.csi-congress.org/laa)

The CSI logo, which consists of a stylized heart shape with a lowercase 'i' inside, positioned at the bottom right of the poster.

HorstSievertMD@aol.com