

TCTAP 2019  
Seoul, Korea, April 27-30, 2019

---

# The Big Picture: Choosing the Right LAA Closure Device for the Right Anatomy

Horst Sievert,

Kolja Sievert, Ilona Hofmann, Sameer Gafoor, Stefan Bertog, Predrag Matic,  
Markus Reinartz, Bojan Jovanovic, Shahrak Zaker, Iris Grunwald, Nalan Schnelle  
CardioVascular Center Frankfurt - CVC,

Frankfurt, Germany

# Disclosures

Physician name	Company	Relationship
Horst Sievert	4tech Cardio, Abbott, Ablative Solutions, Ancora Heart, Bavaria Medizin Technologie GmbH, Bioventrix, Boston Scientific, Carag, Cardiac Dimensions, Celonova, Comed B.V., Contego, CVRx, Dinova, Edwards, Endologix, Hemoteq, Lifetech, Maquet Getinge Group, Medtronic, Mitralign, Nuomao Medtech, Mokita, Occlutech, pfm Medical, Recor, Renal Guard, Rox Medical, Terumo, Vascular Dynamics, Venus, Vivasure Medical	Consulting fees, Travel expenses, Study honoraria to institution



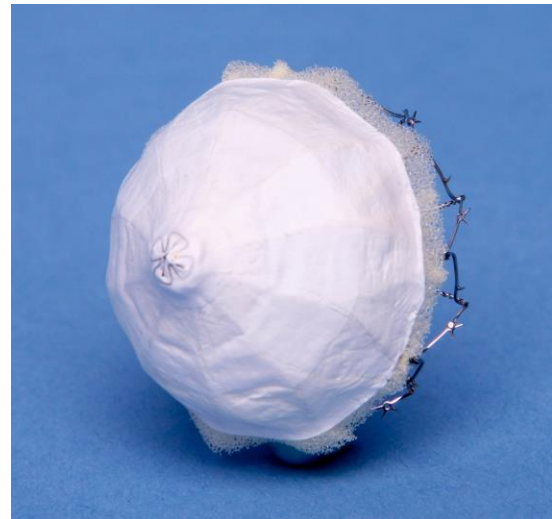
Watchman FLX



Amulet



Lariat



WaveCrest



LAmbre

# Watchman Occluder



- Nitinol frame
- PET membrane with pores
- "ball" design
- Requires a long landing zone
  - Length of LAA should be at least equivalent to device diameter
- Anchoring by compression and small hooks
- One long sealing zone
- 12 F sheath (OD 14F)
- Distal implantation technique
- Device diameter 21, 24, 27, 30, 33 mm

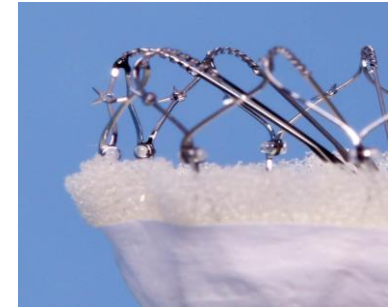
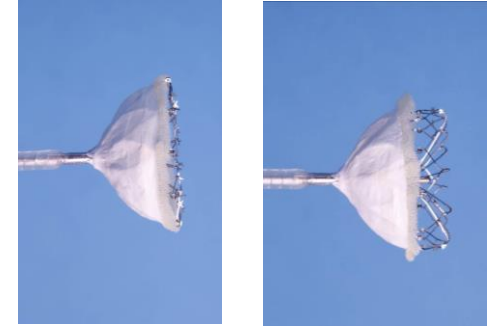
# Amulet Occluder



- Nitinol wires
- Dacron patches inside
- "umbrella" design
- Short landing zone required (only 10-12mm)
- Anchoring by compression and small hooks
- 2 sealing zones: distal plug and proximal disc
- 12 or 14 F sheath
- Proximal implantation technique
- Device diameter 16-34 mm

# Coherex WaveCrest

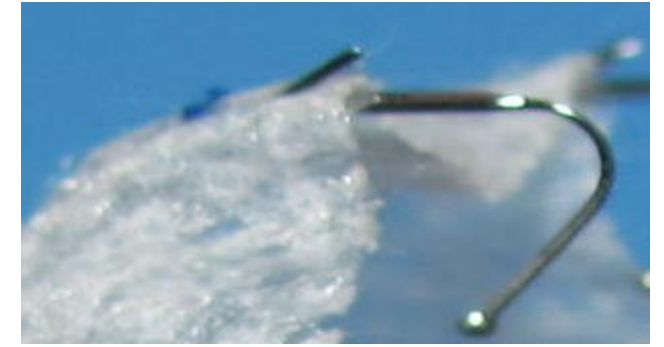
- **Retractable anchors**
  - Separation of device positioning and anchoring
- ePTFE occluder material is **occlusive** and non-thrombogenic
- Distal contrast injection
  - to assess stability
  - to assess occlusion
- 3 sizes (22, 27, 32mm)



# Coherex WaveCrest

- Advantages:
  - Very short landing zone
  - Sheath does not have to be introduced deeply into the LAA
- Limitation:
  - Sheath has to be really perpendicular to the landing zone
- An occlusive membrane can be seen as advantage or disadvantage

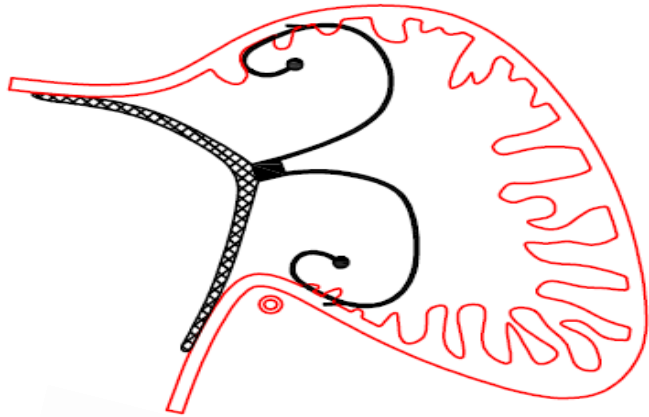
# LAmbre Occluder



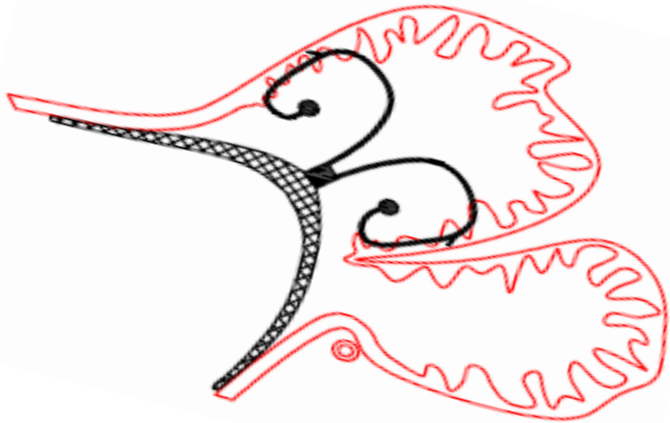
- Nitinol frame
- PET membrane with pores
- "umbrella" design
- Short landing zone required (10 mm)
- Anchoring by compression and hooks and large barbs
- 2 sealing zones
- 8-10 F sheath
- Very proximal implantation technique
- Recessed hub
- Device diameter 16-36, LA cover 20-50mm



# Two device configurations



Size: 16-36mm  
Cover 4-6mm larger



Size: 16-26mm  
Cover 12-24mm larger

- Multiple lobes
- Small LAA

# Sentre Heart - LARIAT

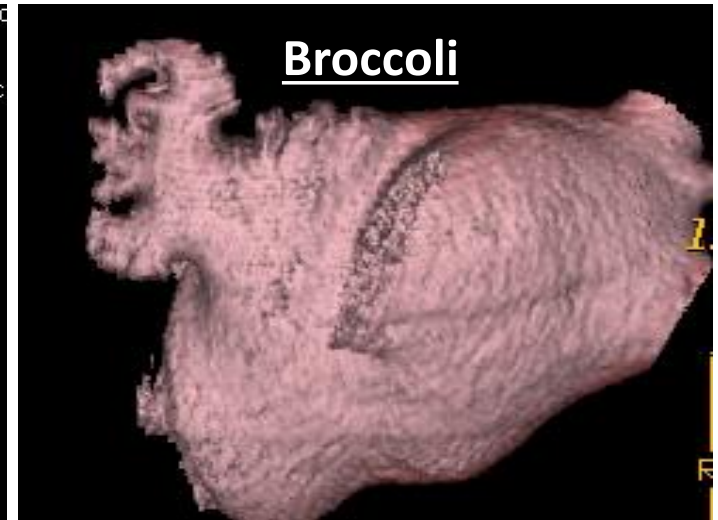
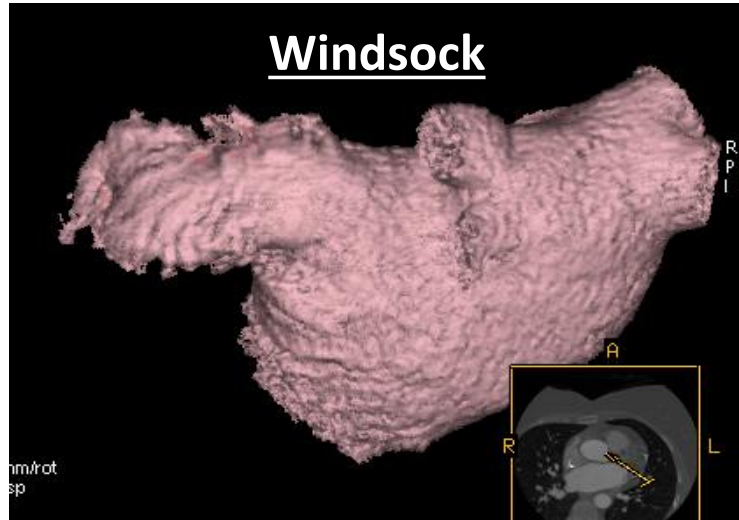


- Pericardial access
  - Wire with magnetic tip → pericardial space
- Transseptal access
  - Wire with magnetic tip → LAA
- The two wire find each other
- A loop suture is advanced over the pericardial wire
- LAA sutured from outside

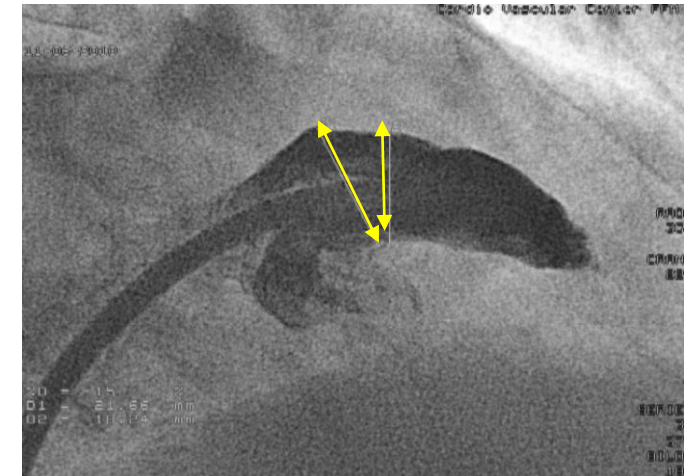
# LAA Ligation

- Advantages
  - Some of the most serious complications of LAA closure are less likely to occur or impossible
    - Tamponade
    - Device embolization
    - Thrombus on a device
- Disadvantages
  - Learning curve for pericardial puncture
  - Not possible
    - after cardiac surgery
    - in large LAA body
    - retroflexed LAA

Different LAA morphologies are important for epicardial LAA closure ...



... but less important for device closure because here we just need a proximal landing zone



# LAA Closure with devices

- It is rare that a LAA can not be closed
  - 95% closure rate with all devices
- There are no data comparing the devices head to head
- You can almost use what you are used to use
- However, the devices have
  - some specific exclusion-inclusion criteria
  - some advantages and disadvantages in specific anatomical subsets

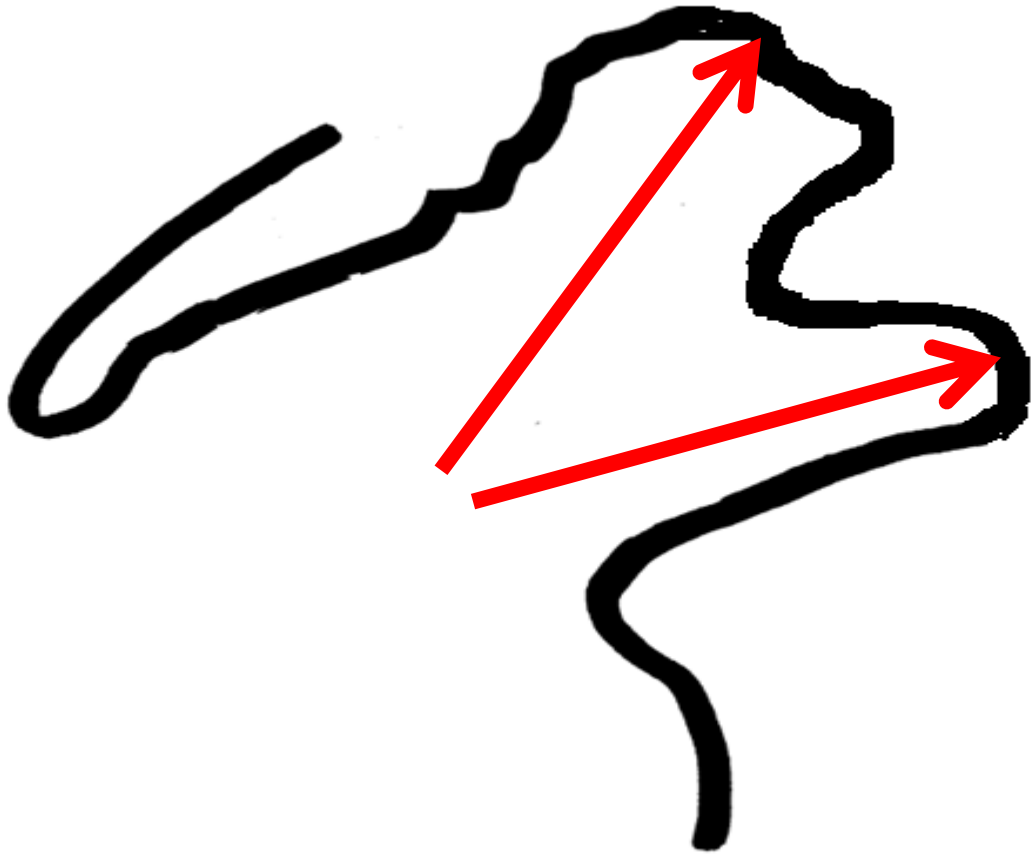
# Size of the LAA

- Watchman:
  - Landing zone has to be 17-31 mm
    - Watchman FLX 14-32 mm
- Amulet
  - Landing zone has to be 11-31 mm
- LAmbre
  - Landing zone has to be 11-30 mm
- Lariat
  - Diameter of the LAA body has to be < 45mm

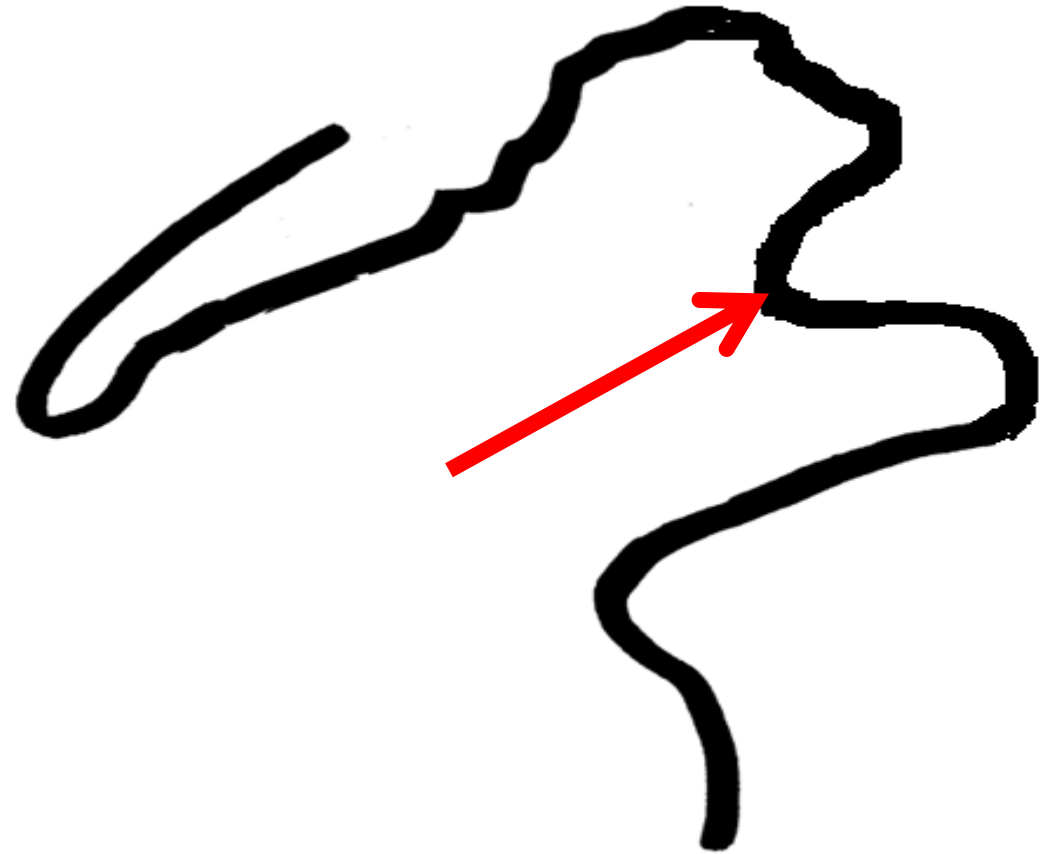
# Length and morphology of the LAA

- Watchman:
  - Minimum "functional" LAA length should be at least equal to device diameter
    - Half of device size with Watchman FLX
- Amulet
  - Minimum "functional" LAA length 10mm
- LAmbre
  - Minimum "functional" LAA length 10mm
- Lariat
  - Posterior oriented and "chicken wing" LAAs can not be closed

Anatomical length



Functional length





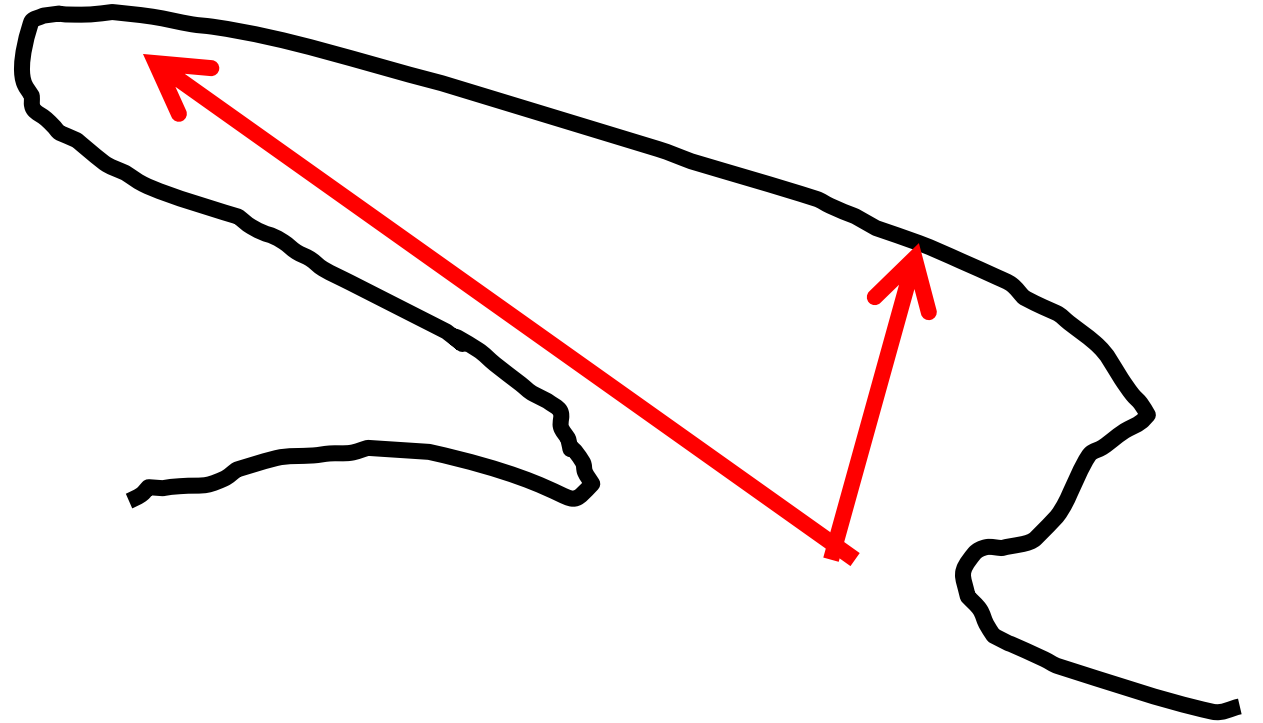
# Chicken Wing

- Good for all types of occluder ...
- ... with Lariat removal of the loop may be difficult
  - less of a problem with the new version were the snare can be released



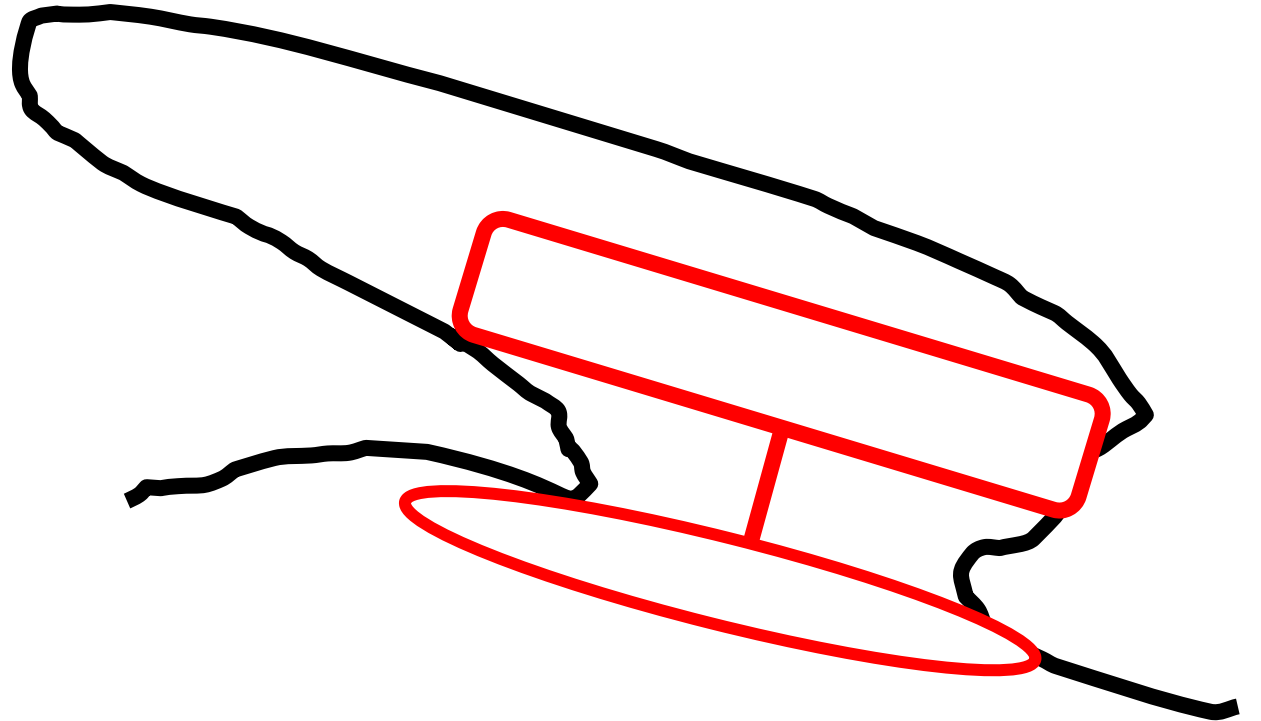
# Chicken Wing with an early bend

- The LAA can be very long ...
- ... with a very short functional length



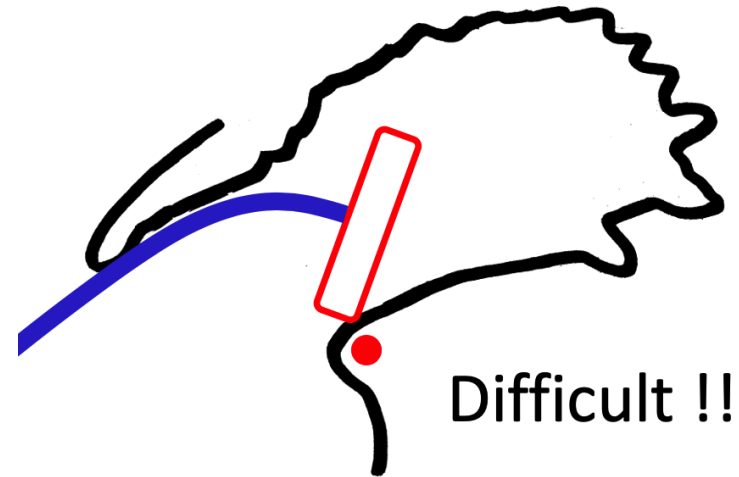
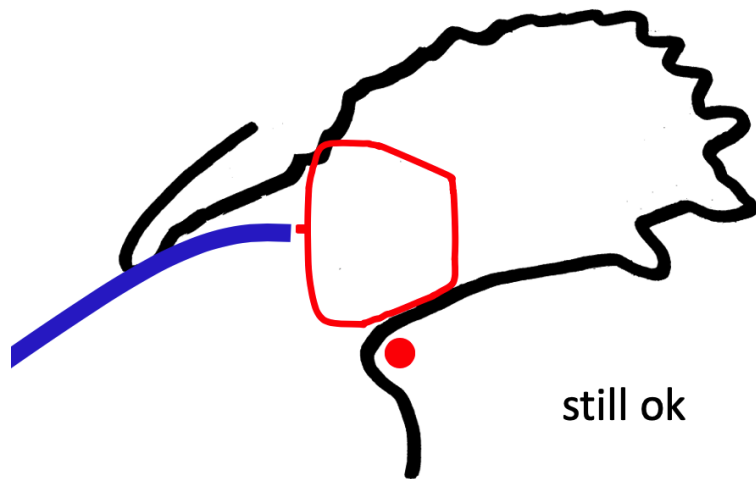
# Chicken Wing with short functional length

- Sandwich technique
  - Amulet
  - LAmbre



# Sheath position

- The sheath should be perpendicular to the LAA ostium
- Ball-shaped devices are more forgiving than disc devices



# Other considerations Watchman vs Amulet

- In case of device embolization it is easier to snare and extract the Watchman than the Amulet
- With Watchman one sheath size fits for all device sizes
  - Decision about device size can be made after sheath insertion
  - The sheath can be used for calibration
- With Amulet no quantitative measurements are needed after device implantation
- That one LAA closure device is effective in stroke prevention does not mean necessarily that all other devices are effective as well
  - Amulet data are looking good but Watchman data are still much more solid
- To compare the safety and efficacy of different devices a randomized study is needed

# When to use which device?

- Very short LAA
  - Amulet and LAmbre may be better than Watchman
- Very small LAA (<17mm)
  - Amulet or LAmbre better
- Multiple lobes
  - Amulet or LAmbre may be better (short landing zone, umbrella may cover all lobes)
- Thrombus in LAA
  - Devices with prox. Deployment technique better (Amulet, LAmbre, Watchman FLX)
- Bad angle between delivery system and LAA
  - Watchman may be better
- Patient can not take any blood thinner therapy
  - Lariat better
- Prior surgery or LAA behind the pulmonary artery
  - Lariat does not work

# Thank you!



CSI FOCUS LAA 2019

# LAA WORKSHOP

NOVEMBER 15–16, 2019  
FRANKFURT, GERMANY

LIVE  
CASES

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



HorstSievertMD@aol.com