

# Role for EVUS and IVUS in complex CLI revascularisation

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# Disclosure

Speaker name: Joseph Campbell, MD

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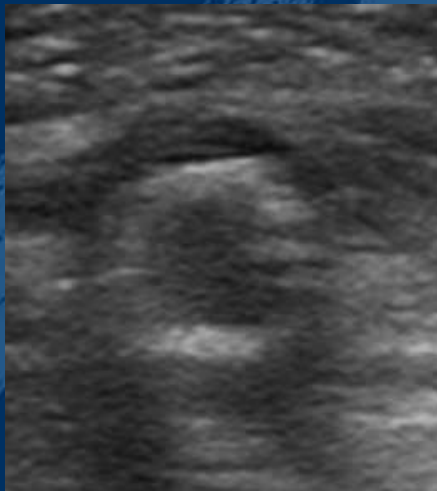
I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
  
- I do not have any potential conflict of interest

# Goals of presentation

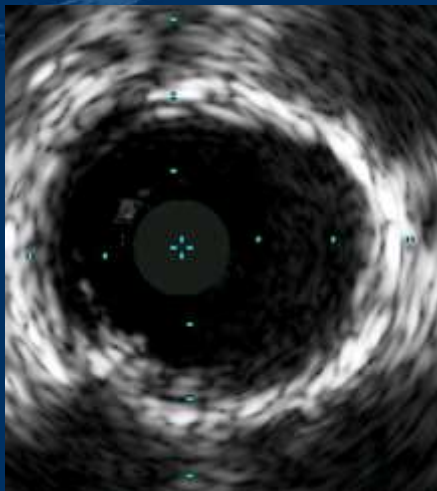
1. Discuss basic concepts regarding equipment selection and image interpretation
2. Review clinical utility of EVUS and IVUS in CLI revascularization

# Use of adjunctive imaging in CLI revascularization



## EVUS:

- Safe access
- Lesion crossing
- Guide therapy
- Complications



## IVUS:

- Vessel sizing
- Plaque morphology
- Wire position
- Complications



EVUS

# Transducer selection



## Linear array 5-9 MHz transducer

- Work horse probe for lower extremities
- Balance depth and spatial resolution
- Groin through mid tibial level

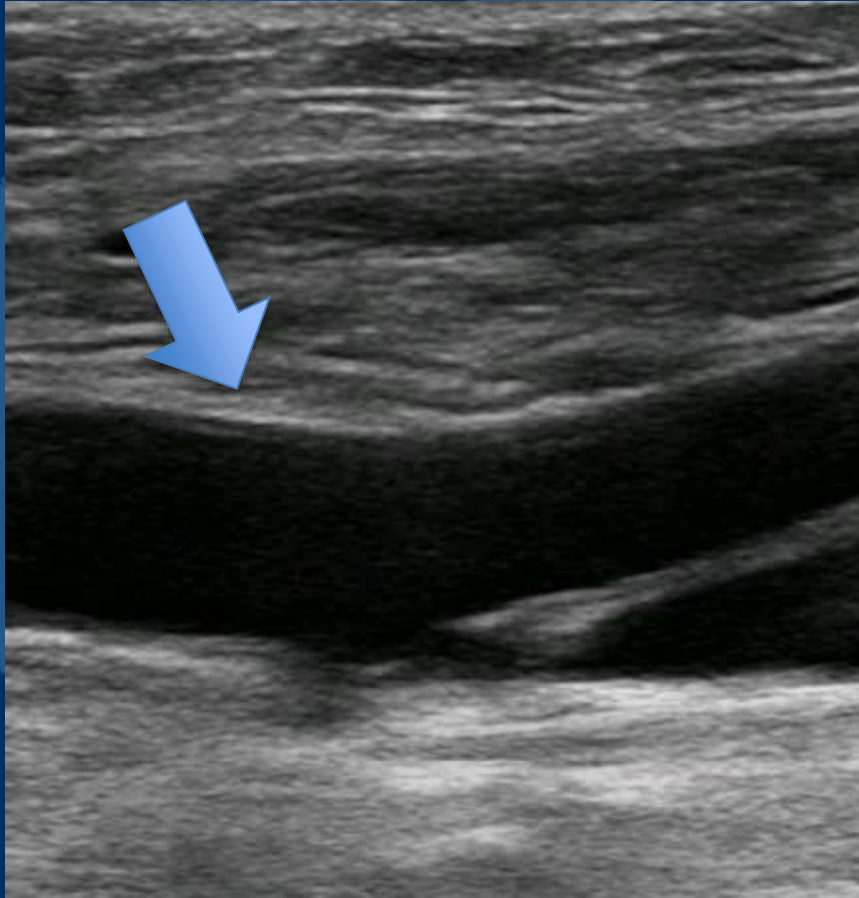


## Linear array 8-15 MHz transducer

- Hockey stick probe
- Best near field spatial resolution
- Lose resolution with increasing depth
- Best for tibial vessels

# EVUS guided arterial access

# Use of EVUS for Antegrade CFA access

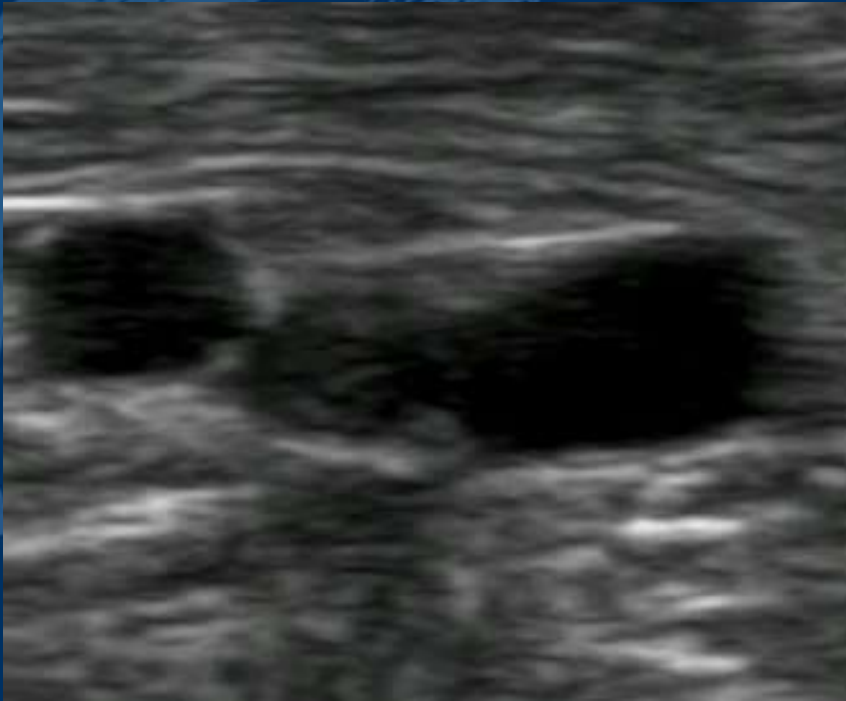


## Added value of EVUS

- Precisely define femoral bifurcation
- Evaluate for plaque and calcium
  - Help select access point
  - Implication for vascular closure
- Single attempt anterior wall puncture
- Wire visualization
- EVUS-guided vascular closure



# EVUS-guided pedal access



## Added value of EVUS

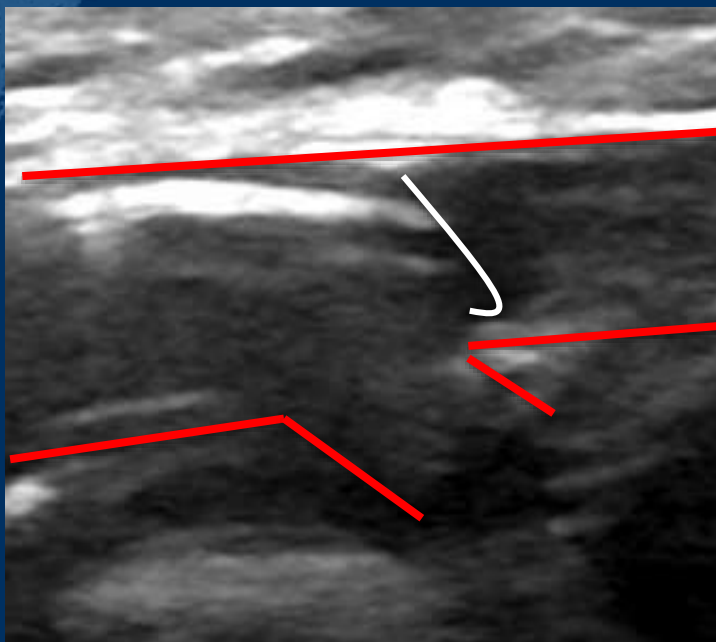
- Diseased vessels
  - Selection of access site
    - Calcium + plaque
    - Hibernating lumen
  - Optimal visualization of vessel
    - Guide anterior wall puncture
- Underfilled vs. occluded vessels
  - Often no flow with access
  - Need to rely on US guidance
- May have CTO near access site
  - US and fluoroscopy to guide wiring

# EVUS-guided intervention

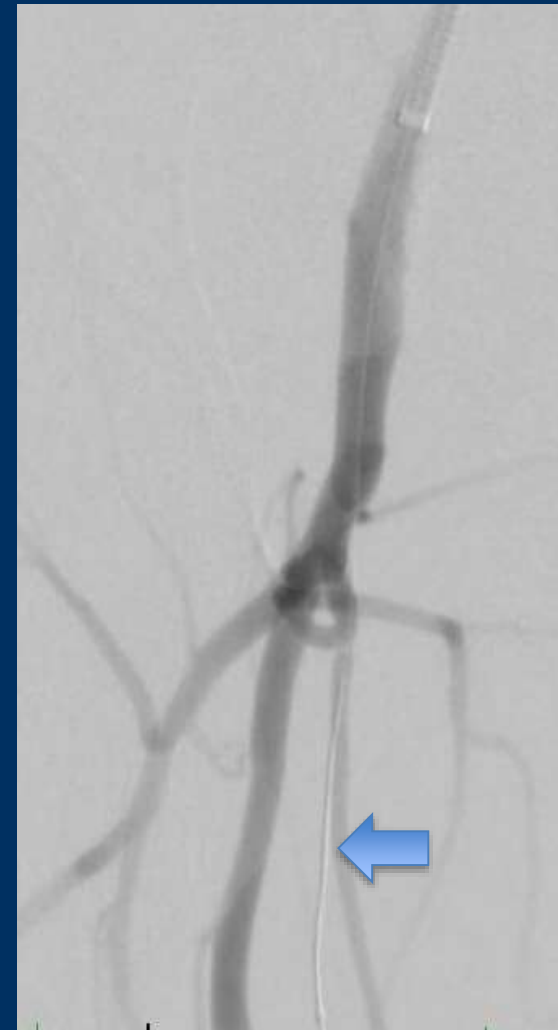
# EVUS-guided puncture of CTO cap



Flush SFA occlusion

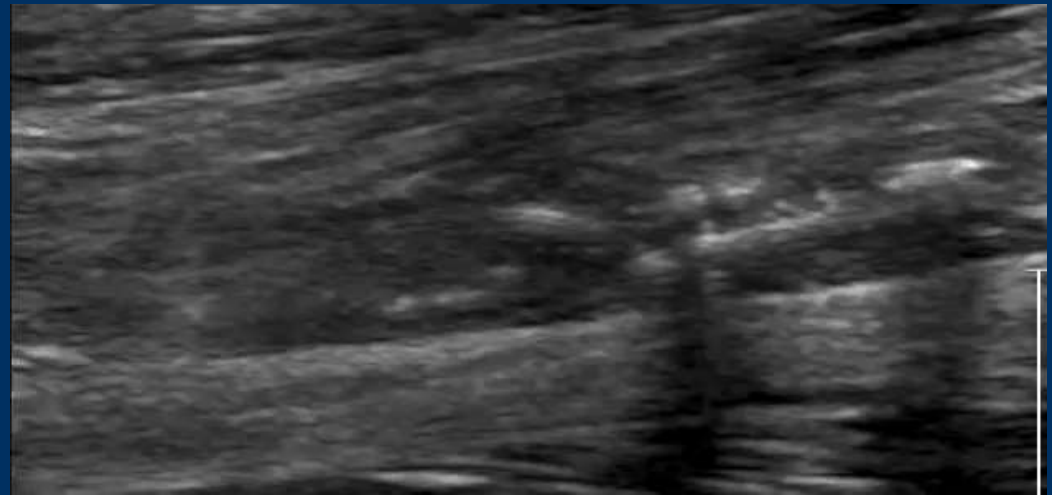
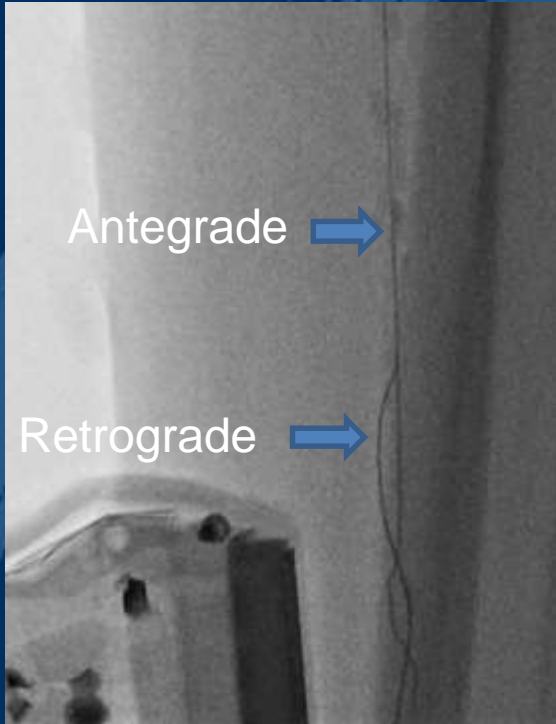


EVUS of femoral bifurcation



Wire in SFA lumen

# EVUS-guided wiring

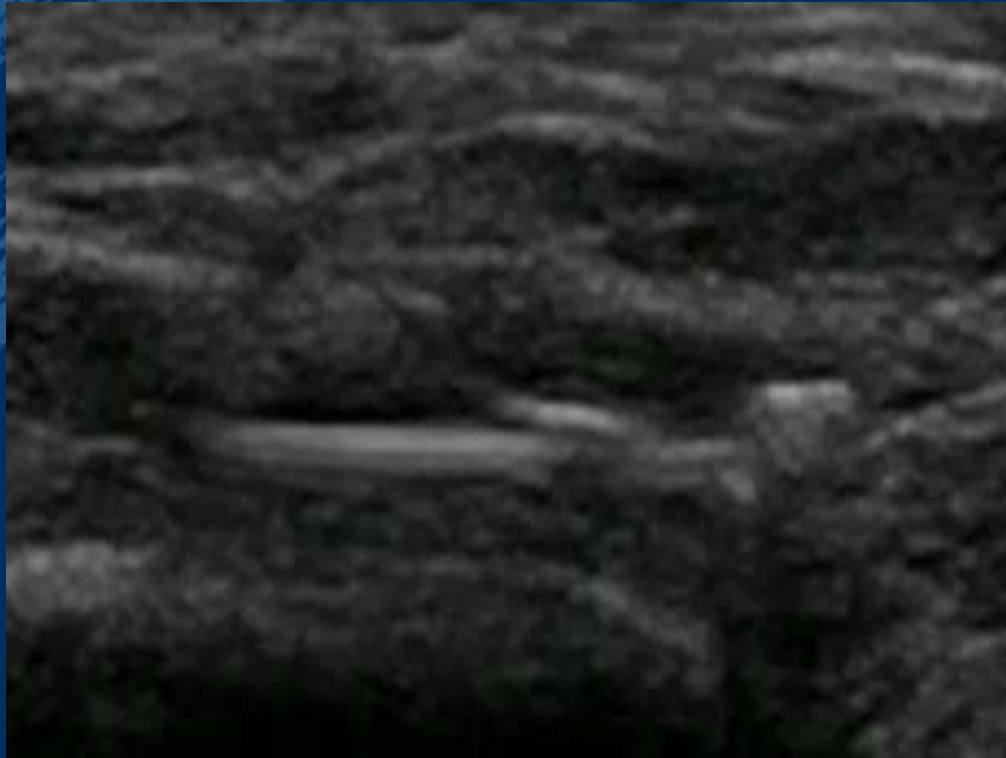


EVUS-guidance with 0.018 Astato

Both wires subintimal

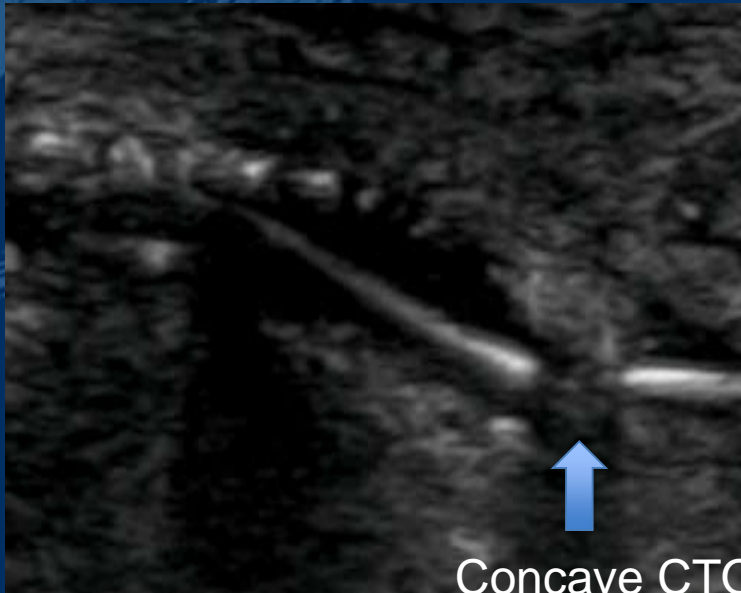
Retrograde wire appeared to exit vessel

# US-guided knuckle wiring



Lesion crossing with wire loop

## Value of US guidance in Inframalleolar lesions

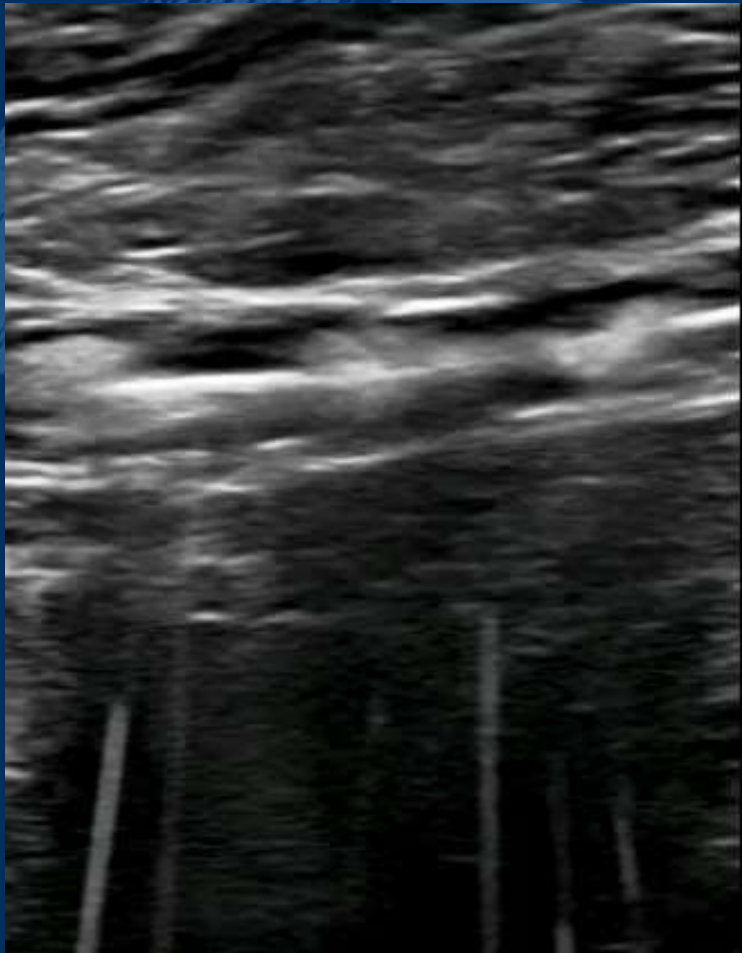


Concave CTO cap



**US allows navigation through complex CTOs within true lumen of vessel**

# US Laser Images



An abstract graphic consisting of several overlapping, curved brushstrokes in various shades of blue, located in the upper-left quadrant of the page. The strokes have a textured, painterly appearance with visible bristles.

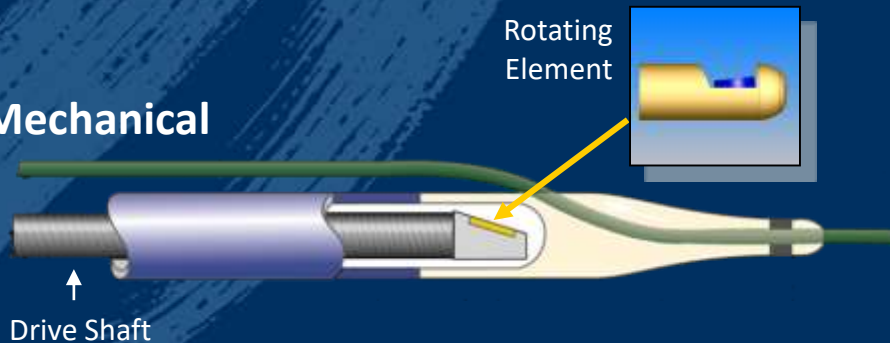
IVUS



# Types of IVUS Systems

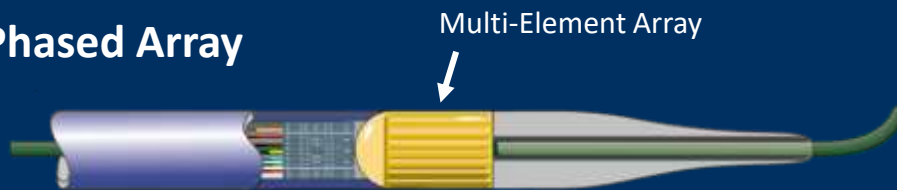
## *Mechanical and Phased Array*

### Mechanical



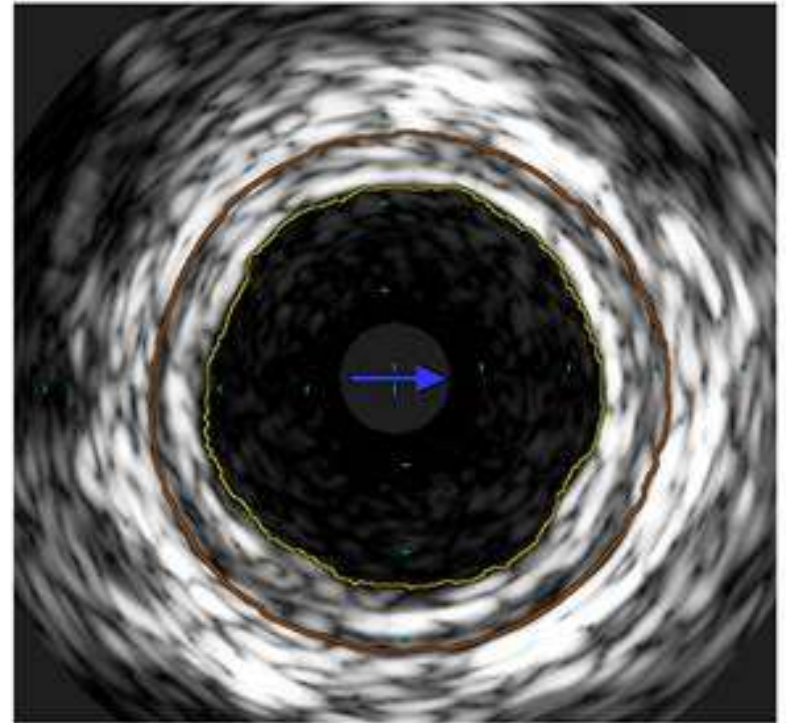
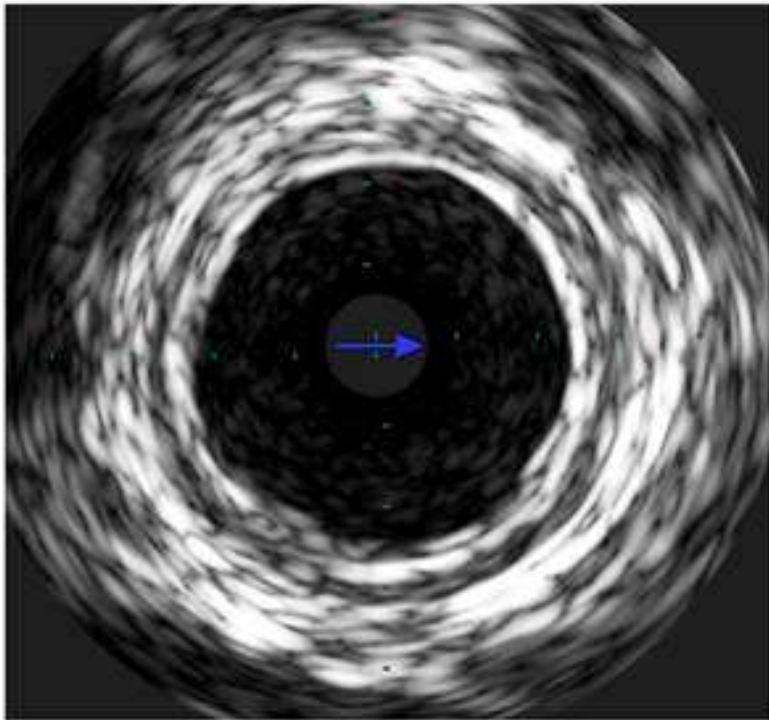
- ❖ Single transducer rotates 1800 rotations per minute to generate image
- ❖ Higher resolution

### Phased Array

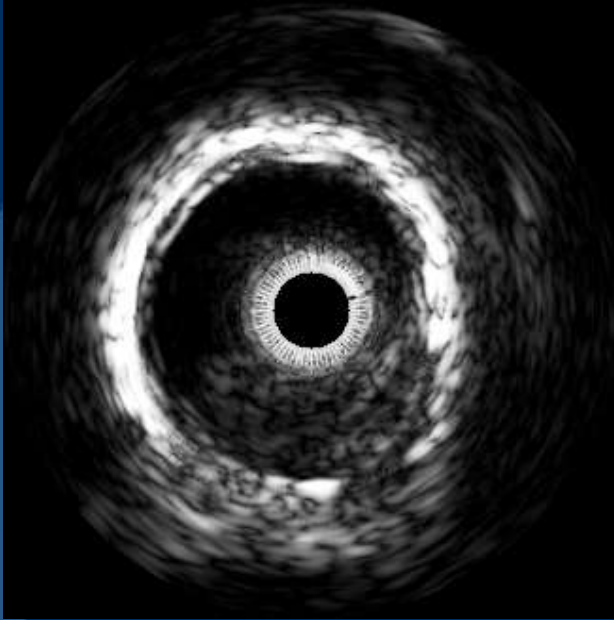


- ❖ Multiple transducer elements combine image sectors to create one image
- ❖ Lower resolution

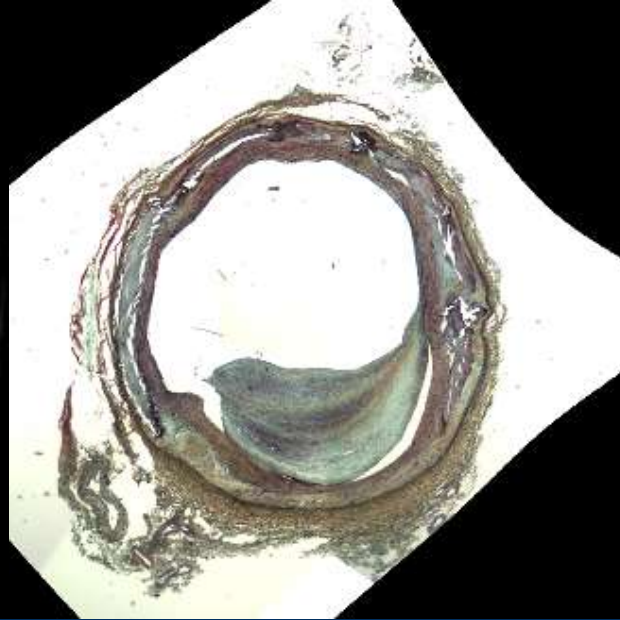
# What you see on IVUS



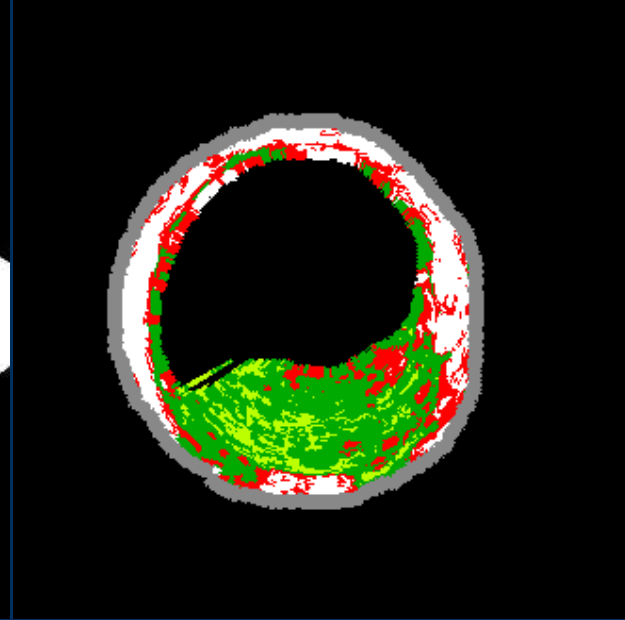
## Medial Calcification



Grayscale IVUS

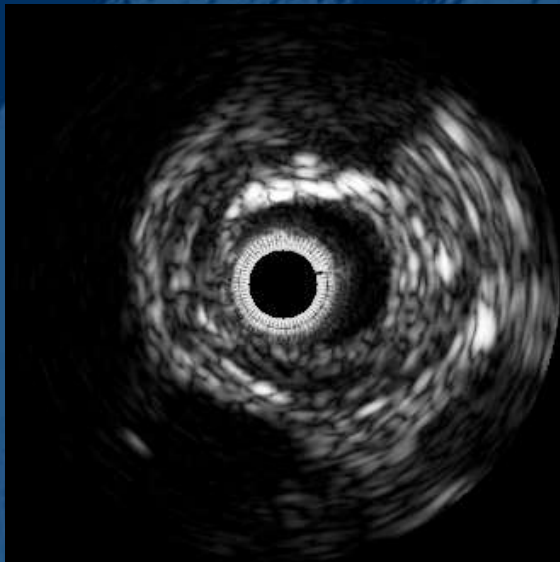


Corresponding MOVAT  
Stained Histology

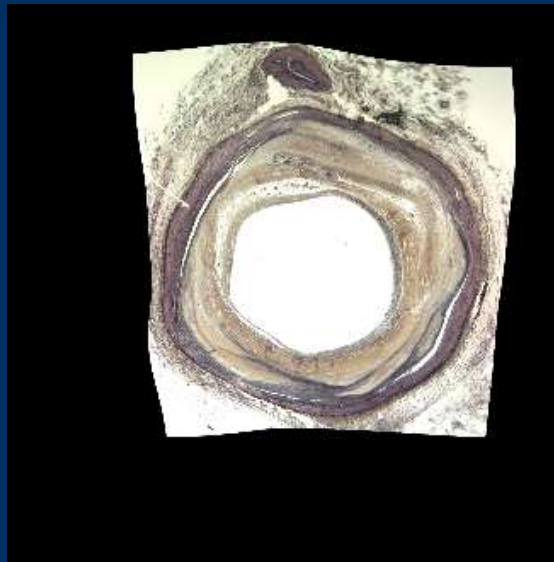


VH-IVUS™

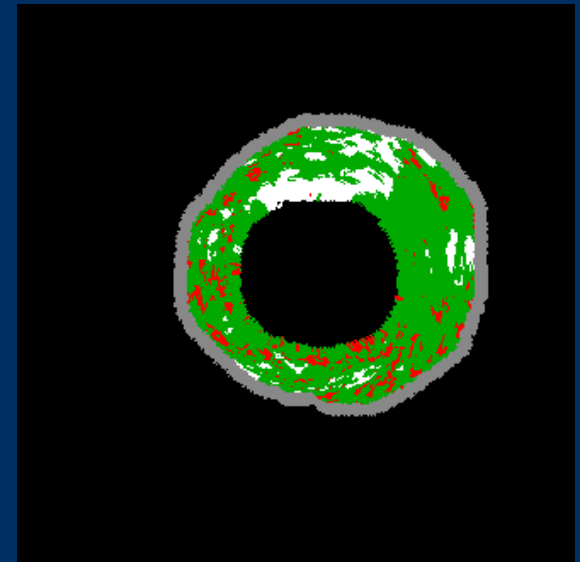
## Calcification present within Plaque



Grayscale IVUS



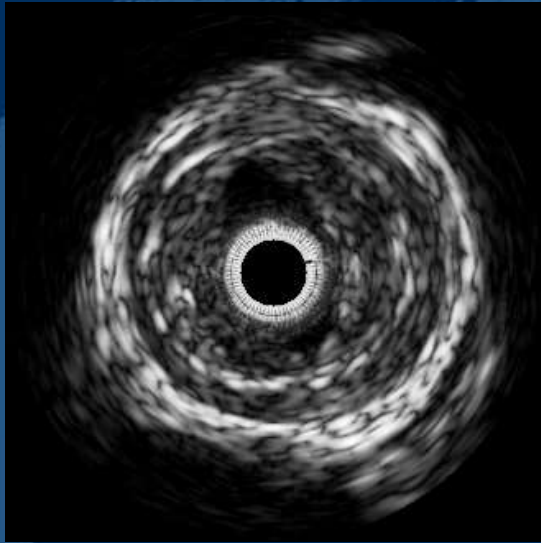
Corresponding MOVAT  
Stained Histology



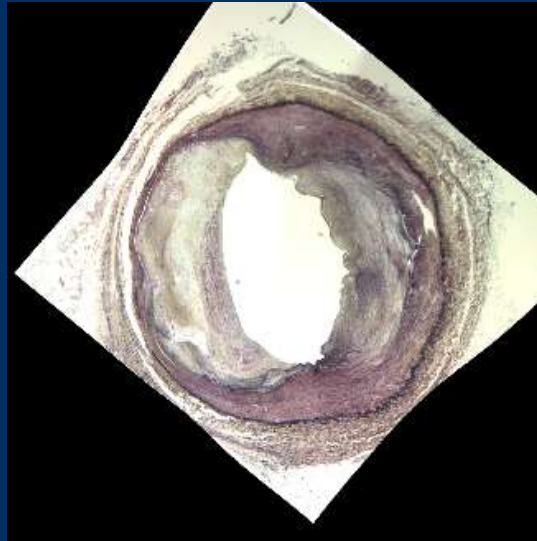
VH-IVUS™

Example Includes:

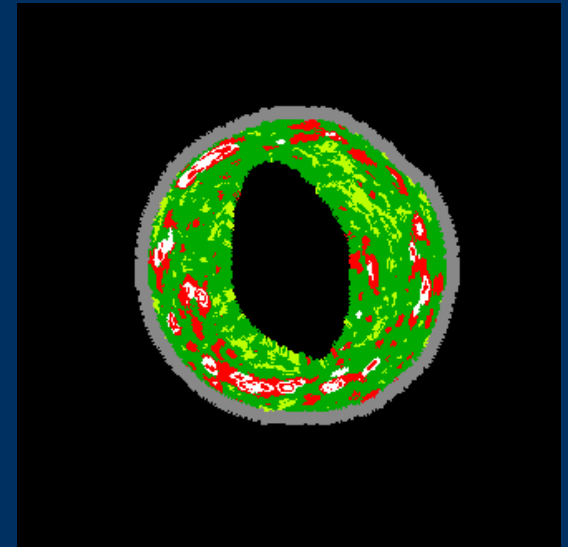
- Intimal thinning
- Intimal thickening



Grayscale IVUS

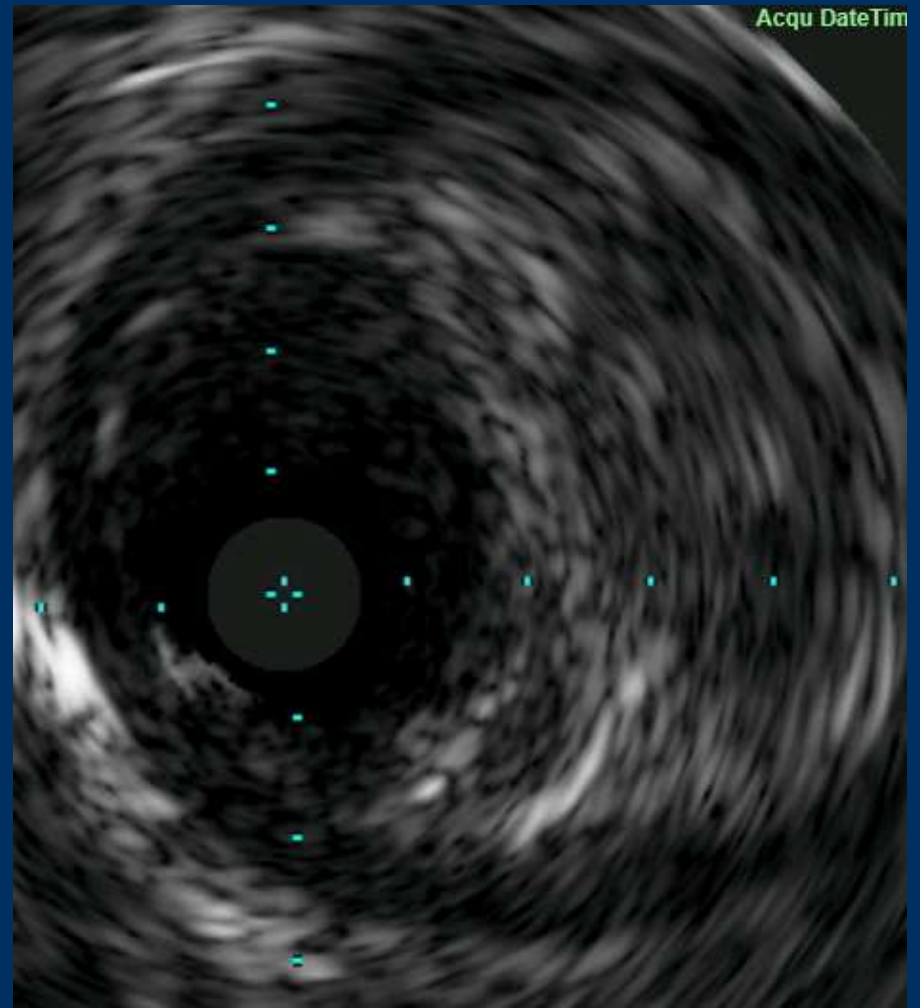
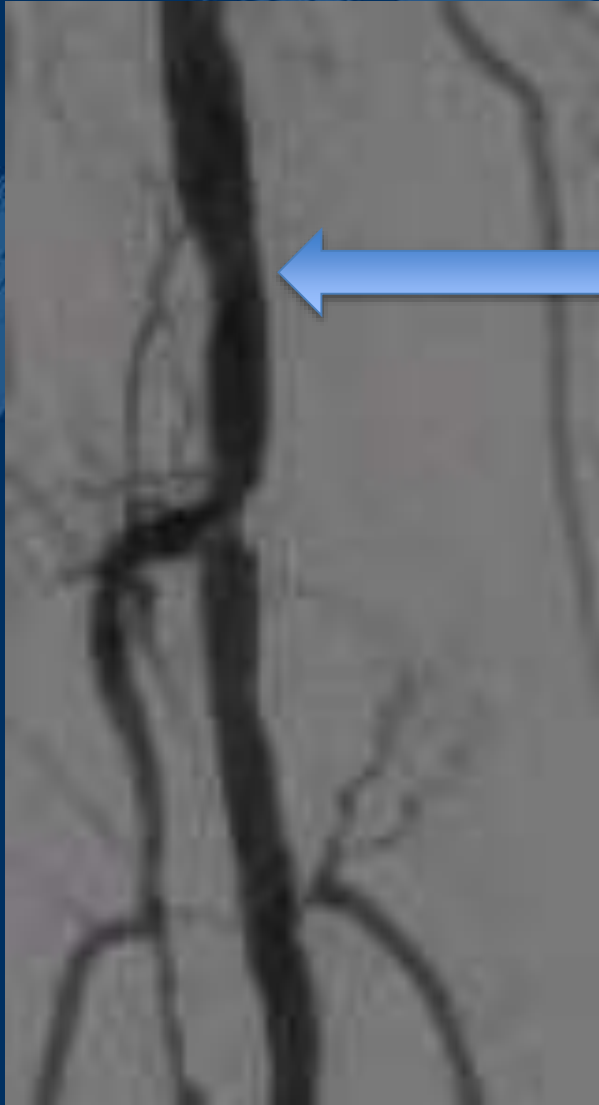


Corresponding MOVAT  
Stained Histology

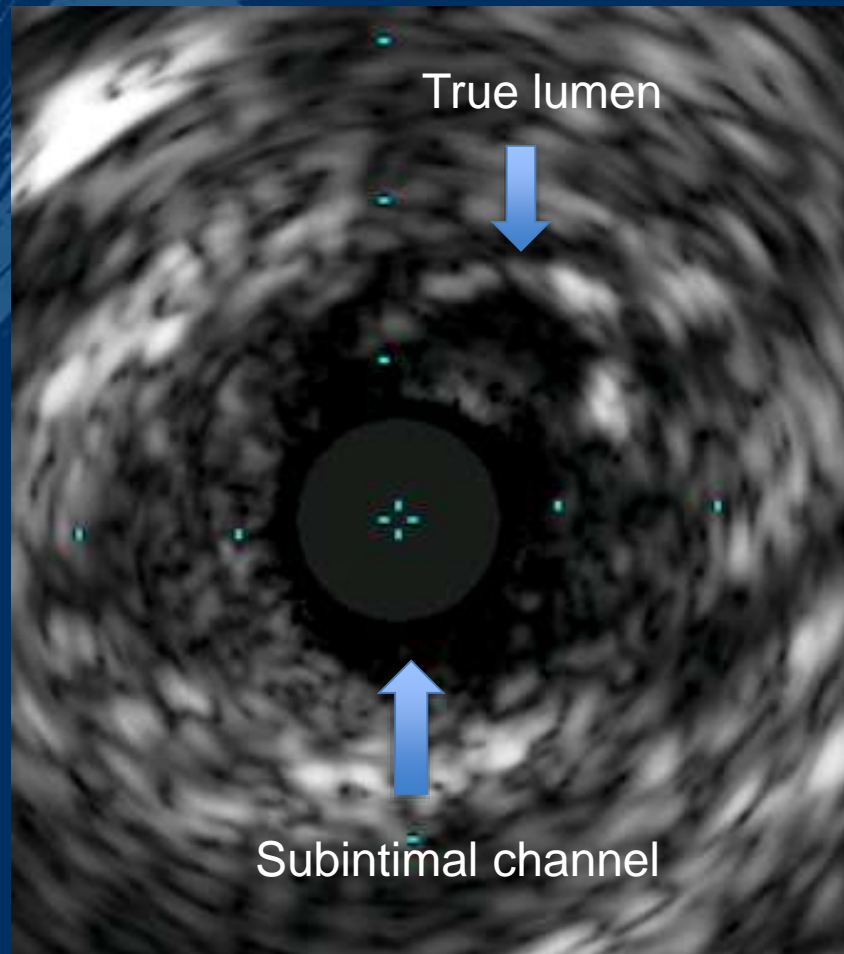


VH-IVUS™

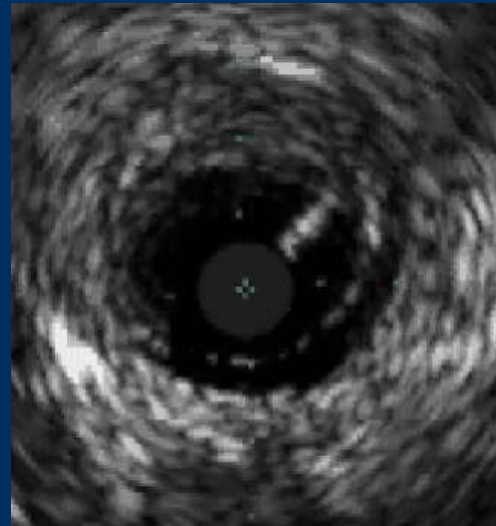
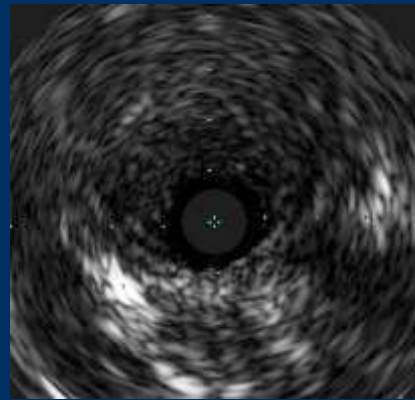
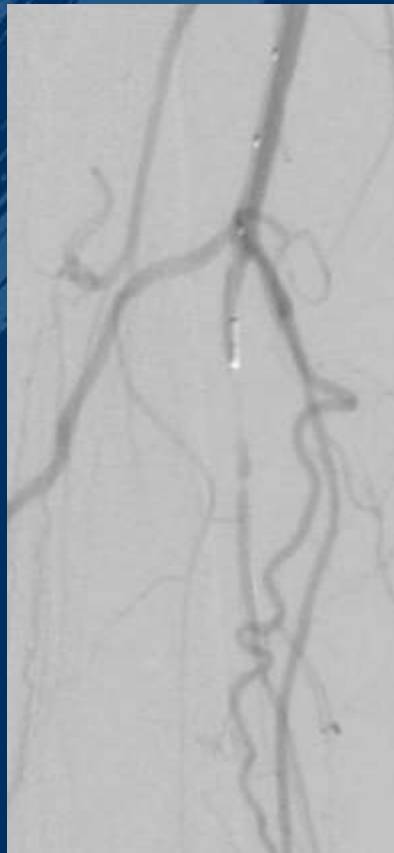
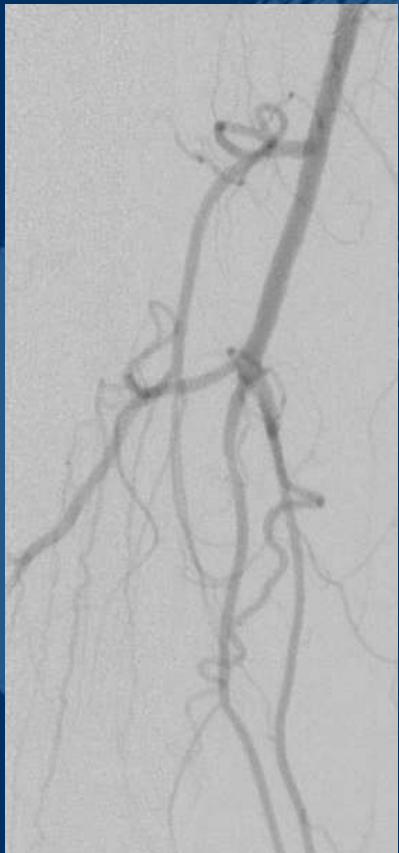
# IVUS images - Popliteal



# IVUS



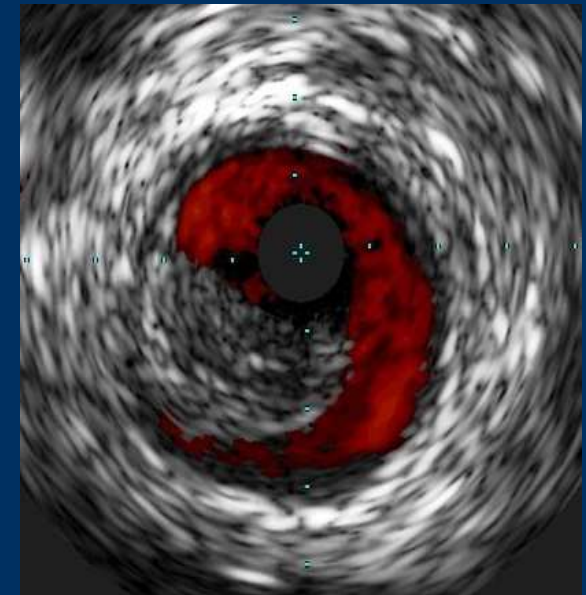
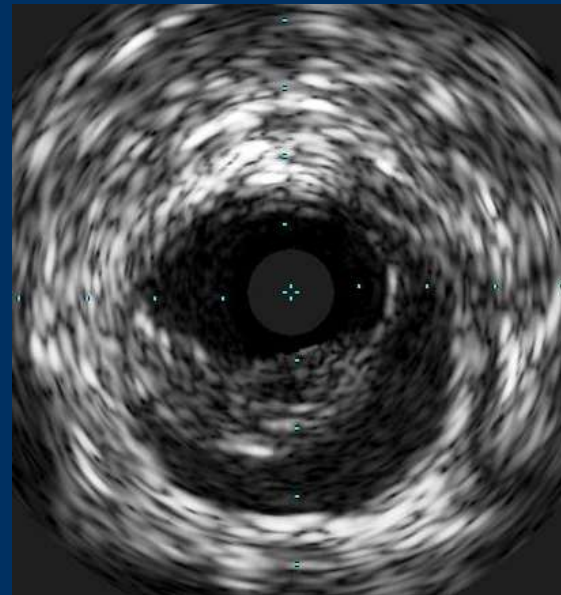
# IVUS-guided puncture of CTO cap



Diagnostic angiogram showing popliteal CTO



# Managing complications with IVUS



**CFA IVUS**

**Poor outflow after stenting**

# Conclusions

- Both EVUS and IVUS are important tools that enhance the safety and efficacy of CLI revascularization
- Incorporating these technologies into routine practice does require some training and additional resources, but pays dividends in terms of optimizing patient outcomes in complex cases

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