Role for EVUS and IVUS in complex CLI revascularisation

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Disclosure

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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
Both wires subintimal
Retrograde wire appeared to exit vessel

EVUS-guidance with 0.018 Astato
US-guided knuckle wiring

Lesion crossing with wire loop
Value of US guidance in Inframalleolar lesions

US allows navigation through complex CTOs within true lumen of vessel
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
IVUS images - Popliteal
IVUS

True lumen

Subintimal channel
IVUS-guided puncture of CTO cap

Diagnostic angiogram showing popliteal CTO
Managing complications with IVUS

Dissection

Poor outflow after stenting

CFA IVUS
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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