



# Prevalence of Mixed Morphology Pathology within Peripheral Arterial Disease

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# Disclosure

Speaker name: Miguel Montero-Baker, MD

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I have the following potential conflicts of interest to report:

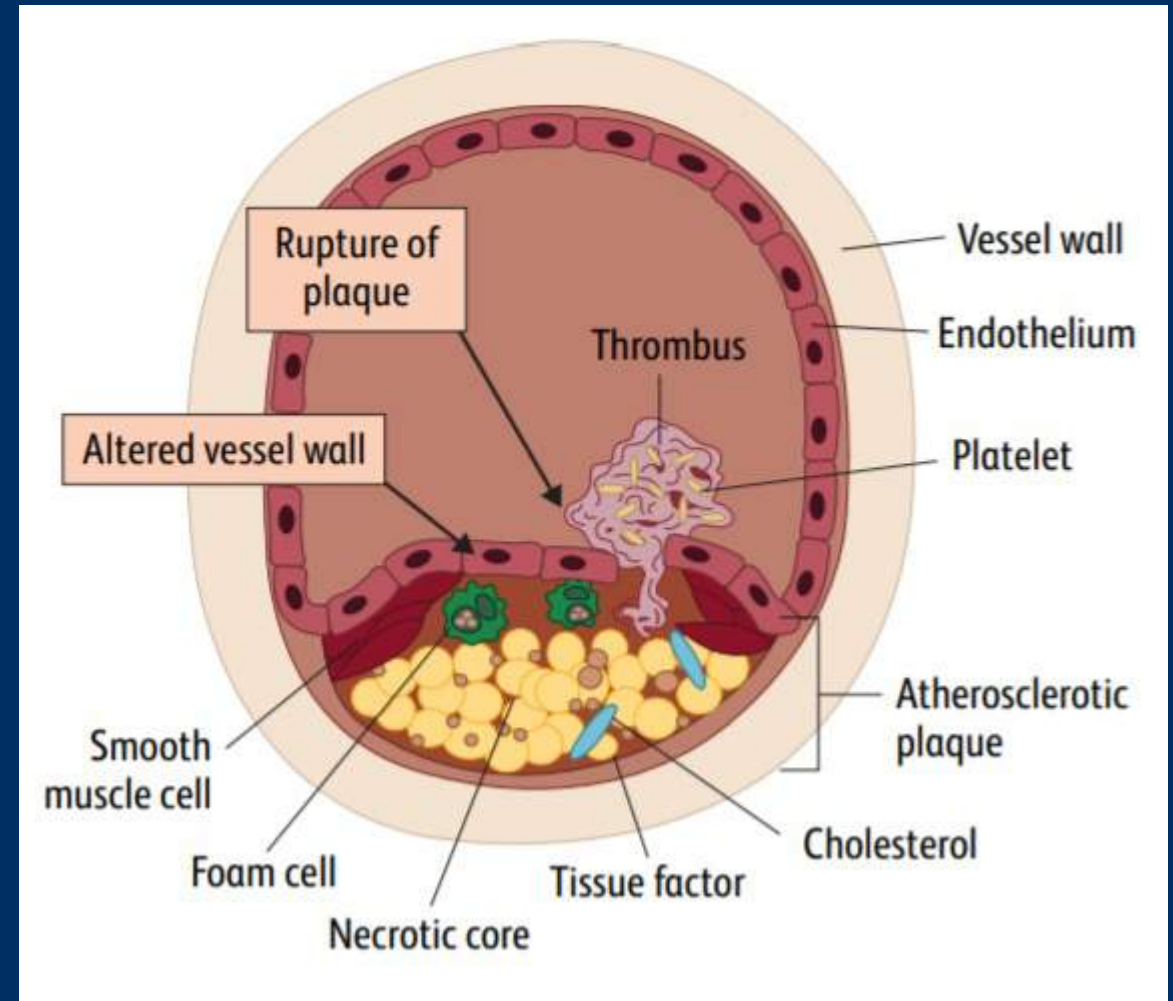
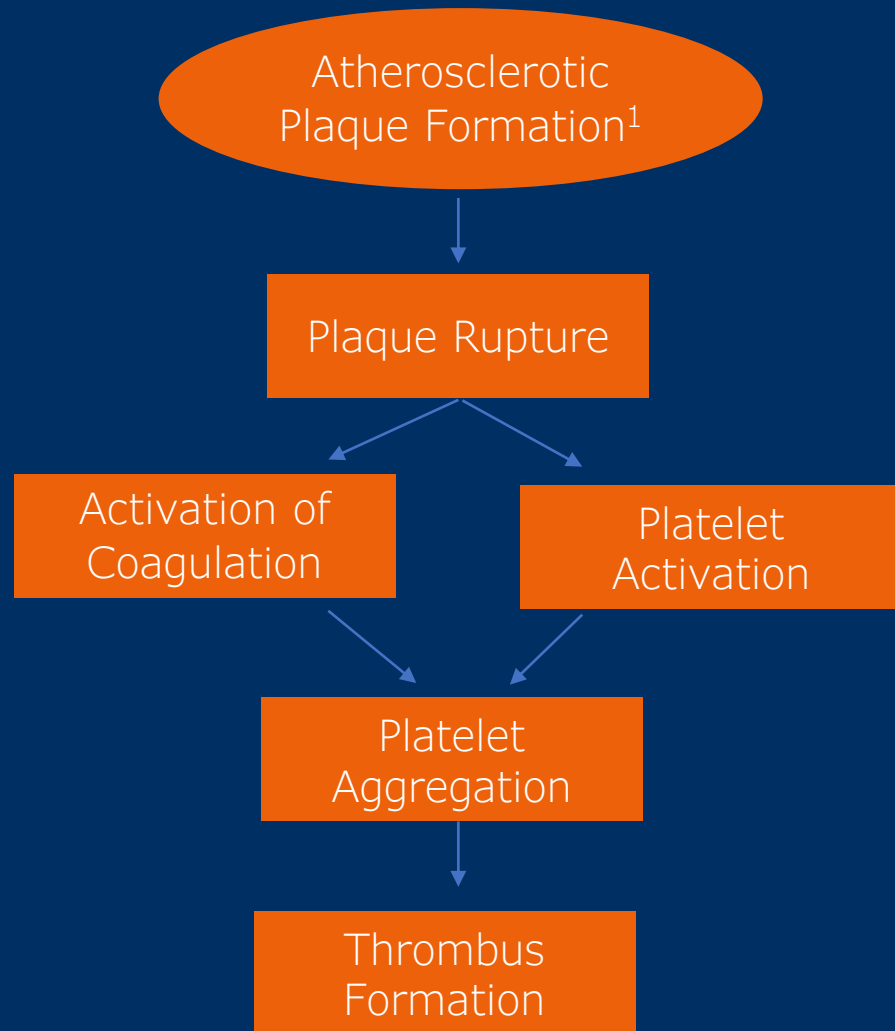
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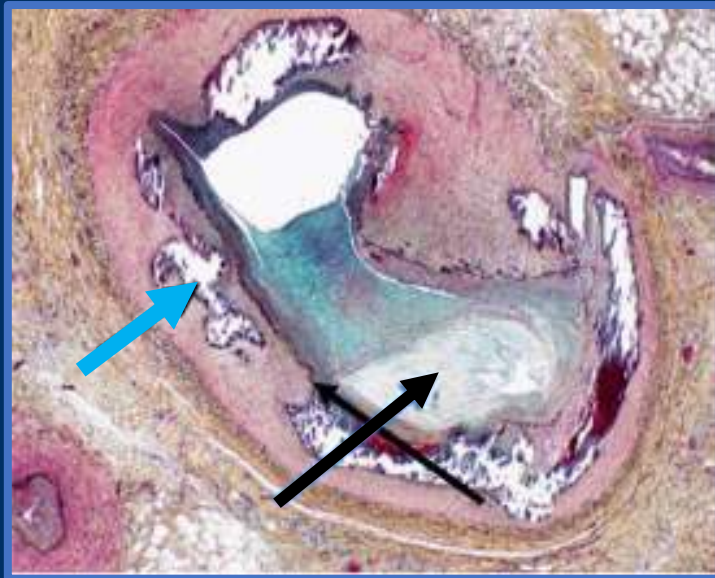
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# Thrombus Formation in Peripheral Arteries

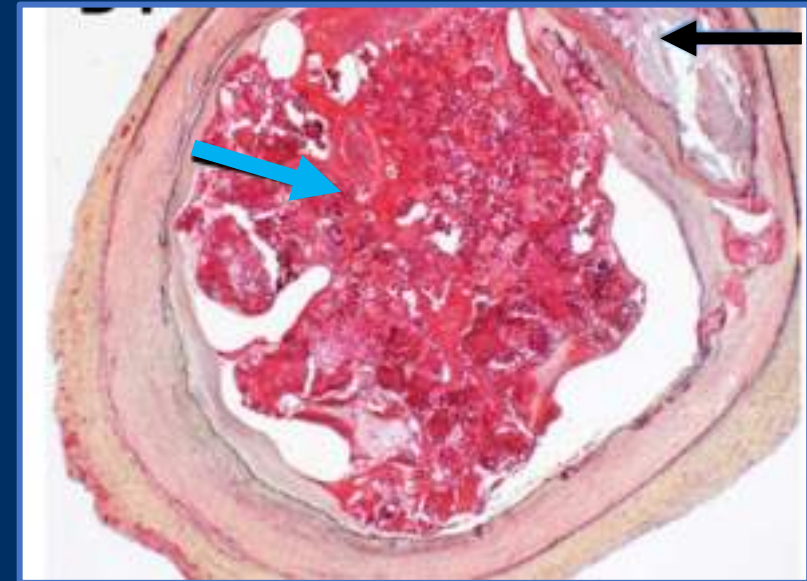


# Thrombus Formation in Peripheral Arteries

Rupture characterized by disrupted fibrous cap (blue arrow); the thrombus with the underlying necrotic core (black arrow)<sup>3</sup>

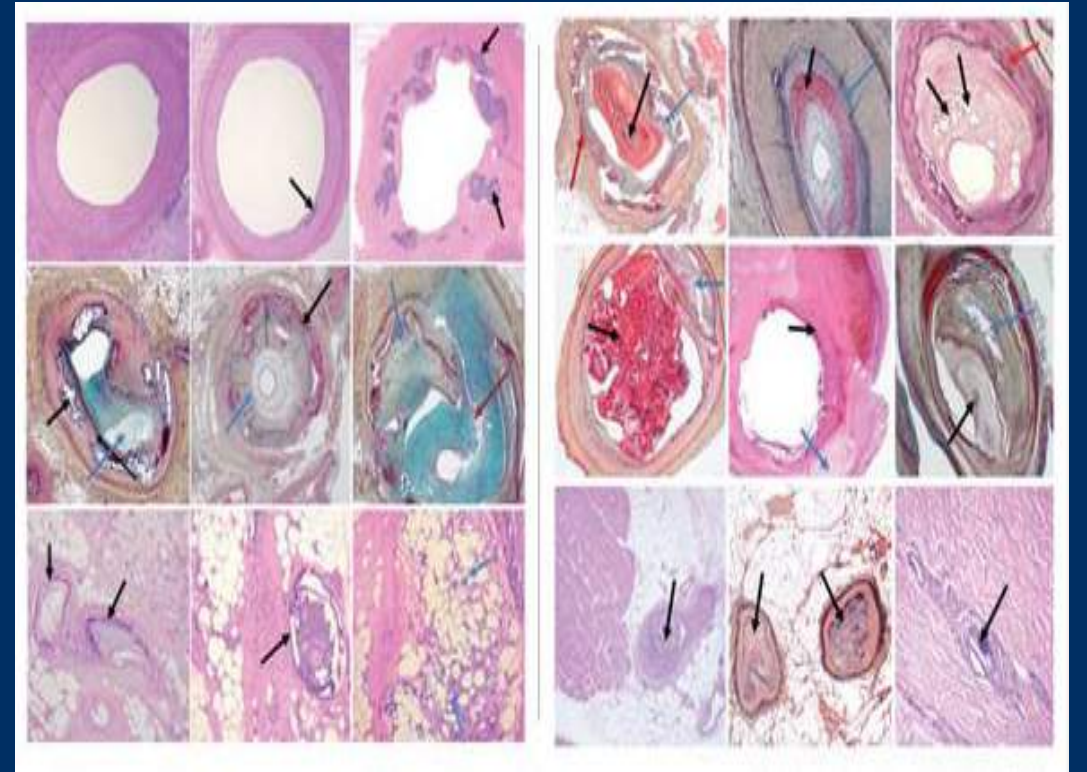


Thrombus consisting of calcified nodule (blue arrow) and fibrocalcific plaque (black arrow)<sup>3</sup>



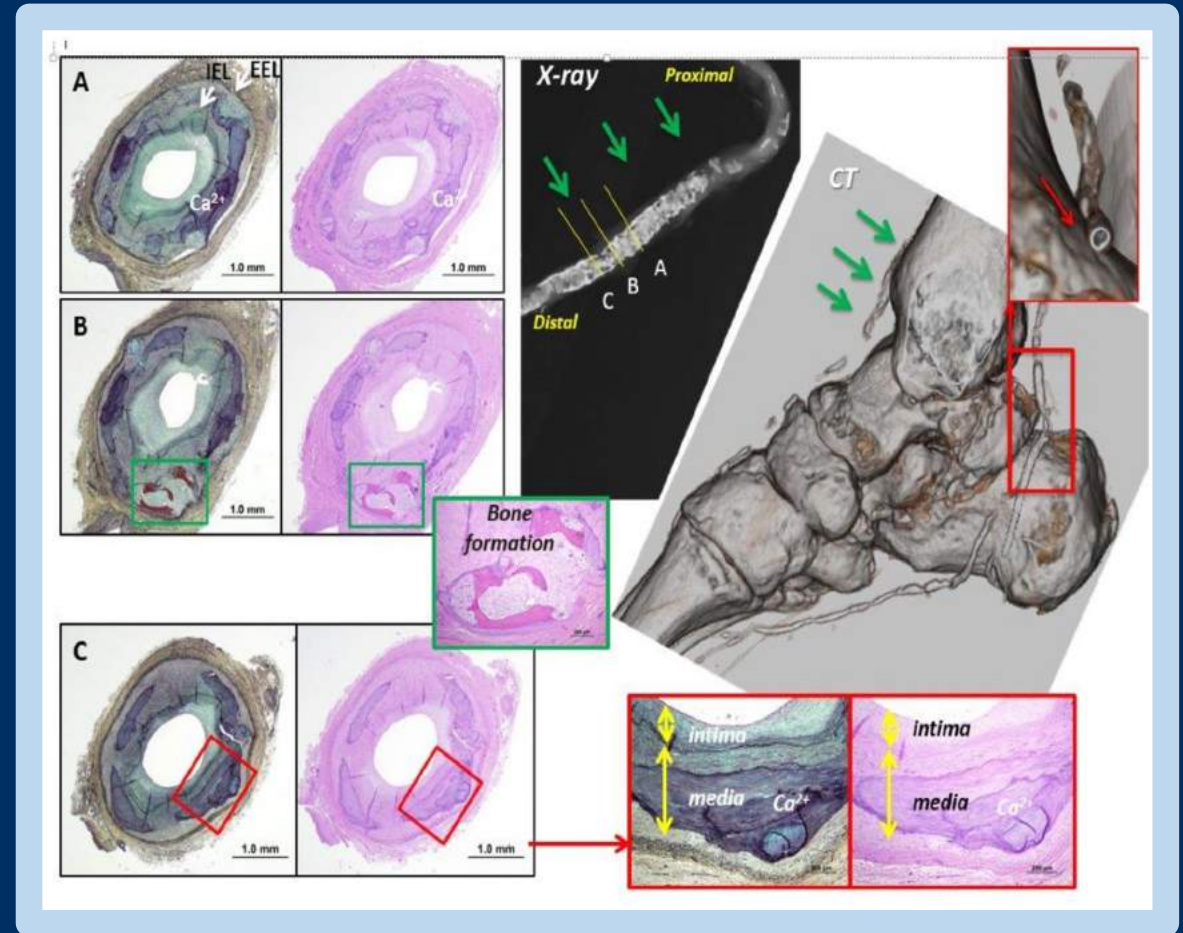
# Vessel Wall Pathology and Luminal Thrombi in CLI<sup>4</sup>

- Evaluated arteries with  $\geq 70\%$  luminal stenosis from amputation specimens demonstrated
  - More atherosclerosis in FEM-POP than INFRA-POP
  - INFRA-POP arteries had higher odds for chronic thrombotic occlusion compared with FEM-POP arteries
  - CLI most frequently resulted from thrombotic occlusion of peripheral vessels



# Calcification Patterns<sup>5</sup>

- Distal tibial vessels through the plantar circulation behave differently on multiple levels
  - Mechanically and pathologically
- CLI involving tibial and plantar disease remains a very challenging space to treat



# Potential Impact of Thrombus



Thrombus  
Formation<sup>6</sup>

Secondary  
Thrombotic  
Events

## Limb Events

- Acute Limb Ischemia
- Major Amputation
- Limb Revascularization
- Symptom Progression
- ABI/ TBI Change

## Cardiovascular Events

- Myocardial Infarction
- Cardiovascular Death
- Heart Failure

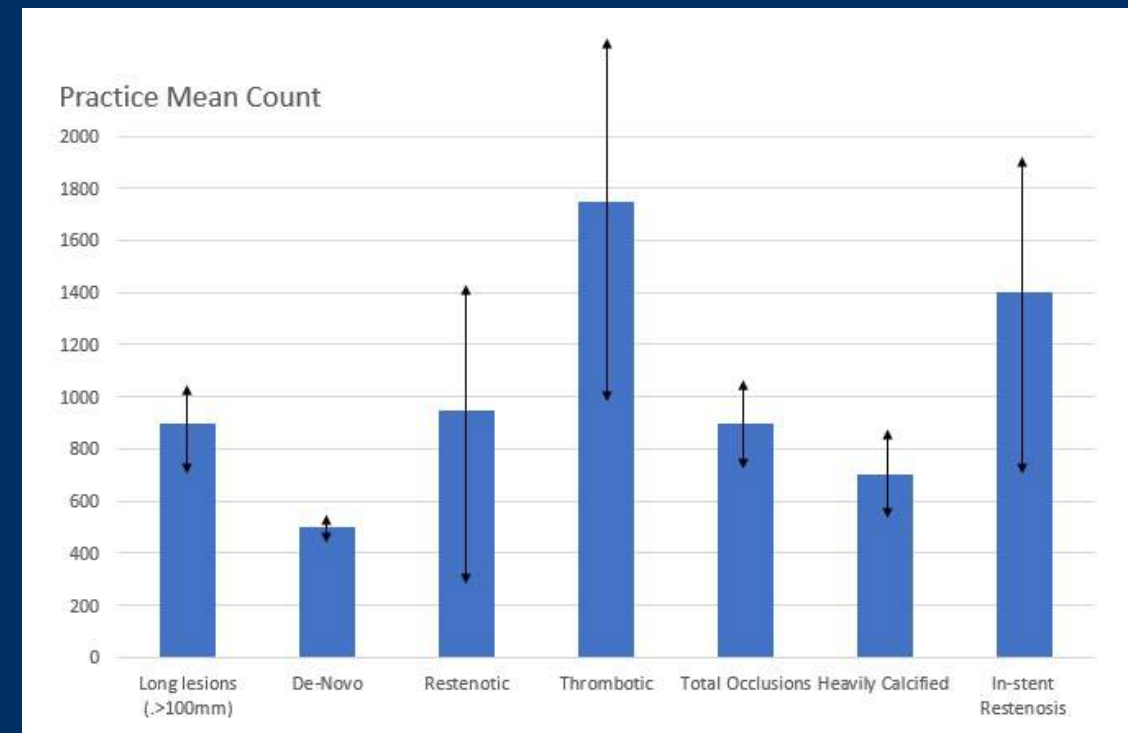


# Histology of PAD

Zeller et al investigated results of an embolic capture balloon in lower limb interventions of 123 patients<sup>7</sup>

- Characteristics of lesions were collected in baseline demographics
- In addition to use of the embolic capture balloon, adjunctive PTA, atherectomy, aspiration, and stents were used
- Histological analysis performed for captured material (present in 100% of the devices)
- “The majority of the thrombus containing lesions were not angiographically pre-identified as thrombotic”

## Embolized Particle Count



Graph: Number of particles counted in capture device at core lab analysis

# Histology of PAD



## Variable lesion types studied<sup>8</sup>

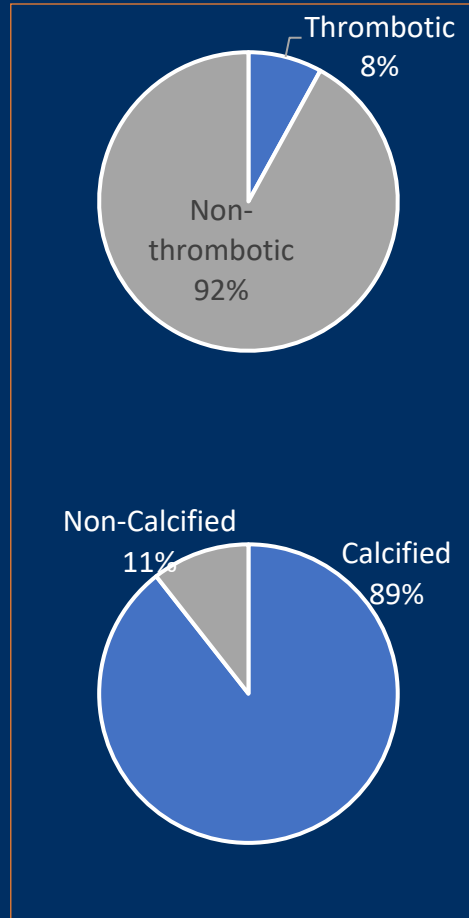
- Iliac, Popliteal, SFA
- Long lesions
- De novo, Restenosis, ISR
- Variable stenosis levels
- Variable perceived calcification levels

# Histology of PAD

**Thrombus Understated**

**Calcium Overstated**

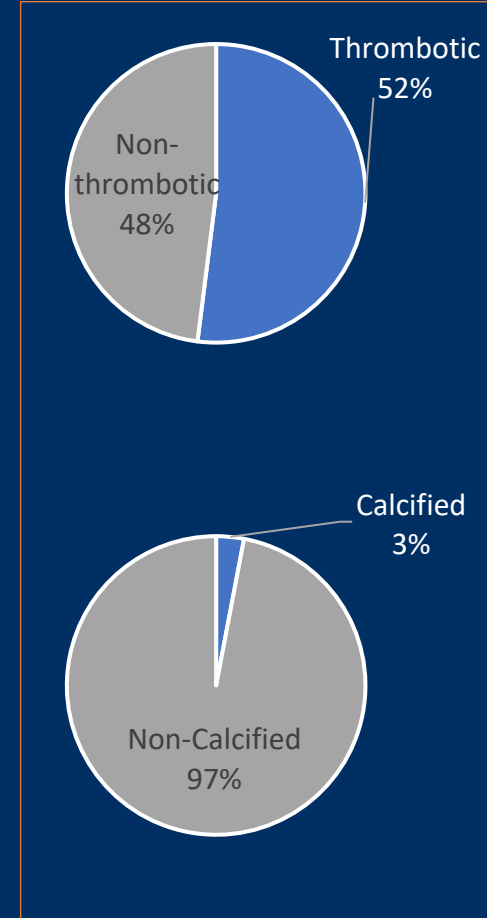
Pre-Treatment Lesion Analysis



Core Lab  
Histological  
Analysis

Core Lab  
Histological  
Analysis

Actual Particle Count of Captured Material



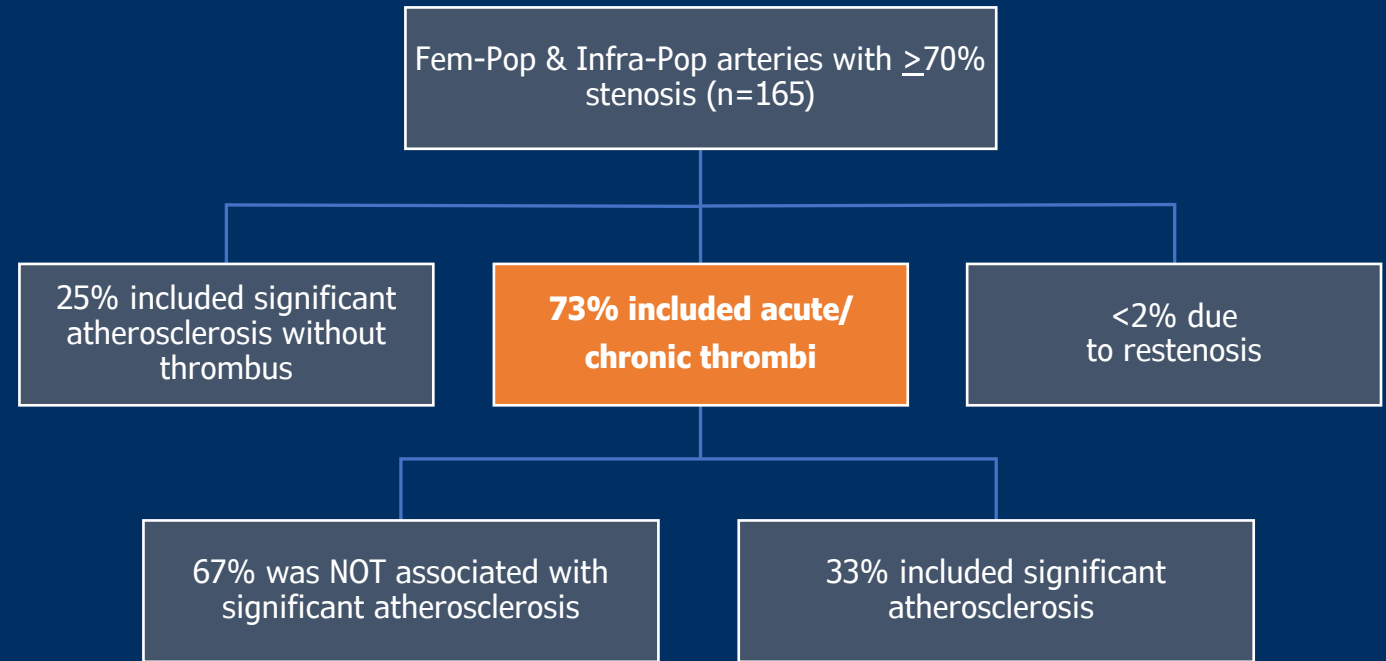
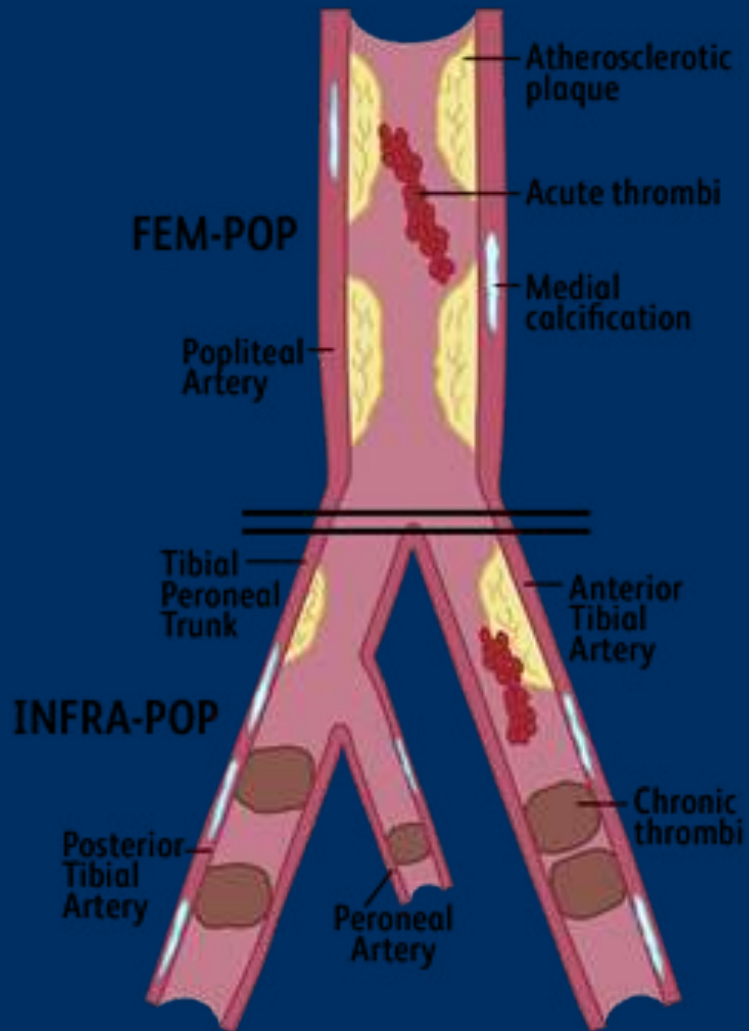
8% of Lesions Thought to be Thrombotic Pre-treatment  
→ 52% of Captured Material was Analyzed to be Thrombus<sup>9</sup>

89.4% of Lesions thought to contain moderate-severe calcium pre-treatment  
→ 3% of Captured Material was Analyzed to be Calcified<sup>9</sup>

# Pathological Characterization of Large Arteries in Amputations for CLI<sup>10</sup>

- Narula et al evaluated 239 lower-extremity amputations to characterize the pathology of CLI
- Peripheral plaque morphology is typically heterogenous
- 73% of stenotic lesions included acute or chronic luminal thrombi
- 27% of stenotic lesions included pathological intimal thickening, fibroatheroma, fibrocalcific lesions, or restenosis

# Pathological Characterization of Large Arteries in Amputations for CLI<sup>10</sup>



# Conclusions

- PAD has heterogenous morphology
- Thrombus in PAD can be more prevalent than initially perceived
- Thrombus can lead to secondary negative outcomes that are often understated
- Tools that can easily adapt to variable plaque morphology are needed in our space

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