Calcification of BTK Arteries

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- Abbott Vascular
- Bard Peripheral Vascular
- Boston Scientific
- Cardiovascular Systems, Inc.
- Cook Medical
- Medtronic
- Spectranetics
- Terumo Medical
CLI and Calcification

• Pre-clinical factors that increase the suspicion of increased calcium presence
• Methods of calcific evaluations
• Intra-procedural measures that determine the depth of calcification
CLI and Calcification

Pre-clinical factors that increase the suspicion of increased calcium presence:

Based on original work by JA Mustapha & Renu Virmani
Myth vs Fact

• Fact: calcium deposit is two types
  – Type one: intimal calcification
  – Type two: medial calcification

• Myth: all calcium deposit is non structured and sporadic with the same densities.

Based on original work by JA Mustapha & Renu Virmani
Fact: Medial calcification deposit in the medial wall is organized and structured in crescent shapes.

Based on original work by JA Mustapha & Renu Virmani
Fact: Intimal calcification deposit in the intima and plaque is disorganized and not structured.

Scattered disorganized Intimal calcification

Based on original work by JA Mustapha & Renu Virmani
Preclinical and clinical value of the two different calcium deposit types

• Suspicion of calcium presence/deposit should be high in patients with increased *age, DM, CKD, and PVD/CLI*
Preclinical and clinical value of the two different calcium deposit

There is higher association of medial calcification in patients with:

1- CLI RF IV - IV
2- CKD
3- Type 1 DM and long term Type 2 DM

Based on original work by JA Mustapha & Renu Virmani
Angio vs CT for calcium assessment

Based on original work by JA Mustapha & Renu Virmani
Crescent shape medial calcification

Medial calcification is similar to intimal calcification with its variable densities.

Based on original work by JA Mustapha & Renu Virmani
2D vs 3D Reconstruction CT (no contrast) of Calcified SFA

Based on original work by JA Mustapha & Renu Virmani
IVUS limitations and benefits

**Intimal calcification**
Acoustic shadowing: yellow arrows show the drop out caused by the dense intimal calcification

**Medial calcification**
Medial calcification not causing acoustic shadowing
And the vessel wall is well visualized

**Crescent and organized**

Based on original work by JA Mustapha & Renu Virmani
Pre-clinical Subject

- 87 year old female
- Smoker
- Hx of MI, CHF, COPD

Calcium macro-evaluation in an 87 y/o patient without h/o clinical PAD
Fluroscopic images

Based on original work by JA Mustapha & Renu Virmani
Faxitron x-ray
What is so amazing is the amount of connective tissue between EACH layer of this hyperplastic tissue on TOP of severe medial calcification.
Take a look at this eccentric Calcified plaque combined with Layers of medial calcifications AND Dense connective tissues
2D CT without contrast

Based on original work by JA Mustapha & Renu Virmani
CT 3D reconstructed/pop combined medial and intimal calcification. *Intimal to medial*
(Tibial) 3DCT reconstructed concerning negative remodeling and more medial calcification
Less medial calcification and more intimal calcification

Based on original work by JA Mustapha & Renu Virmani
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Based on original work by JA Mustapha & Renu Virmani
Jenali Gap: An Ominous Sign
Associated with negative remodeling

Based on original work by JA Mustapha & Renu Virmani.
Circumferential medial Calcification causes Severe high grade stenosis In the distal tibials and Pedal arteries. Also causes complete Luminal occlusion.
Based on original work by JA Mustapha & Renu Virmani

plaque calcification (intimal) tend to be more asymmetrical.
Calcium Micro-histology/histopathology
R PROX AT 310-330

Based on original work by JA Mustapha & Renu Virmani
R PROX AT 330-350

Based on original work by JA Mustapha & Renu Virmani

Organized thrombus
✓ Ca(intimal)
✓ Ca(media)
✓ Necrotic core
Tibial-pedal trans-luminal obliteration in CLI patients

CTOs comes in all different forms

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Thank You

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