Patterns of Vessel Calcification in BTK arteries and Implications for Vessel Preparation and Atherectomy

Jihad A. Mustapha, MD, FACC, FSCAI
Advanced Cardiac & Vascular Amputation Prevention Centers
Grand Rapids, MI USA
Disclosure

Speaker name: Jihad A. Mustapha

I have the following potential conflicts of interest to report:

- Consulting: Abbott Vascular, Bard Peripheral Vascular, Boston Scientific, Cagent Vascular, Cardiovascular Systems, Inc., Cook Medical, Medtronic, PQ Bypass, Spectranetics, Terumo Medical
Pre-clinical studies to understand the required therapeutic options for BTK/BTA vessels

The 1<sup>st</sup> step in successful therapy for tibial arteries: Accept the fact that tibial arteries are different from all other arteries, especially coronary and SFA arteries.
FreedomFlow™ – Dynamic rotational design allows treatment in arteries up to 8 mm

Cardio Flow, Inc.
CAUTION: Investigational device. Limited by United States law to investigational use.

CONFIDENTIAL
Real world practice, based on the Data collected from pre-clinical studies
Spiral Performance vs. Competition?

This repeated study leads to confidence to help us achieve great results.

Very small number of particles > 10 microns
E: Rupture characterized by disrupted fibrous cap and the thrombus is in continuity with the underlying hemorrhagic necrotic core. Note presence of punctate areas of calcification in the periphery of the necrotic core.

F: Healed plaque characterized by the underlying thin collagen rich fibrous cap (black arrow) over the necrotic core and a luminal healed thrombus consisting of smooth muscle cells surrounded by proteoglycan rich matrix (green).

Cholesterol Chrystal's: mostly in the proximal to mid lesions can be associated with intimal calcification.

Fibrotic tissue: mostly in the distal Tibials. Can be associated with medial calcification.

J.A. Mustapha, MD F. Saab MD. J Cardiovasc Surg (Torino) 2017/Feb
Doi: 10.23736/S0021-9509.17.98-0
Tibial evolution to CTO
With JENALI gap
NOT GOOD

J.A Mustapha, MD
preclinical Selective Angiogram
LLE

• SFA and popliteal – 60 mm lesion, >70% stenosis with moderate calcification then CTO and reconstitute in the mid/prox Tibis
• AT – 200 mm lesion, >90% stenosis with severe calcification
• PT – 200 mm lesion, >70% stenosis with moderate calcification
Dying tibial artery. End results is negative remodeling with Jenali gap filled with uncrossable material.
Tibiopedal Disease

What atherectomy Would you choose?
The pre-clinical work
New Stent Concept

Plan: Open the PT and connect it to the plantars
With micr-medical stent

Micro-medical developed 3F compatible balloons and stents 2-4mm, with a length up to 300mm
And working on 5-6mm
Finally, a tibio-pedal stent is here. Imagine the endless possibilities.
Tibial CTO is Very Challenging: additional tools will be needed....
Orbital, Rotational & Directional Atherectomy

- Three different MOA (mechanisms of action)
- How do we choose which device to use?
- How do we get the effective benefit from each device?
- Type of lesion and composition are the main factors in determining the type of atherectomy device.
- Do atherectomy devices perform equally in the same lesion? NO
How can we use all atherectomy devices in the most effective safe way?

Go Slow to Finish Fast:

• Going slow allows the atherectomy device to do what it was designed to perform.
• Going slow allows the device to come in contact with the target lesion with sufficient time to deliver what it was designed to do.

Conclusion

• Vessel prep and atherectomy are not just for moderate to severe calcified lesions, but for all types of lesions and locations.
• Much progress has been made as shown above
• Still must con’t pre-clinical work, as I believe our understanding Tibial-Pedral and CLI still in its infancy
• AWARENESS IS KEY.
Patterns of Vessel Calcification in BTK arteries and Implications for Vessel Preparation and Atherectomy

Jihad A. Mustapha, MD, FACC, FSCAI
Advanced Cardiac & Vascular Amputation Prevention Centers
Grand Rapids, MI USA