What is vessel preparation and why is it important?

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Disclosures

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Vessel prep is improving the local environment of the vessel prior to leaving something behind, whether that something is a stent or an anti-proliferative agent.
Lesion preparation may serve notoriously complex settings such as:
- de-novo
- ISR
- CTO
- severe calcium
Vessel Preparation Tools

Balloons
- Standard Balloons
- Chocolate Balloon
- Cutting Balloons
- Scoring Balloons

Atherectomy
- Directional
- Orbital
- Rotational
- Hybrid
- Laser

Others
- Lythoplasty
Plaque Scoring in Calcified SFA

Insights form the PANTHER Registry

Treatment of femoropopliteal lesions with the AngioSculpt scoring balloon – results from the Heidelberg PANTHER registry

Ira Lugtenbiel1, Michaela Grebner1, Qianxing Zhou1, Anna Strothmeyer1, Britta Vogel1, Rita Cebola2, Oliver Müller1, Bernadett Brado3, Marc Mittnacht4, Benedikt Kohler2, Hugo Katus1, and Erwin Blessing8

Key Lesion characteristics

Single center, retrospective registry

N= 124 calcified fem-pop Lesions treated with Angiosculpt™ scoring balloon (ASC)

- 37.1% ASC alone
- 32.3% prep before DCB
- 30.6% prep before BMS

Overall Calcium rates and definition

- 21.8% mild (unilateral < 3 cm)
- 34.7% moderate (unilateral, > 3 cm)
- 43.5% severe (bilateral, any length)

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Debulking + DCB in Ca++

Highest benefit suggested in presence of long and/or calcified arteries and following highest plaque debulking (≤30% DS post-atherectomy)

- T.Zeller - When DCB is not enough: Is there a need for a new DAART study? – LINC 2016, oral presentation

**Debulking + DCB in Ca++**

**12-Month Patency: DAART RCT Patients**

*Increased lumen gain with DA before DCB may result in improved 12-month patency*

**Per Core Lab Assessment: All Severe Ca++ group includes all patients with severe calcium (including randomized and non-randomized). Results for all patients who returned for angiographic follow-up.**

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**Debulking + DCB in Ca++**
DCB and Calcium

Evidence (in-vivo and ex-vivo) indicates Calcium as potential barrier to optimal drug absorption. Circumferential Calcium strongest contributor

N=5 human cadaveric lower limbs with observed arterial calcification

DCB and Calcium

Ex-vivo and pre-clinical experiments confirm Calcium, not plaque burden, remains the real barrier for DCB drug uptake.

- **Similar PTX tissue concentration irrespective of plaque debulking**
- **Debulking of calcified fem-pop arteries exhibits a 70% larger effective diffusion coefficient vs. untreated segments (2.85 ± 0.25 ×10−9 cm2/s [treated] vs. 1.66 ± 0.18 ×10−9 cm2/s [untreated], p < 0.001).**

**Graphs and Data**

Debulking + DCB in Ca++

HawkOne™ directional atherectomy system

Images courtesy Fabrizio Fanelli, MD
Conclusions

- Vessel preparation remains a must in total occlusions and severely calcified lesions.
- Multiple technologies are nowadays available but ….. “the ideal” isn’t available yet.
- Atherectomy devices increase the luminal gain and may also improve drug uptake.
- Vessel preparation with plaque scoring and lithoplasty do not debulk calcium but are able to increase vessel permeability, drug absorption, and patency rate.
- Lesion preparation with plaque modification methods (non-conventional balloon) may further improve technical success and long-term outcomes in complex settings.
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