Vessel preparation options when stenting is not an option in the popliteal artery

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Disclosure

Speaker name:
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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 related to this presentation
Calcified Nodules Projecting into the Popliteal Artery Successfully Treated Through the Use of Myocardial Biopsy Forceps

Takamitsu Shinnada, MD, Tatsunori Goto, MD, Shunsuke Kabe, MD, Seiji Habara, MD, Hiroyuki Tanaka, MD and Kazushige Kadota, MD

Summary

A 60-year-old man on maintenance dialysis underwent endovascular therapy for a refractory wound due to critical limb ischemia in the popliteal and below-knee arteries. Because of bulky calcified nodules projecting into the popliteal artery, conventional balloon angioplasty alone did not seem to provide a sufficient lumen area, and we ablated the calcified nodules by using myocardial biopsy forceps for lesion preparation. Under roadmap guidance, we repeated ablation 29 times to carefully treat off the bulky calcified nodules, and subsequently performed balloon angioplasty in the popliteal artery. Neither time-limiting dissection nor perforation occurred, and a sufficient lumen area was obtained. After treatment of the popliteal artery, conventional endovascular therapy was performed in the below-knee arteries. One month later, the wound was fully epithelialized. We report a case of critical limb ischemia with calcified nodules projecting into the popliteal artery, in which the use of myocardial biopsy forceps led to good results.

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Endovascular Management of the Popliteal Artery: Comparison of Atherectomy and Angioplasty

Elie Semaan, MD,1 Naomi Hamburg, MD,2 Wael Nasr, MD,1 Palma Shaw, MD,1 Robert Eberhardt, MD,2 Jonathan Woodson, MD,1 Gheorghe Doros, PhD,3 Denis Rybin, MS,3 and Alik Farber, MD1
Atherectomy vs. PTA

56 patients (77% critical limb ischemia)
  Angioplasty n=38
  Atherectomy n=18

Similar clinical characteristics, TASC II classification, mean lesion length, and run-off scores

Trend toward higher rates of technical success after atherectomy (94% vs 71%, p=.08)
Atherectomy vs. PTA

Angioplasty:
- More arterial dissection (23% vs 0%, p=.003)
- More adjunctive stenting (45% vs 6%, p=.005)

Atherectomy:
- More thromboembolic events (22% vs 0%, p=0.01)

Improvement in ABI, primary patency, limb salvage and fTLR similar
Clinical Investigation

One-Year Outcomes Following Directional Atherectomy of Popliteal Artery Lesions: Subgroup Analysis of the Prospective, Multicenter DEFINITIVE LE Trial

Aljoscha Rastan, MD1, James F. McKinsey, MD2, Lawrence A. Garcia, MD3, Krishna J. Rocha-Singh, MD4, Michael R. Jaff, DO5, Stuart Harlin, MD6, Suraj Kamat, MD7, Sean Janzer, MD8, and Thomas Zeller, MD1
Atherectomy

158 patients, 162 popliteal artery lesions

- Intermittent claudication 69.6%
- CLI 30.4%

Mean lesion length $5.8 \pm 3.9$ cm; 23.5% occlusions

Procedure success ($\leq 30\%$ residual stenosis) 84.4%
Atherectomy

Adjunctive stenting 3.7%

Complications
- Abrupt closure 2.5%
- Distal embolization 5.7%
- Flow limiting dissections 1.9%
Atherectomy

1-year primary patency rate 75.0%
   IC patients 78.2%
   CLI patients 67.5% (p=0.118)

Freedom from major amputation in both cohorts was 100%

Significant improvements at 1 year in the Rutherford category, walking distance, and quality of life (both IC and CLI)
Clinical Investigation

Combined Directional Atherectomy and Drug-Eluting Balloon Angioplasty for Isolated Popliteal Artery Lesions in Patients With Peripheral Artery Disease

Konstantinos Stavroulakis, MD\textsuperscript{1,2}, Theodosios Bisdas, MD\textsuperscript{1,2}, Giovanni Torsello, MD\textsuperscript{1,2}, Arne Stachmann, MD\textsuperscript{1,2}, and Arne Schwindt, MD\textsuperscript{1,2}
Atherectomy and DCB

21 patients (85% intermittent claudication, Rutherford class 3)
Atherectomy and DCB angioplasty (IN.PACT Admiral/Pacific n=15, Freeway n=6)
Mean lesion length $34.2 \pm 22.3$ mm.
All cases with embolic protection device
Technical success 90%
Atherectomy and DCB

Complication rate 15%
- Bail-out stenting for dissection n=1
- Popliteal perforation n=1
- False aneurysm puncture site n=2

Primary patency
- 1 year 95%
- 18 months 90%

Secondary patency 100% (TLR 10%)
Atherectomy and DCB

Combined therapy of DA and DCB angioplasty for popliteal artery lesions showed promising midterm performance. Combination of DA and DCB may overcome the challenges presented by the mobility of the knee joint.
Clinical Investigation

Directional Atherectomy With Antirestenotic Therapy vs Drug-Coated Balloon Angioplasty Alone for Isolated Popliteal Artery Lesions

Konstantinos Stavroulakis, MD1,2, Arne Schwindt, MD1,2, Giovanni Torsello, MD, PhD1,2, Arne Stachmann1,2, Christiane Hericks1,2, Michel J. Bosiers, MD1,2, Efthymios Beropoulos, MD1,2, Stefan Stahlhoff, MD1,2, and Theodosios Bisdas, MD1,2
DAART vs. DCB

72 symptomatic patients with isolated popliteal lesions
  DAART n=41 (5 restenotic lesions; total occlusion 44%)
  DCB n=31 (3 restenotic lesions; total occlusion 36%)
Similar ‘calcium score’
DAART vs. DCB

RCC3 81%, RCC4 8%, RCC5 11%

Atherectomy devices used: TurboHawk, SilverHawk, Panteris and HawkOne

DCB’s used: IN.PACT Admiral/Pacific, Freeway, Lutonix and Passeo Lux
DAART vs. DCB

Technical success

DAART group 93%
DCB group 84%

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<tr>
<th></th>
<th>DCB</th>
<th>DAART</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Primary patency</td>
<td>65%</td>
<td>82%</td>
<td>0.021</td>
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<tr>
<td>fTLR</td>
<td>82%</td>
<td>94%</td>
<td>0.07</td>
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DAART vs. DCB

Complications

- Distal embolization DCB n=1, DAART n=2 (p=0.99)
- Arterial injury DAART n=2 (p=0.5)
- False aneurysm DCB n=1, DAART n=2
- Popliteal aneurysm formation DAART only (n=3, 7%)  

Greater need bail-out stenting in DCB group (but NSS)
DAART
DAART

Explanation aneurysm formation: synergic action of paclitaxel and DA
Minor injuries of the arterial wall during plaque excision could increase the toxicity of paclitaxel and deep injury of the adventitial layer should be avoided
New technologies

VascuTrak (BD)
Serranator Alto PTA Serration Balloon Catheter (Cagent Vascular)
Flex VP System (VentureMed Group)
Optical coherence tomography guided directional atherectomy
Orbital atherectomy
New technologies

No specific data for popliteal artery available (only fem-pop)
Conclusion

Vessel-preparation, especially when combined with anti-restenotic therapy, is a valid option for treatment of steno-occlusive popliteal disease.

When using atherectomy meticulous technique is needed to avoid long-term aneurysmal complications.
Vessel preparation options when stenting is not an option in the popliteal artery

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