Implications of the wound related artery concept for BTK revascularization strategies: When and how to do pedal interventions?

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Disclosure

Roberto Ferraresi, MD

I have the following potential conflicts of interest to report: consulting, travel reimbursement, teaching courses, training, proctoring:

• Medtronic
• Boston Scientific
• Abbott
• LimFlow
• Terumo
• Cook
• Biotronik
• Asahi
Implications of the wound related artery concept for BTK revascularization strategies: When and how to do pedal interventions?

1. Values & limits of the wound related artery concept

2. Is foot vessel angioplasty useful?

3. Restenosis & stenting in foot vessel angioplasty

4. When and how to do pedal interventions?
Direct revascularization according to the angiosome concept seems to be better than indirect rev. in terms of wound healing and limb salvage.
All of the studies comparing direct and indirect revascularization are retrospective. It is possible that in the “indirect revascularization” groups there was a propensity to collect patients with the most technically challenging disease and the differences in the outcomes may simply reveal basal differences in the extension and type of obstructive disease.
Try to do what is possible and don’t lose time on unrealistic targets!

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It is possible that in the “indirect revascularization” groups there was a propensity to collect patients with the most technically challenging disease and the differences in the outcomes may simply reveal basal differences in the extension and type of obstructive disease.
The value of an angiosome-oriented revascularization is inversely related to the function of collateral vessels.
Results: The wound(s) interfered with one angiosome in only 24.0% cases.

Conclusions: In CLI, the tissue lesion affects several angiosomes in the majority of the cases.
PTA of infrapopliteal arteries: Long-term clinical follow-up and analysis of factors influencing clinical outcome

Jan H. Peregrin · Boris Kožnar · Josef Kováč · Jarmila Laštovičková · Jiří Novotný · Daniel Vedlich · Jelena Sklábová

<table>
<thead>
<tr>
<th>Open BTK vessels</th>
<th>Limb salvage</th>
<th>1 better than 0</th>
<th>2-3 better than 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>56%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>73%</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>80%</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>83%</td>
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</tbody>
</table>

PTA of tibial arteries had a better outcome than PTA of the peroneal artery alone.
Extensive tissue damage cannot be classified on the basis of an angiosome-oriented scheme. In these patients complete rev. better than partial rev
1. Try to do what is possible and don’t lose time on unrealistic targets!

2. Consider the rule of collateral vessel disease/function

3. Complete rev. better than partial rev. in Rutherford 6 pts
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1. Clinical results of below-the-knee intervention using pedal-plantar loop technique for the revascularization of foot arteries

M. Manzi, M. Fusaro, T. Ceccacci, G. Erente, L. Dalla Paola, E. Brocco

J Cardiovasc Surg (Torino) 2009;50:331-7

135 CLI pts treated with the pedal-plantar loop technique

2. Below-the-ankle Angioplasty is a Feasible and Effective Intervention for Critical leg ischaemia

M.F. Abdelhamid, R.S.M. Davies, S. Rai, J.D. Hopkins, M.J. Duddy, R.K. Vohra

Eur J Vasc Endovasc Surg (2010) 39, 762–768

42 cases of BTA angioplasty

3. Subintimal Angioplasty for Below-The-Ankle Arterial Occlusions in Diabetic Patients With Chronic Critical Limb Ischemia

Yue-Qi Zhu, Jun-Gong Zhao, Fang Liu, Jian-Bo Wang, Ying-Sheng Cheng, Ming-Hua Li, Jue Wang, and Jie Li

66 cases of subintimal angioplasty of the dorsalis pedis or plantar arteries
Foot vessel angioplasty in CLI pts is technically feasible and safe, and appears to provide positive clinical results at both acute and mid-term follow-up.
Above-the-ankle PTA

Lesion treatment

It is difficult to separate its effect from the rest of the vascular and surgical treatment
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1. Provisional stent placement in 19 lesions
2. Mean lesion length 4.2 ± 1.4 cm
3. 1 year lesion binary restenosis rate = 64.1%
4. Self-expanding stents presented higher restenosis and poorer primary patency compared to POBA or balloon expandable DES
1. Significant deformation and/or fracture of balloon-expandable stents were identified in 5 of 11

Fig. 4 Lateral foot x-ray shows complete stent collapse in the dorsalis pedis artery. The collapsed stent could not be recanalized, and the patient had to undergo a major amputation.
2. 8 dorsalis pedis lesion treated with coronary BMS due to failed POBA

- 2 yy FU
  - 2/8 acute or subacute stent thrombosis
  - 4/8 symptomatic in-stent restenosis
  - 7/8 stent presented significant deformation of the stent mesh (compression, fracture, subluxation)

**Figure 6** Samples of stent deformity. (A) Partial stent compression, (B) complete stent compression, (C) separate stent fracture, and (D) subluxation stent fracture.
Restenosis after POBA in BTA vessel → No data
26 months of recurrent pain, inability to walk, infections, medications, hospitalizations, multiple “minor” amputations... This is what we call “limb salvage”!
Foot vessels are the cemetery of POBA and stents

When we go BTA the reaction of the vessel will be dramatic in biological and mechanical terms
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We have got a problem!

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Foot vessels are the cemetery of POBA and stents
When we go BTA the reaction of the vessel will be dramatic in biological and mechanical terms

Foot vessel angioplasty has good technical and clinical results
It is difficult to separate its effect from the rest of the vascular and surgical treatment
... a direct blood flow through one tibial artery with a good distal distribution system into the foot vessels can be a good and conclusive result of the revascularization for the majority of the patients and a good distal distribution system must always be respected and, if possible, not touched.

A different situation is the diffuse disease involving the foot vessels (desert foot), where opening the distal distribution system, if possible, becomes essential for wound healing.
Go below-the-ankle:

1. **Clear clinical indications:** RTF 5-6 patients

2. **Clear pathophysiology:** disease of the foot vessels with failure of the foot distribution system

3. **Clear limits:** never touch what is, more or less, functioning
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