Angiosome-targeted isolated tibial angioplasty for healing of ischemic foot ulcer: a retrospective study

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Disclosure

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I do not have any potential conflict of interest
# Importance of the Angiosome Model (AM)

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Series</th>
<th>Clinical success without AM</th>
<th>Clinical success with AM</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neville</td>
<td>2009</td>
<td>Surg</td>
<td>62%</td>
<td>91%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Varela</td>
<td>2010</td>
<td>Surg + Endovasc</td>
<td>73%</td>
<td>92%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Iida</td>
<td>2010</td>
<td>Endovasc</td>
<td>69%</td>
<td>86%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>O’Brien-Irr</td>
<td>2010</td>
<td>Surg</td>
<td>61%</td>
<td>82%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Alexandrescu</td>
<td>2011</td>
<td>Endovasc</td>
<td>67%</td>
<td>86%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Iida</td>
<td>2011</td>
<td>Endovasc</td>
<td>68%</td>
<td>82%</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Blanes</td>
<td>2011</td>
<td>Endovasc</td>
<td>73%</td>
<td>79%</td>
<td>P &gt; 0.05</td>
</tr>
<tr>
<td>Deguchi</td>
<td>2010</td>
<td>Surg</td>
<td>72%</td>
<td>73%</td>
<td>P &gt; 0.05</td>
</tr>
</tbody>
</table>

*Alexandrescu et al. J Cardiovasc Surg 2012; 53:3-12*
Anterior pedal circulation. The major anterior pedal arteries are depicted in anteroposterior (left) and lateral oblique (right) angiographic projections. Anterior pedal angiosomes. Photograph with color overlays shows the dorsum of the foot, which is supplied by the anterior circulation (red), and the first toe (purple), which may be supplied by the anterior circulation via the first dorsal metatarsal artery and by the posterior circulation.

Manzi et al. Radiographics 2011; 31:1623-1636
Posterior pedal circulation. The major posterior pedal arteries are depicted in lateral oblique (left) and anteroposterior (right) angiographic projections.
(a) Lateral oblique angiographic projection shows the bifurcation of the peroneal artery into anterior perforating (arrowheads) and lateral calcaneal (arrows) branches. (b) Photograph with color overlay shows the angiosome of the peroneal artery (green), which includes the lateral regions of the ankle and heel.
Aim of the Work

To evaluate our short term results at Mansoura university (VSD) in angiosome targeted angioplasty for healing of ischaemic foot ulcer
Patients and Methods
This study was conducted in (VSD) at (MUH) enrolling 57 patients presented with CLI due to Infragenicular arterial disease during the period between October 2014 and January 2016.
Inclusion criteria:

- Patients with critical lower limb ischemia Rutherford categories 4, 5, and 6 who have isolated tibial vessels lesions
Exclusion criteria:

• Patient with:
  - Acute on top of chronic ischemia.
  - TASC (D) lesion (occlusion >2cm and/or diffuse disease).
  - Non-salvageable foot.
Technique:

All the cases were approached ipsilaterally.

After sheath insertion 5000 IU heparin IV was given.

Selective angiography of the target arteries was done with a 4F multipurpose diagnostic catheter.

0.018 guide-wire used to pass the infrapopliteal lesion.
• After crossing the lesion, dilation using low-profile balloons was done (2.5,3mm) for tibial arteries.

• Following deflation, completion angiography was done to assess the outcome and angiographic success.
Follow up:

Ranged from 3 to 26 months with a mean of $(21.08 \pm 3.2)$.

Patients were seen at 1, 3, 6 and one year interval.

- Regarding the followings points:
  - a- *clinical improvement*: Rutherford shift
  - B- *Hemodynamic improvement*: ABI
  - C- *Ulcer Healing*
  - D- *Limb salvage*: Absence of major amputation
Case I: peroneal artery angioplasty
A) Preangioplasty CTA showing calcified tibial vessels

B) post-angioplasty CTA dilation of peroneal artery
Post PTA one week with healing granulation tissue
Case II: PTA of the three tibial vessels
Case III: PTA of ostial lesion in ATA
Healing granulation tissue one week post PTA
• **Case IV: PTA of ATA**
Case V: PTA of Posterior tibial artery
(C) One week post (D) complete healing 3 month post PTA
Case VI:
PTA of PTA
Healing granulation one month post PTA
Demographic data

- Female: 40.4%
- Male: 59.6%
# Risk Factors & Co-morbidities

<table>
<thead>
<tr>
<th>Condition</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetics</td>
<td>48</td>
<td>84.2%</td>
</tr>
<tr>
<td>Smoking</td>
<td>23</td>
<td>40.4%</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>18</td>
<td>31.6%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>40</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>15</td>
<td>26.3%</td>
</tr>
<tr>
<td>Renal failure</td>
<td>4</td>
<td>7%</td>
</tr>
</tbody>
</table>
Rutherford categories of studied cases

- Major tissue loss (category 6) 14.0%
- Rest Pain (category 4) 8.8%
- Minor tissue loss (category 5) 77.2%
The mean pre-PTA ABI was 0.54 ± 0.196

and the mean post-PTA ABI was 0.83 ± 0.211. (p = .001)
• 27 legs in the direct angioplasty and 30 legs in the indirect angioplasty groups.

• Limb salvage rates

  Overall 71.8% (41/57)
  Direct angioplasty group 81.7% (22/27)
  Indirect angioplasty group 61.2% (18/30)
  P=0.001
Limb Salvage (2 years follow up)

Groups (Direct, Indirect)
- Indirect
- Direct
- Indirect-censored
- Direct-censored

Rate (%)

Follow up duration (days)
Ulcer Healing (2 years follow-up)
Conclusion

• Angiosome directed angioplasty had superior limb salvage rate in CLI patients (p=0.001)

• The presence of a complete plantar arch is associated with higher limb salvage rate in CLI patients (p=0.012)
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