Angiosomal-Guided Revascularization in CLI

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I have the following potential conflicts of interest to report:

- Consulting: Medtronic, Abbott Vascular
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

☐ I do not have any potential conflict of interest
The Angiosome Concept: The Past

• 1889: the original angiosome concept
  • Manchot: The Skin Arteries of the Body
    • Identified cutaneous vascular territories, perforators, and source vessels on cadavers

• 1930s:
  • Michel Salmon mapped out cutaneous circulation with lead oxide and x-ray confirmation

• 1987:
  • Taylor and Palmer
The Angiosome Concept: The Present

If you ask a cardiologist...

“First we insert a balloon to open the clogged artery, then we fill the balloon with helium so you weigh less.”
Direct in-line flow
Lack of robust microcirculation

Feasibility and end-target vessel
Microcirculation and collaterals
Systematic Review and Meta-analysis of Direct Versus Indirect Angiosomal Revascularisation of Infrapopliteal Arteries

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Angiosome-directed revascularization in patients with critical limb ischemia

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Editor’s Choice — Direct vs. Indirect Angiosomal Revascularisation of Infrapopliteal Arteries, an Updated Systematic Review and Meta-analysis

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Meta-Analyses: Broad Strokes

- DR patients
  - Better wound healing\textsuperscript{1,3}
  - Shorter time to wound healing\textsuperscript{3}
  - Greater limb salvage rates\textsuperscript{1,3}
- No effect on mortality or re-intervention\textsuperscript{1,3}
- Benefits of DR can be replicated in pts with IR in the presence of collaterals\textsuperscript{2}
- Bypass washes out DR/IR trends\textsuperscript{2}

\textsuperscript{1}Bosanquet et al. *Eur J Vasc Endovasc Surg* 2014;48(1):88-97.
\textsuperscript{3}Dilaver et al. *Eur J Vasc Endovasc Surg* 2018;56:834-48.
Data Out
Shortcomings

- Retrospective, nonrandomized, observational studies
  - High level of heterogeneity in the analyses
  - Observational nature: IR patients may have been failed DR pts, with more severe disease
  - Studies association...not causation
- Quality of collaterals not uniformly described
  - IR with good collaterals are different qualitative results compared to IR with poor collaterals

RCTs...
Prospective study

1<sup>st</sup> target = angiosome (DR)
- Secondary target = any other vessel (IR)
- Pts with ≥2 revascularized tibials excluded

n = 212
- 117 (55%) DR, 95 (45%) IR
DR v. IR

- DR
  - Improved wound healing*
  - No difference in
    - Limb salvage
    - AFS

*But recall IR cohort are those who have failed DR first…
  …implies more severe disease in IR group

Randomized single v. multi-vessel revasc

- 1st vessel = easiest to cross with adequate outflow
  - Pedal arch as end target preferred but not required
- If 2 equal vessels, preferred target to angiosome
- n = 80, 1:1 randomization after 1st vessel
- Treated artery(ies) corresponding to angiosome
  - 40% of pts in SV, 75% of pts in MV
SV v. MV

- MV
  - ↓ time to wound healing
  - ↑ AFS
- No difference in wound healing or limb salvage when analyzed to revascularization of corresponding angiosome*

*But that wasn’t the intended randomization… ... nor is it powered for it

Other Considerations

- Bypass surgery
- Wound healing independent of DR v. IR
- Increased post-procedural arterial pressure
- Role of diabetes
- Oftentimes poor collateral circulation
- The "wound blush" is more important

Case Presentation

• 67 yo man with CAD s/p CABG and PCI, AF s/p LAA ligation, DM2, ESRD on HD, severe AS.
• Medications: ASA, Plavix, atorvastatin, metoprolol, amlodipine, and insulin

• Awaiting TAVR in anticipation of listing for renal transplant.
Case Presentation

ABI NC

ABI 0.31
Proceeded with left leg first...

anomalous
AT

?DP
successful retrograde PT and antegrade peroneal reconstruction

couldn’t cross AT antegrade retrograde attempts – spasms...
but now with more DP flow via collaterals
At 4 week follow up:

...but 2 weeks after that:
2\textsuperscript{nd} attempt: changed plan of attack

peroneal patent but
PT now restenosed

Command ES 0.018+CXI
rCART with 2.5 mm
externalized Glide Gold
Chocolate 3.5 mm both AT/PT

re-established hibernating DP and digital flow
Underwent TMA last week:

2 days ago
Thank you!
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