Angiosome Targeted Revascularization Is More Important With Endovascular Repair Than Bypass Surgery

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It is beneficial in terms of wound healing and leg salvage to revascularize the crural vessel leading to the angiosome with tissue lesion.

ANGIOSOME CONSEPT:

The foot can be divided into five angiosomes originating from the three main crural arteries.

Evidence

Endovascular revascularization

1. Iida et al. J Endovasc Ther. 2014: 539 diabetic patients
2. Iida et al 2010: 177 patients
3. Varela et al 2010: 35 patients
5. Söderström et al 2011: 54 patients
6. Söderström et al: 168 patients
7. Fossaceca et al 2013: 201 patients
9. Spillerova et al 2014: 504 patients

1900 patients. In almost all studies wound healing and leg salvage have been better after AS-targeted ER

Surgical bypass

1. Neville et al 2009 43 patients
2. Varela et al 2010 41 patients
3. Azuma et al 2012 228 patients
5. Kabra et al 2013 39 patients
6. Spillerova et al 2014 252 patients

600 patients, results more controversial, wound healing better in angiosome targeted group in most of the studies, leg salvage in some of the studies.


744 infrapopliteal revascularizations 2010-2013
562 endovascular
242 distal bypasses

458 angiosome-targeted
336 non-angiosome targeted

252 propensity score matched pairs

60% diabetic patients. Mean number of affected angiosomes 2.2

Cox proportional hazards model

Propensity score analysis: treatment method was included to the analysis

Endpoints: wound healing, amputation, death

Wound healing

Cox proportional hazards analysis, factors associated with improved wound healing:

Angiosome-targeted revasculation (HR 1.3; 1.12-1.49)
Bypass surgery (HR 1.8; 1.4-2.3)
All patients no angiosome (HR 0.65; 0.45-0.96)

No clinical covariates (HR 0.85; 0.64-1.16)

Propensity score analysis (252 pairs)

Bypass vs. pta HR 1.72 (1.35-2.2)
Leg salvage (252 propensity score matched pairs)

Angiome-targeted revascularization yielded a significantly lower rate of major amputation (HR: 0.66, 0.45-0.90)

When treatment strategy was included, bypass surgery was significantly associated with leg salvage (HR: 0.79; 0.48-1.03)

Highest risk for amputation was seen after non-angiome-targeted angioplasty (HR: 1.8, 1.2-2.7)

When only angiome targeted procedures were included, no difference between bypass or angioplasty in leg salvage was seen, although bypass surgery was associated with better wound healing.

Prospective trial

- Prospective data on wound healing
- Angiograms: revascularization, collaterals, arch
- Perfusion of each foot angiosomes before and after revascularization using ICG-fluorescence imaging

Preliminary results: immediate perfusion improvement in each angiosome

- 6.8. – 11.11.2015: 52 patients with critical leg ischemia
- Mean age 72 years, 72% diabetes, 35% smoking
- Below the knee revascularization to all patients
  - 36 successful endovascular revascularizations
  - Patients in whom open line to the foot was not achieved were excluded
  - 16 surgical bypasses

ICG fluorescence imaging

After injecting ICG, foot image is recorded for 4 minutes

Ingress rate units per sec

Maximize intensity end time

Spy10 = intensity gained during the 10 first seconds

67 years old male, ulcer, atp-recanalization

ICG imaging of the ANGIOSOME which was revascularized directly (ATP)

Ingress 33 iu - 86 iu
Ingress rate 1.5-7.4 iu/sec
Spy 10 15 – 43 iu

Before

After

ABI before and after revascularization

At the baseline, ABI was lower in bypass group
And it increased significantly in both groups
ICG measures describing the change in perfusion before and after the procedure in the angiosome that was directly revascularized and in the angiosome that was indirectly revascularized after bypass and PTA.

**Before and After OR and ET**

In the angiosome recascularized directly, after both bypass and endovascular repair, a significant increase in perfusion was seen. However, in the angiosomes that were indirectly revascularized, the increase was more clear after bypass surgery compared to endovascular repair.

**Significant Increase**

- In the angiosome that was directly recascularized, there was a significant increase in perfusion.
- However, a clear increase, although not as big, was seen also in neighbour angiosomes.
Conclusions

**Angiosome Targeted Revascularization**

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