Multimodal revascularization strategies- the Helsinki approach

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ADJUNCT PROF, VASC SURGEON
Conflicts of interest

- none
The number of all arterial surgical procedures in Helsinki University Hospital during 1971-2017. In 1999 and 2007 smaller hospitals were closed and procedures were centralized to HUH, which explains the rapid increase at 1999-2000 and 2007-2008.
All patients treated by vascular surgeons, 30-50 ward places
18 consultants, 4+4 in training
2 hybrid theatres
Weekly: 8 hybrid tables, 13 elective altogether + >1 on call 24/7

Good collaboration with angioradiology, procedures together or separate
Vascular surgeons in angiolab 2 tables / week + consultations (4 suites)
Angioradiologist 24/7

No angiography, internal medicine joins ward rounds

Tissue coverage with plastic surgeons

Vascular laboratory run by surgeons

DM foot team and educated nurses

University level wound care center
> 6000 toe pressures / year (ca 35 / day)

**Pressure values and ABI/TBI**

<table>
<thead>
<tr>
<th>Ankle Right</th>
<th>Arm</th>
<th>Ankle Left</th>
<th>Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>Mean</td>
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<tr>
<td>Right Ankle</td>
<td>33</td>
<td>33</td>
<td>33</td>
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<td>152</td>
</tr>
<tr>
<td>Arm [ANKLE]</td>
<td>132</td>
<td>152</td>
<td>142</td>
</tr>
<tr>
<td>Left Ankle</td>
<td>55</td>
<td>51</td>
<td>53</td>
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<tr>
<td>Arm [TOE]</td>
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</tbody>
</table>

- **ABI**
  - (Arm) Mean
  - Right Ankle 0.22
  - Left Ankle 0.35

- **Toe Right**
  - 2 Mean
  - Right toe 27

- **TBI**
  - (Arm) Mean
  - Right toe 0.18

**PVR**

- **PVR Right**
- **PVR Left**

**Notes**

molemmista jaloista mitä 2 varpaasta.
Transcutaneous O$_2$ pressure (tcpO$_2$)
ICG studies:

Basic review 2012
Quantification of foot perfusion 2013
Repeatability 2016
Revascularization quality control 2017
Follow-up after revascularisation 2018
Vascular imaging – Helsinki opinion

MRA > CTA > DSA > US

“It takes 30s to perform a CTA, but 30min to interpret it, with MRA it is the other way around”

Kimmo Lappalainen, head of angioradiology, HUH

Contrast induced nephropathy is a real thing for CT, not for MRA
We never see systemic fibrosis
Treatment – á la carte

Open Surgery

HYBRID

Endovascular
Angiosome targeted treatment is important in endovascular, less so in open surgery

Figure 1. Cox proportional hazards analysis adjusted for number of affected angiosomes

Figure 2. Cox proportional hazards analysis on leg salvage adjusted for number of haemodialysis (p = .04).

Spillerova 2017 EJVES
Spillerova 2015 EJVES
Söderström 2013 JVS
Hybrid theatres since 2003
Today 1 Zeego, 1 Pheno and 2-3 c-arms
8 hybrid tables /week
<table>
<thead>
<tr>
<th>Year</th>
<th>ATA/ATP prox</th>
<th>ATA/ATP dist</th>
<th>Peroneal</th>
<th>ADP</th>
<th>Aplant</th>
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<td>2015</td>
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<td>20</td>
<td>16</td>
<td>22</td>
<td>7</td>
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</tbody>
</table>

102 115 128 110 (120)
Bypass, incl arm veins, mapping+ tumescence
“spliced vein graft”
Femorotibial (distal ATA) bypass with GSV ex situ...

... and microvascular free flap transfer (LD)