Perfusion angiography: towards new standards for optimized treatment outcomes

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I have the following potential conflicts of interest to report:

- [x] Consulting: Philips
- [ ] 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 CLI dilemma

Endovascular treatment of CLI has been shown to be effective in preventing amputation
The CLI dilemma

However:

• vessel patency is not always a predictor for clinical outcome and vice versa

• No methods to determine whether recanalization will be sufficient to resolve rest pain or achieve wound healing

• Optimal angiographic end point for limb salvage is not yet clear

• The angiosome and wound blush concept give some guidance, but are controversial
The CLI dilemma

Need to assess the perfusion restoration in the foot preferably in an Objective and Quantitative manner
Perfusion Angiography and Time Density Curve

The total contrast distribution of a DSA run is displayed in one color coded image.

The redistribution of arterial flow to the region of interest visualized in a time density curve.
Image acquisition REPEAT STUDY

$T_0$  $T_0 + 5 \text{ min}$  Intervention  $T_{\text{end}}$  $T_{\text{end}} + 10 \text{ min}$
Aim of the REPEAT STUDY

Reproducibility of acquisition

Reliability of measurements

Correlation with clinical outcome
Reproducibility Statistics

- Normalized root mean square error
  - $NRMSE \leq 0.10 = \text{reproducible}$

$$NRMSE = \frac{\sqrt{\sum (TDC_{1i} - TDC_{2i})^2}}{TDC_{max}} / n$$
Reproducibility Results

- 11 patients included
- 91% reproducible

NRMSE
SmartPerfusion - smart alignment

Guided Positioning

- Guided positioning for standardization of pre-and post-comparison runs
- Guidance for positioning system and anatomy
- Visualize and store catheter position to standardize injection placement for accurate comparisons
Smartperfusion

Perfusion angiography software supporting determination of treatment endpoint
Conclusions

• With perfusion angiography reproducible and instant information on foot perfusion can be obtained

• Perfusion angiography could be helpful in treating CLI patients but more research is needed to prove its added value

• SmartPerfusion provides guided positioning to standardize pre- and post-comparison runs
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