The advantages of using perfusion angiography during CLI procedures

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Disclosure

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I have the following potential conflicts of interest to report:

☑ Consulting for Philips IGT
CLI procedures

• Can be extremely challenging
• Demanding for patient and operator
• No clear objective endpoint for a successful revascularization procedure
CLI procedures

The angiosome and woundblush concept offer some guidance but are controversial
CLI procedures

- Need for an objective endpoint to define optimal result of revascularization procedure
- Correlation with clinical outcome
Perfusion Angiography

- Is based on standardized foot angiography
- Measures the total foot perfusion (TFP)
- Provides objective measurements
- Pre and post revascularization
Basics of Perfusion Angiography

T1 + T2 + T3 → 2D Perfusion color map

Legend
- Horizontal axis: Time
- Vertical axis: Density
- 1. Arrival Time
- 2. Time to Peak
- 3. Wash-in Rate
- 4. Width
- 5. Area Under Curve
- 6. Mean Transit Time

Time-density curve
Standardized Acquisition protocol

- Foot immobilized in dedicated foot rest
- Tip of sheath at P2 (55cm)
- Injector settings: 450 PSI, 9ml 3ml/sec
- High density contrast 320
- Pre and post revascularization runs in identical angulations
SmartPerfusion software

- The **smart alignment tool** helps to obtain the exact same angulations, table position and SID even after long procedures and foot movements.

- Table side usage, instant results
Preliminary results REPEAT trial

Peak Density (PD), Time To Peak (TTP) and Mean Transit Time (MTT) are reproducible with less than 10% variation.

T0

T0 + 5 min
Preliminary results pilot study

- Incision criteria
  - RBC 4 and 5
  - Below the knee disease
  - Endovascular revascularization

- End point
  - Peak Density improvement defined as > 20%
  - Clinical improvement at 3 months RBC > 2
Preliminary results pilot study

• Results
  • 41 patients
  • 17/41 ≥ 2 RBC scales at 3 months, 9 > 20% increase in PD
  • 24/41 < 2 RBC at 3 months, 16 < 20% increase in PD
  • A threshold of > 20% increase in PD has an odds ratio of 2.25 for positive clinical outcome at 3 months
Possible algorithm in CLI

Baseline DSA including PA

Revascularization of 1\textsuperscript{st} tibial

Repeat PA

Increase in PD >20% → Consider end of procedure

Increase in PD <20% → Repeat PA

Revascularization of 2\textsuperscript{nd} tibial

Increase in PD >20%

Increase in PD <20%
Conclusions

• PA provides objective and reproducible end points for CLI revascularizations
• A threshold of >20% increase in PD has an odds ratio of 2.25 for positive clinical outcome at 3 months
Conclusions

• PA is a promising tool for defining a revascularization endpoint in CLI
• Further research is required to optimize the treatment algorithm
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