2D Perfusion imaging to assess the result of BTK interventions

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Disclosure

Speaker name: Shinya Sasaki, MD.

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s): PHILIPS

- I do not have any potential conflict of interest
Background - Endpoint of BK EVT

Classical method which is instantly available during procedure

- 1 straight line
- Angiosome
Endpoint after BK EVT

✓ Is the **Angiosome Concept** Fact or Fiction?

✅ FACT

✅ Fiction

Novel Endpoint after BK EVT

Enough blood (contrast) around wound = Wound Blush

Utsunomiya et al. JVS 2012: 55; 113-21
Novel Endpoint after BK EVT

✓ Vascular Flow Reserve (VFR)

Fukunaga et al.
Circ Cardiovasc Interv. 2015;8:e002412.
Endpoint after BK EVT

✓ Indigo carmine angiography

## Comparing New Methods

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<th>Limitation of Adaptation</th>
<th>Visual impact</th>
<th>Quantitative evaluation</th>
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<td>Wound Blush</td>
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2D Perfusion
Philips Volcano is tackling the PAD challenge head on

2D Perfusion imaging technology

Perfusion Imaging is a software product that provides functional information about tissues perfusion based on a digital subtraction angiography (DSA).

Provides interventionalists an objective understanding of the impact of their treatment to help determine the outcome of perfusion procedures.
Workflow and parameters

The time-density parameters are defined as follows:

1. **Arrival time**: Time from start of the measurement till the start of the contrast uptake. Provides a ratio of pre and post treatment velocity changes and a gross upper estimate of blood velocity from point of contrast injection to ROI if approximate distance between points are measured (e.g. external lead tape)

2. **Time to peak**: Reflects the flow rate of the bulk of the contrast (compared to fastest contrast in arrival time measure); shorter TTPs suggest higher flow rates

3. **Wash in rate**: Represents the steepness of the slope of the wash in curve

4. **Width**: Metric of duration of average contrast passage time. Larger widths (longer mean transit times) suggest slower passage of flow in and out of a region of interest

5. **Area under curve**: When the total amount of contrast is constant in a region of interest, it can be used to estimate volumetric blood flow

6. **Mean transit time**: Similar to width parameter, but taking asymmetry into account
Only Take Angio@Pre & Post EVT
Get 6 way of figures

1. Arrival Time
2. Time to Peak
3. Wash in Rate
4. Width
5. Area Under Curve
6. Mean Transit Time

Time density curve
Quantitative Evaluation

Selected Parameter: Arrival Time

Average: 4.3 s
Average Mirror: 7.1 s
# Comparing New Methods

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What do we do globally
Clinical research studies

Current peer-reviewed publications:
2013. Neuro. Levitt et. al. **Real-Time Assessment of Endovascular Treatment for Cerebral Vasospasm** *J Neuro*
2014. Methodology for CLI. Jens et. al. **Perfusion Angiography of the Foot in Patients with Critical Limb Ischemia** *CIR*
2015. Drug challenge: Reekers et. al. **Functional Imaging of the Foot with Perfusion Angiography in Critical Limb Ischemia** *SPA*
2016. Technical Considerations and Initial Analysis : Murray et. al. **Two-Dimensional Perfusion Angiography of the Foot** *PALI*
Take Home Message

✓ **Endpoint of BK EVT** is still uncertain.

✓ Stability, visual impact, and digitizing are important issue for identification.

✓ **2D perfusion** satisfies ALL requirements.

✓ The **optimal parameter** and **cutoff** are still unclear.
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