Role of IVUS within a “Treat Optimally” Algorithm of Care

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Disclosure

• Consultant / Speaker / Proctor / Advisory Board
  – Bayer
  – Bolton
  – Boston Scientific
  – Cook
  – Medtronic
  – Shockwave Medical
  – Philips
  – W.L. Gore & Associates
Background

- DSA is still considered the gold standard image modality for the evaluation of the peripheral vessels.
- The correct degree of stenosis can not be assessed with DSA.
- Bidimensional image visualization of DSA.
- Percent stenosis depends on the angle of image intensifier and x-ray tube.
- Only one vessel diameter can be assessed with DSA.
- In case of obstruction definition of endoluminal or extraluminal recanalization is not always possible with DSA.
- Volcano IVUS provides a 360 cross-sectional real-time view that improves the evaluation of the peripheral vessels and of the aorta.
IVUS Advantages

- Exact length measurements «pull back method»
- Luminal diameter evaluation and cross-sectional area
- Vessel morphology (plaque, thrombus, calcium)
- Wall thickness
- Degree of stenosis
- Lesion type (Virtual Histology: fibrous vs. calcific)
- Treatment guidance
- Quick and accurate determination of true and false lumen
- Improved alignment of the stent-graft with the renal arteries
- Reduction of contrast media
- Guide for correct stent deployment
52 pts. 71 limbs

Aorto-iliac occlusive disease treated with angioplasty and primary stenting

36 pts. 49 limbs DSA+IVUS
16 pts. 22 limbs DSA
Kaplan Meyer evaluation Primary Patency

3Y: 100% (IVUS) - 82% (DSA)

6y: 100% (IVUS) - 69% (DSA)  \(p<.001\)

Secondary intervention: 5/22 limbs (23%)  DSA
Diameter evaluation
What can you see through IVUS eyes?

**Vessel size**
- Vessel diameter
- Lumen diameter
- Plaque burden

**Benefits of understanding vessel size**
Guides device sizing to ensure precise wall apposition, drug delivery, and placement.

**Plaque morphology**
- Soft
- Fibrotic
- Calcific
- Thrombus
- CTOs

**Benefits of understanding plaque morphology**
Understand plaque type and severity to help guide proper device selection.

**Plaque geometry**
- Eccentric
- Concentric

**Benefits of understanding plaque geometry**
Visualize plaque burden location for precise treatment.

**Guidewire position**
- True lumen
- Sub-intimal

**Benefits of understanding guidewire position**
Confirm true lumen or sub-intimal guidewire location.
Flow Evaluation
before treatment

Vision PV .014 catheter
Philips
Post
3.0mm Stellarex
(Philips)

Eagle Eye catheter
Philips
Visions PV catheters

• Only full suite of advanced imaging catheters

ChromaFlo
Highlights blood flow red for easy assessment of stent apposition, lumen size and more. Helps identify branches, dissections and plaque in bifurcations.

VH IVUS
Colorized tissue map of plaque composition with automated lumen and vessel measurements. Proprietary spectral analysis technique to classify plaque into 4 tissue types.
Plaque Geometry

Heavy calcified lesion (grade 4 b) SFA

Pre

Post Lithoplasty

Vision PV .018 catheter
Philips
IVUS changed treatment plans in 79% of cases

67 y M

Diabetic, Hypertension, Ex smoker

Previous PTA + stent Rt SFA

Rt severe claudication (<50 mt)
5 mm PTA

Vision PV .018 catheter
Philips

6 mm Stellarex
(Philips)

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Eagle Eye catheter - Philips
Stellarex DCB
Ø 5 mm
(Philips)

Vision PV .018 catheter
Philips
Conclusions

- IVUS can be considered a valid tool in daily activity
- As interventional procedures are becoming increasingly complex, success is related to the degree of accuracy or to the guiding system employed
- IVUS gives a more precise evaluation of the peripheral arterial diseased segment
- It offers an objective assessment of plaque morphology
- It can improve the technical success of all endovascular procedures
- The role of IVUS is to «guide» peripheral interventions
- Complete integration with other devices, especially re-entry devices