Imaging, it’s central role in planning and guiding intervention

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• IMPORTANT INFORMATION: These materials are intended to describe common clinical considerations and procedural steps for the on-label use of referenced technologies as well as current standards of care for certain conditions. Of course, patients and their medical circumstances vary, so the clinical considerations and procedural steps described may not be appropriate for every patient or case. As always, decisions surrounding patient care depend on the physician’s professional judgment in light of all available information for the case at hand.

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Disclosure

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I have the following potential conflicts of interest to report:

- Consulting: Boston Scientific, Bard Medical, Cook Medical, Terumo, Jotec.
• Stenting of iliac venous obstructive lesions may provide an important clinical benefit with a low risk of complications

• To achieve successful treatment and maintain clinical benefits over time, several key points must be evaluated on basis of imaging test
Planning

• Vein **access site selection**

• Assessment incoming **Inflow**

• **Outflow** evaluation:

  Patency of the inferior vena cava

  Is the inferior vena cava disease-free or should it also be treated?

  Is the contralateral axis venous flow compromised? Is it also diseased?
Proper imaging techniques allow:

- **Extent** of the lesions
  
  “healthy to a healthy vein”

- **Correct sizing** (balloons and stents)

- **Confirm good stent deployment**

- **Ensure sufficient stent overlap** if necessary
Duplex Ultrasound

- **1st test** (acute DVT, CTO, NIVL)
- Global vision extension of disease
- **Inflow** (femoral, deep femoral, and CFV)
- **Outflow** (IVC patency, anatomic variations)
**Duplex Ultrasound**

**Direct signs**

- Lumen changes (thrombus..)
- Caliper reductions
- Trans stenotic flow velocity ratio increments (>2,5)

Indirect signs:

- Reverse flow in IIV or deep pudendal V
- Cephalad flow in epigastric V
- Nonphasic flow in the CFV
- Asymmetrical flow pattern in CFV
- Nonphasic flow during Valsalva
- No velocity augmentation in CFV during distal compression
- Detection of collateral veins

CT-Venography

- IVC status
- Collateral and internal iliac veins
- Iliac / renal vein compression
- Non-diagnosed malignancy
CT-Venography

- Delayed portal phase
- Factors influencing (cardiac output...)
- Acute DVT / NiVL
- Overlook intraluminal lesions
CT-Venography

- Direct CTV
- Post Thrombotic Chronic Cases
- Excellent detail
- Essential tool in planning CTO
MR-Venography

- No radiation
- Good images
- Operator dependent
- Overestimate stenotic lesions
Phlebography

- Visualization of patent vein
- Estimation blood flow rhythm
- MULTIPLANAR
- Cone –Beam or Dyna CT Techniques
- If available it should be supplemented with IVUS
Phlebography
Phlebography
• High-res examination of the vein wall and internal structure

• Detection and qualitative characterization of lesions

• Extent of diseased segments

• NIVL

• True gold standard
• Wall thickness
• Intraluminal irregularities
• Wall movement in respiratory and cardiac cycles
IVUS

- Sizing balloons and stents
- Assess correct stent deployment
- Final aspect after implantation

• Flow resistance decreases with the more circular shape of the vessel and stent
• Aspect Ratio = Maximum Diameter / Minimum Diameter.
• Greater AR values = greater flow resistance and flow reduction.
Message to take home

• Planning !!!

• Inflow

• Outflow

• Treat all lesions
  “healthy to a healthy vein”

• Sizing

• Rounder Shape
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