The role of surgery in the management of deep vein obstructions

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Introduction

PTA & stenting are quickly gaining popularity in deep venous obstructive disease

- Results in ilio-caval disease are excellent (> 85%)

- Treatment in CFV obstruction remains controversial

  - **Stenting alone does not secure** outflow from the DFV, FV and GSV into the stented iliac tract !!
Treatment options in DVO

- Improved inflow measures
- Definitive
  - Endophlebectomy (CFV involvement)
Treatment options in DVO

- Improved inflow measures when CFV involvement on MRV
Improved inflow measures
CFV endophlebectomy

Secure inflow from the GSV, FV and DFV !!
First series:

- 84 Patients
- Patients with
  - CEAP C4-6
  - Severe venous claudication
- Diagnosis of occlusion/obstruction
  - Duplex ultrasound
  - Magnetic Resonance Venography
  - Per-procedural venography
- Patency control
  - Duplex ultrasound
Patency rate after Hybrid (n= 84 (PTA and stenting)) OP’s :
QoL improvement after Hybrid stenting in PTS: Veines QoL-Sym

Δ > 6 is clinically significant!
Complications

- **Wound problems**
  - Hematoma (17%)
  - Lymph-leakage (40%)
  - Infection (31% (gr 1 and 2))

- All temporary (max 6 weeks) problems

(PREVENA® KCI)
Complications

- Patency
  - Stent related
    - Tapering
    - Compression
    - Kinking
    - Straithening
  - Inflow related
    - AVF geometry
    - Inflow vessel (FV, DFV, GSV)
    - Endophlebectomy collapse

Flexibility ++

New Sinus Venous nitinol stent

Radial force ++

European Venous Centre; Aachen-Maastricht
New Sinus-Venous (SV) stent (n=21) vs Old design stents (AS) (matched n=21): In Hybrid procedures

Arterial stents vs Sinus Venous for PTS with Endophlebectomy and AV-fistula

SV secondary
SV assisted primary
SV primary
AS secondary
AS assisted primary
AS primary

+ 15 %
Complications

- Patency
  - Stent related
    - Tapering
    - Compression
    - Kinking
    - Straithening
  - Inflow related
    - AVF geometry
    - Inflow vessel (FV, DFV, GSV)
    - Endophlebectomy collaps
Geometry of AV-fistula

Lateral view after recanalization with endophlebectomy of CFV
Influence AV fistula geometry:

Patency: Trent
Cranial > Caudal
Complications

- **Patency**
  - **Stent related**
    - Tapering
    - Compression
    - Kinking
    - Straighthening
  - **Inflow related**
    - AVF geometry
    - Endophlebectomy collaps
    - Inflow vessel (FV,DFV,GSV)

20% needed stenting of the endophlebectomy segment after 6 weeks before AVF closure due to stenosis of the segment. This is the most important cause for the difference between the primary and assisted primary patency. (Stent elongation)

A venous inlay is developed to prevent collaps of the endophlebectomy segment.
Complications

- Patency
  - Stent related
    - Tapering
    - Compression
    - Kinking
    - Straithening
  - Inflow related
    - AVF geometry
    - Endophlebectomy collaps
    - Inflow vessel (FV, DFV, GSV)

8 (10%) of the patients showed a bad inflow in the endophlebectomy segment and were stented into a single inflow vessel (FV, DFV or GSV) with a of 63% patency after a mean follow up of 147 days.

A primary stenting into a single inflow vessel might be considered and prevent an endophlebectomy.
Conclusion

- Endophlebectomy is safe and successful method with still a lot of temporary complications, but an assisted primary patency of around 90% with dedicated venous stents is very good.
- Re-occlusions do not decrease the QoL!!
- Solutions for the identified problems can improve the outcome even further:
  - Inlay
  - AVF improvement
  - Other flow augmentation methods
  - Anticoagulation
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