Case of combined NIVL and PTS stenting

Courtesy of Mr. Stephen Black

United kingdom
25 y/o female

2011: Conservatively treated ilio-femoral DVT

2013-2015:
• Increasing c/o pain and swelling despite using adequate BK compression stockings.
• On gabapentin to control pain
• Known family history of AT III deficiency and verified in patient.
Initial venogram

- A soft hydrophilic guidewire (0.035”) is inserted under ultrasound guidance in the femoral vein mid-thigh.
- The cannula is replaced by a #9 sheath.
- An initial venogram is performed through the sheath.
- A power injector and subtraction technique was utilized.
- 20ml at 8ml/s contrast dye, pressure 900 psi.

AP Venogram
Intravascular Ultrasound – (IVUS)

Initial IVUS - (left side) Images from IVC to femoral vein acquired during pullback
Central non-thrombotic iliac vein lesion (NIVL) >50%

Green - CIV stenosis at vessel-crossing, focal, normal wall – NIVL

Blue – reference “normal” vein just central to the inflow of the int. iliac vein

Area % stenosis = (114.0 - 42.2 / 114) x 100 = 63%
Min diam % = (9.5 - 3.6 / 9.5) x 100 = 62%
Postthrombotic occlusion EIV and CFV

Occluded EIV
Area % stenosis = 100%
Min diam % = 100%

Size of patent distal CFV
Min diam = 7.6mm
Max diam = 13.6 mm
Area 85.7 mm²
Sizing of the Stent

Assess the diameter of the “normal” vein:
Take the average of the 2 diameters of the “normal”
For example $14.1 + 9.5 = 23.5/2 = \text{appr. } 12$;

Select a stent diameter at least 2 mm larger than the surrounding “normal” vessel.

“Normal” CIV
Max diam 14.1 mm
Min diam 9.5 mm
Area 114 mm$^2$

“Normal” CFV
Max diam 13.6 mm
Min diam 7.6 mm
Area 86.7 mm$^2$
Identifying Central “Landing Zone”

Stenting from centrum to periphery
Starting >5mm central to lesion
Identifying Peripheral “Landing Zone”

Pre-dilation IVUS

Occluded Proximal CFV

Stent lower limit
Deciding the Length of the Stent System

**With venogram**
May need several injections
Contralateral CFV injection
Oblique views

**With IVUS**
Use the cm marking on the IVUS catheter to indicate extent of stenting
Use IVUS head for exact positioning

The stent system should be at least 1 cm longer than the lesion (5 mm centrally and 5 mm peripherally).
Plan the number and length of the individual stents.

Appr. 24 cm on the IVUS catheter
Pre-dilation

- Directly to final size balloon
- In stages with increasingly larger balloons
- Keep highest inflation pressure until pressure stable

12-16 mm high-pressure balloon
Stent Placement

- An Over-The-Wire system
  - 0.035 in. (0.89 mm) guidewires
  - 9 French introducer sheath

- Loosen the valve of the RHV.

- Magnify the central “landing zone”.

- Start deploying stent above intended level to “Martini-glass” formation by securing the shaft hub and retract the RHV.

- Pull back the device to appropriate level and fully deploy.
Stent Deployment

“Martini-glass” able to pull down

“Wine-glass” committed

The VICI Venous Stent System cannot be re-captured!
Stent Deployment

“Martini-glass” able to pull down

“Wine-glass” committed

The VICI Venous Stent System cannot be re-captured!
This particular patient required three stents to adequately cover the lesion. Other patients may require more or fewer stents to adequately cover their lesion(s).

Notice the expected foreshortening of 10-20% of the stent length at delivery as compared to the stent length when restrained in the delivery sheath.
Middle and Lower Stent Placement and Dilation

If using >1 stent, the stents should overlap by at least 1 cm. (notice expected foreshortening from sheath to full deployment)

Deployment of the middle stent

Deployment and dilation of lower stent
Final IVUS –
Following stent placement and balloon dilation

IVC
IVUS – Lower end of stent

End of Stent
Final Venography

Before Stenting

After Stenting

16mm Vici Venous Stent 120mm, 120mm and 90mm
Post-op DUS
Post-op DUS - grayscale

Longitudinal

Transverse
Post-op DUS - colorflow

Mid-stent

Central stent to IVC
One year follow-up

- No swelling, no pain.
- Does not use compression stocking or pain medication.
- No secondary intervention.
- Maintained on Rivoxarban.
- Annual DUS follow-up planned.
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