Is Venous Stenting Safe Below the Inguinal Ligament?

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Iliac venous obstruction- who cares?

- Landmark study by O’Donnell/Browse 1977
- Purely IF DVT
- At 5 years most could not walk properly
- At 10 years
  - 50% had ulcers
  - 11 of 12 men were disabled and unable to maintain a steady job because of their leg symptoms
  - “”7 of 9 women were unable to perform household duties””

How common is this problem:

- 300-500,00 new DVTs per annum in Europe
- Say 1/3 Ilio-femoral =100- 166,000 IF DVTs pa
- Recanalisation with AC alone 24-36% - say 1/3
- So between 66,000 and 104,000 new iliac stenoses or occlusions per annum
- After 10 years 660,000 to 1,000,000 cases Iliac occlusion
Most of us learned arterial intervention-angiograms/angioplasty/stents/EVAR

Central venous access was the start of my venous exposure

Graduated to dialysis intervention

Venous stent placement in outflow of AVF

IVC filters

Eventually preformed catheter directed thrombolysis for acute IF DVT

Learned that veins don’t stay open without stents!!

Gradual increased exposure to venous disease
• Direct CTV provides much better images
• Direct CTV is difficult if limb swollen
• Indirect CTV more generally applicable, can be done as a follow on to standard CTPA; 150cc at 150s
• More idiot proof
• No matter how inept your colleagues are indirect CTV is hard to screw this up…
• Most MRVs sent to me are poor quality

• Therefore:
  DIRECT CTV for chronic and INDIRECT for acute
  MRV for either IF you are expert

Direct CTV v Indirect CTV v MRV
INDIRECT CTV - Thrombus within L CIV
DIRECT CTV
Perfect delineation of iliac vein compression
MRV- tends to overcall stenosis, but is Radiation free and getting much faster

Easier to miss calcification on MR
Stent from “flow to flow”

• If this means stenting from right atrium to upper PFV- go for it!
Post op-every patient

- Thigh high Class 2 compression stockings
- Pneumatic compression boots overnight
- Colour Doppler US next day
- IF CDUS is OK, then pneumatic compression boots off
- Full anticoagulation before, during and after procedure
- CTV at 6/52; MRV not adequate
Evidence for stenting?

- The patients who fare worst following DVT have a combination of obstruction and reflux
- There is good evidence that relief of obstruction diminishes post thrombotic syndrome (PTS)
Do stents stay open long term?

• Good patency in long term series
• Biggest risk factor for re-occlusion is extent of prior thrombosis and poor inflow
• Active cancer does not seem to be a risk factor for re-occlusion

Neglen JVS 2008 (48), 5: 1255-1261
OSullivan JVIR 2000
Kolbel EJVES 2007
Figure 3. Life-table analysis of patients with acute (---) and chronic (--) symptoms treated by endovascular stent placement.
Stents: Does the inguinal ligament matter? (Neglen)

- 177 limbs stents terminating below Ing. ligament v 316 limbs terminating above
- 54 month follow up: assessment patency by US and venography
- Cumulative secondary patency (CSP) 95% in those which terminated above v 86% below

Slight drop in patency more likely related to poor inflow
What is your ideal stent?

- Big
- Consistent radial hoop strength *from end to end*
- Flexible
- Trackability
- No foreshortening
- ?? Radio-opaque/sheath size/Radio-opacity?
Cook Zilver Vena

- Longer
- Bigger
- Zero foreshortening
- Consistent expansile force over its whole length
Case 1

- 23 y old lady
- Left ilio-femoral DVT at 37 weeks gestation
- Treated conservatively
- Seen at 3/12 post partum with persistent symptoms- leg swelling, venous claudication, weight gain; no ulcers
- CTV at 4 months as follows:
Tiny L External Iliac Vein; HUGE Left Obturator vein
Initial steps:

- No need of IVC filter in chronic setting
- Prone
- Popliteal venous puncture using US
- 5F sheath
- Ascending venography
- Multiple oblique views of occlusion
- Cross it
- Confirm position in IVC

Then:

- Upsize to 9F sheath
- 5000u IV Heparin
- Balloon from 4 to 14mm
- DEEP CONSCIOUS SEDATION OR GENERAL ANAESTHETIC - this is really painful
- Big Long Cook ZV stents
- POST DILATATION TO 14 OR 16mm
Angio
At 7 months Post DVT
PRONE
< Popliteal
Iliac>>

Left
Oblique Iliac
12 month Ultrasound

IVC  CIV  CFV
Case 2

- 18 y old girl
- On low dose OCP for acne
- Studying 10 h per day for exams
- Abd pain x 3/7
- Dysuria
- Admitted St Elsewhere
- L leg swells
- CTV
Plan

- Transfer to Galway
- Filter- Cook Celect
- Trellis/AngioJet to R/L CIV
- CDT to left leg
- Cook ZV to whatever is left- probably kissing iliac stents
Day 3 of CDT
Post Thrombolysis and 14mm PTA

Little improvement

Note narrow L CFV

I had planed to puncture L CFV and do kissing stents

What now?
Stiff Glide wire

Cook ZV 14/140

Superb Tracking
Zero

Fore-shortening
Extreme accuracy
In delivery
Post 14/140mm
Cook ZV stent to L CFV EIV
And 14mm PTA to both areas

What to do with IVC?
Change from stiff to floppy glidewire
Deliberately pull wire back……
While simultaneously deploying 14/140 Cook ZV stent....
Incredible flexibility and accuracy
Minor
IVC stenosis persists, but
overall very satisfactory

Clinically

Leg swelling gone
CDUS day 1 open both sides
Went home
Normal activity now
Galway 3.5 year Cook ZV patency
Patency by US and CTV

- 177 stents
- 94 patients
- 90/94 stented segments patent at 30 days
- 65/69 segments patent at 180 days
- 44/48 segments patent at 1170 days
Common mistakes

- Not performing adequate pre operative imaging- CTV/MRV essential
- Not anti-coagulating before, during and after
- Not using purpose designed stents
- Not ballooning aggressively enough
- Not stenting from flow to flowing- inguinal ligament is irrelevant
- Treating between 6/52 and 6/12 – active phlebitis- avoid

POST OP-
- Pneumatic compression boots x 24h
- Color Doppler US day 1; if clear, boots come off
- Class 2 thigh high compression stockings x 3/12
Venous Stenting is going to grow

• Compared to arterial we need stents that are
  – Purpose designed
  – Large diameter
  – Longer
  – Enhanced radial force
  – Good flexibility
Thank you

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All doctors interested in venous disease are welcome to visit!!
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