Complex Iliocaval Reconstruction: Steel Alloy Stents

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I have the following potential conflicts of interest to report:

- Consulting: Medtronic, Boston Scientific, Philips Volcano
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

I do not have any potential conflict of interest
Complex Reconstruction is Possible
Procedure: Access and Venography

• **Access:** Femoral vein mid-thigh, IJ, popliteal

• **Venogram:** Initial Roadmap
Goal to Transverse Trabeculae

RAJU et al

Procedure: Crossing / Recanalization

Standard glide wire / catheter techniques

Support sheaths as needed
Wire can enter the spinal canal via venous plexus
Procedure: Crossing / Recanalization

Confirm re-entry with venography and free wire movement in the right atrium
IVUS: Landing Zones

IVUS: determine disease extent & stent landing zones
**Proximal Landing Zone**

*Must stent to healthy vein: Ok to cross renal/hepatic veins*

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<tr>
<th>Infrarenal</th>
<th>Suprarenal</th>
<th>Thoracic</th>
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<td><img src="image2.jpg" alt="Image" /></td>
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![Thoracic Image]
Distal Landing Zone

*Must stent to healthy vein: Ok to cross inguinal ligament*

*Required in almost all patients*
Pre-Dilation

- **Important:** Pre-dilation breaks fibrotic lesions prior to stenting

- Large, noncompliant, high pressure balloons
  - IVC – 18 - 24mm
  - Iliofemoral: 16 - 18mm

- Serial Dilation not necessary

- Bleeding complications very rare (low pressure & fibrotic)
IVCFs are the most common cause of IVC occlusion
IVC Filters

Balloon Crush and Stent
IVC Filters

Balloon Crush and Stent

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<th>Optease</th>
<th>Greenfield</th>
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Stenting

- Metal load is not thrombogenic: **Under-stenting is**!
- Adequate Inflow & Outflow determined by IVUS
- Large stents (IVC 20 - 24mm, Iliac 16-18mm) & overlap
Stenting – Steel Alloy Stents

Wallstents & Z-stents
Unilateral Configurations

- **Indications:**
  - Unilateral Symptoms
  - Failed opposite recanalization
  - Surgeon Preference (duration / difficulty)

wall stent

wall stent w/ z-stent @ bifurcation
Conversion to Bilateral Stents

• Can be converted to bilateral stents
• Support fenestration with Z-stent
Bilateral Reconstruction
Case 1: IVC Clip
Case 1: IVC Clip
Case 2: Lymphedema??
Case 2: Lymphedema??
Case 2: Lymphedema??
Endovascular management of chronic total occlusions of the inferior vena cava and iliac veins

- 71 patients with IVC CTO
- Contributing factors: Occluded IVCF 38 (54%), Surgical caval interruption 4 (6%), Hypercoagulability 27 (38%)
- Duration of Occlusion: 8 +/- 9 years (R: 2m-39 years)
- Technical Success: 60/71 (85%) Not affected by presence of IVCF or duration of occlusion!
- Minimal morbidity (2 hematoma, 1 RF); No mortality; 57/60 d/c POD #1
Overall Stent Patency

- Primary Patency: 93%
- Assisted-Primary Patency: 85%
- Secondary Patency + Cumulative: 52%
Cumulative Patency: IVCF vs No Filter

**Filter Cumulative (n=34)**
- 100%
- 86%

**Non-Filter Cumulative (n=26)**
- 100%
- 86%

*Months*
- 0
- 6
- 12
- 18
- 24
- 30
- 36
- 42
- 48
- 54
- 60

*Cumulative Patency (%)*
Relief of Pain

- Complete Relief of Pain
- Complete + Partial Relief of Pain (≥3/10 VAS)

- 91% Pain Relief After IVC Recanalization (n=60)
- 66% Pain Relief After IVC Recanalization (n=60)
Relief Of Swelling

% Cumulative Relief of Swelling

- Complete Relief of Swelling
- Complete + Partial Relief of Swelling

Months

60 53 52 52 52 52 52 52 52 52 52
60 40 34 31 29 28 28 28 28 28 28
83%
41%

83%
Freedom from Ulcer

- Freedom of Ulcer in C5 Limbs
  - 100% at 60 months

- Healed-Active Ulcer
  - 61% at 60 months
Conclusions

- Technical challenges of IVC occlusion can be navigated with steel alloy stents
- Minimal morbidity and mortality
- Excellent Mid-term patency and symptom relief
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