Chronic Iliocaval Venous Occlusive Disease

David Rigberg, M.D.
Clinical Professor of Surgery
Division of Vascular Surgery
University of California Los Angeles

Chronic Venous Occlusive Disease

Less well-characterized than atherosclerotic and non-atherosclerotic arterial disease

Multiple etiologies:
- Congenital iliocaval atresia
- Malignant stenosis or obstruction
- Dialysis related
  - Venous compression syndromes
  - Post-thrombotic venous disease

Venous Compression Syndromes
- Non-thrombotic venous stenosis
- Associated DVT secondary to venous compression

Post-thrombotic Disease
- Chronic occlusions following DVT
- Partially occlusive chronic mural changes secondary to incomplete recanalization of thrombus
Venous Compression Syndromes

- **May-Thurner Syndrome**
  - Left CIV compression by right CIA
  - Compression/webs in symptomatic pts (under-recognized)

- **External Iliac Compression**
  - Compression of right or left EIV by crossing hypogastric arteries

- **Extrinsic Compression**
  - Malignancy
  - Fibroids and benign lesions

Clinical Spectrum

- Nuisance Leg Swelling
- Debilitating edema
- Skin changes
- Venous ulceration

Interventional Management of Venous Occlusive Disease

Options for Percutaneous Intervention: *Chronic Venous Occlusions / Stenoses*

- Venography with Intravascular Ultrasound
- Venous angioplasty and stenting
Post Stent IVUS

Immediate, 3, 6, 12 months and annually...
Procedural Details

- Popliteal / femoral + IJ approach
- Diagnostic venography
- IVUS in all patients without chronic total occlusions

- Patients **without known DVT**
  - Angioplasty and stenting alone
  - Dual antiplatelet Rx

- Patients **with acute DVT**
  - CD-thrombolysis / perc mech thrombectomy
  - Angioplasty and stenting of underlying lesions
  - Lovenox/Coumadin and dual antiplatelet Rx

Procedural Details

- Careful sizing with IVUS
- Stents
  - Stainless steel stents (IVC, CIV) – Wallstent, Visipro
  - Self-expanding nitinol (EIV, CFV) - Protege
  - Diameters: 14-22mm, IVUS-based sizing

- Anticoagulation
  - Intraoperative ACT at >250 sec
  - Post-op anti-platelet therapy
    - ASA 325mg, Plavix 75mg
  - Post-op anti-coagulation
    - Lovenox/Coumadin (DVT, hypercoaguable states)

Deep Venous Thrombosis

- Incidence: up to 100,000 cases/yr (inpatient samples)
- < 50% complete clot lysis with anticoagulation alone
- 30-50% long-term risk of leg swelling and PTS
- Up to 15% long-term risk of venous ulcers

Deep Vein Thrombosis

**Late Sequelae**

- **Venous Reflux**
- **Venous Occlusions**
- **Venous Hypertension**
- **Pain & Venous Claudication**
- Lipodermatosclerosis
- Venous Ulcers
May-Thurner with DVT

Chronic Iliocaval Occlusion
Results in the Literature

Unanswered major role for venous stenting in deep reflux disease

- 528 Limbs, all with deep system reflux
- 69% with associated superficial or perforator vein reflux
- Only treatment was stenting of IVUS-determined iliac lesions

- 37% non-thrombotic
- 54% post-thrombotic
- 9% combined

Symptom Relief
Swelling Relief
Freedom from Ulcer
Recurrence

16 studies with 2,373 T and 2,586 NT pts
“Quality of evidence is currently weak”
“promising and safe”
“low risk”
Many issues unanswered

Unanswered Questions & Future Directions

- Stenting across the Inguinal Ligament
- Evolution of Optimal Stent Design

Surgical Management of Venous Occlusive Disease

Endovenectomy of the common femoral vein and intraoperative iliac vein recanalization for chronic iliofemoral venous occlusion

- Many issues unanswered
- Stenting across the Inguinal Ligament
- Evolution of Optimal Stent Design
Stenting across Inguinal Ligament

10 month Secondary Patency
Non-thrombotic pts = 100%
Thrombotic pts = 84%

Venous Stent Design

- Sinus-Venous (Optimed)
  - 12-18mm Diameter
  - 60-150mm length
  - 10Fr
  - Laser-cut Nitinol

- Zilver Vena (Cook)
  - 14-16mm Diameter
  - 60-140mm length
  - 7Fr
  - Laser-cut Nitinol

Stent fractures and restenosis is not the same in the CFV as it is in the CFA
Stenting across the inguinal ligament is less of a concern than leaving untreated stenotic disease
Venous Stent Design

**Vici Venous (Veniti)**
- 12-18mm Diameter
- 60-150mm length
- 10Fr
- Laser-cut Nitinol

**Wallstent (Boston Scientific)**
- 14-24mm Diameter
- 60-120mm length
- 10Fr
- Braided stainless steel

Venous Stent Design

- Loss of radial force at ends

Ideal Venous Stent Properties
- High crush resistance
- Uniform crush resistance
- Low Profile
- Conformability
- Wide range of diameters
- Large diameters

Conclusions

**Venous angioplasty and stenting**:
- Is a safe and effective treatment modality
- Is associated with excellent primary and secondary patency rates
- Can reduce the life-long symptoms of DVT and venous occlusive disease, and can contribute to venous ulcer healing

**Conclusions**

- Patients with May-Thurner Syndrome
  - Leg swelling and venous claudication / DVT
  - Complete resolution of symptoms in most patients

- Patients with post-thrombotic iliocaval occlusions
  - History of prior DVT and IVC filter placement
  - Technically challenging, lower success rates
  - Dramatic symptom improvement when successful
Technique and Lessons Learned

- Use of intravascular ultrasound
  - Essential for stent sizing and positioning
  - Post-stent assessment for residual stenosis or wall apposition

- Aggressive anticoagulation
  - Glycosaminoglycan (Arixtra) for 4-6 weeks in Thrombotic MT patients postop (before transition to Coumadin)
  - Full antiplatelet therapy in Non-thrombotic MT patients

- Correct all underlying venous lesions
  - Extend stent into IVC
  - Extend with nitinol stents into CFV if needed
  - Aggressive lysis to improve inflow (from femoral vein / PFV)

ULCA Division of Vascular Surgery
David Geffen School of Medicine at UCLA
UCLA Ronald Reagan Medical Center

Thank You