The Role of Iliac Venous Obstruction and Pelvic Vein Dysfunction in Chronic Venous Insufficiency

Society of Vascular Medicine

Friday June 15, 2018
Chicago, Illinois

Joann M. Lohr, MD, FACS, RVT, CWSP

Iliac Vein Compression Syndrome

- Prevalence 14.8% (48/324)
- Technical success endovascular treatment 95.8%
- No difference thrombotic or nonthrombotic
- Edema relief:
  - Thrombotic 81.8%
  - Nonthrombotic 58.5%
- Cumulative recurrence free ulcer healing rate 71.4%
  12 months after treatment


Nothing to Disclose

I have no relevant financial relationship(s) with any proprietary entity producing health care goods or services related to the content of my talk.
May Thurner Syndrome

Suprainguinal Anatomy

It is Not Just Reflux!

- Poor understanding importance of venous outflow obstruction in the pathophysiology of primary and secondary chronic venous diseases
- Sole reliance of infrainguinal Doppler studies for diagnosis of lower limb venous system
- Unknown at what percentage of venous stenosis becomes critical. Accurate noninvasive or invasive hemodynamic tests are therefore not available
- Diagnosis of occlusive or non-occlusive obstruction is based on morphological studies (>50% stenosis is considered significant – arbitrarily chosen based on clinical outcome)


Do Not Overlook Subtle Clues

- Lack of respiratory variation and poor augmentation on Doppler wave form
- Compare two bilateral common femoral waveforms
- Vein size on duplex and CT scans
- LCIV diameter 4.0 mm in DVT patients and 6.5 mm for patients without DVT (p=.001) in another study 3.5 mm vs 11.5 mm (p<0.01)
- For each mm decrease in diameter increased odds of DVT by factor of 1.68
- Right iliac compression frequent CT finding
- Iliac vein diameter can predict results of catheter-directed thrombolysis in those with iliac vein compression syndrome


Stephanie Carr, BS, Keith Chan, MD, Jarrett Rosenberg, PhD, William T. Han, MD, Naths Kohany, MD, David M. Hovsepian, MD, Daniel Y. Sun, MD, PhD, and Lawrence V. Robbins, MD. Compression of the Diameter of the Left Common Iliac Vein with the Risk of Lower-extremity Deep Venous Thrombosis. J Vasc Interv Radiol 2012; 23:1474-1479.


• Venogram underestimates degree of stenosis by 30%
• Degree of stenosis accurately measured by planimetry – invariably more extensive than shown by venography
• Useful to guide stent placement
• Appropriate diameter and length of stent can be determined
• Crucial to cover entire lesion in both non-occlusive and occlusive disease to ensure long term stent patency
• Ceplalad and caudal endpoints of stenting can be adequately evaluated with better visualization of wall apposition of the stent and any recoil after stent insertion


IMV Too Large Just to the Left of the Aorta

IMV Pelvic Collaterals

IVC Occlusion After Retrievable Filter Removal

Atresia Infrarenal IVC with Collaterals
IVC Occlusion

Gone but not forgotten
Large uterine fibroids causing compression of the inferior vena cava at the level of the kidneys and right hydronephrosis

PP Mass

JF Chronic Venous Calcification
DM 2004

DM 2010 In Stent restenosis
DM 2018

KV Chronic Occlusion MRI

Avoiding Injury
Venous Stents vs Arterial Stents

- Increased radial force and flexibility
- Greater diameter and length

**Results of Stenting in Chronic Iliofemoral and Inferior Vena Cava Thrombosis**

- In patients with venous outflow obstruction and complicated chronic venous disease (C3 – C6)
- Ameliorated venous claudication
- Normalizes outflow
- Enhance calf muscle pump function
- Significant clinical improvement and wound healing
- Resolution chronic pelvic pain and dyspareunia


Stent Patency

- Endovascular treatment technically successful 225/233 patients (96.6%)
- All treated with percutaneous transluminal angioplasty and stent placement
- No severe procedure-related complications
- Cumulative 1, 3 and 5 year primary patency rates at mean follow-up of 34 months were 93.2%, 84.3% and 74.5%, respectively
- Independent predictors for in-stent obstruction were use of multiple stents and irregular stocking use
- Mayo clinical primary assisted patency rates at 1 and 3 years was 94% and 90% respectively; secondary patency 95%


Iliac-Femoral Stenting for Lower Extremity Stasis Symptoms

- 56 limbs managed conventional methods – leg elevation, compression, GSV and perforator ablation if needed
- 3 months
- Ulcers not healed 3 months
  - Venography and IVUS (>50% reduction cross sectional area on IVUS)
- Post thrombotic 17.8%
- Incompetent perforators 12.5%
- Incompetent superficial system 48.2%
- Deep reflux 51.8%
- 29 of 56 limbs needed stenting for stenotic lesions
- Ulcers healed in 58% stented group over a period of 1 week to 8 months

Predictors of In-Stent Recurrent Stenosis in Stents Placed in the Lower Extremity Venous Outflow Tract

- Severe > 50% in-stent restenosis uncommon short term
- Risk factors
  - Presence of thrombotic disease
  - Positive thrombophilic test results
  - Stent extending below inguinal ligament (long stents)

Stephanie Carr, BS, Keith Chan, MD, Jarrett Rosenberg, PhD, William T. Kuo, MD, Nishita Kothary, MD, David M. Hovsepian, MD, Daniel Y. Sze, MD, PhD, and Lawrence V. Hofmann, MD. Correlation of the Diameter of the Left Common Iliac Vein with the Risk of Lower-extremity Deep Venous Thrombosis. J Vase Interv Radiol 2012; 23:1467-1472.

Phlebolymphedema (Secondary Lymphedema in Venous Insufficiency)

- Recumbent position
  - Arterial pressure 100 mm Hg
  - Venous pressure 8 mm Hg
- Standing increase pressure LE
  - Hydrostatic pressure increase directly proportional to height and vertical distance from heart to bottom of feet
- Standing passive hyperemia in blood capillaries ultra filtrated
  - Reabsorption of fluid does not occur
  - Walking decreases venous pressure to approx. 25 mm Hg – calf muscle pump affect on ambulatory venous hypertension

Raju; AVF Tucson February 2018
Life Long Learning a Never Ending Path