Clinical/Duplex Evaluation of Varicose Veins: Who to Treat?

Sanjoy Kundu MD, FASA, FCIRSE, FSIR
The Vein Institute of Toronto
Scarborough Vascular Group
Scarborough Vascular Ultrasound
Scarborough Vascular Institute
Toronto Endovascular Centre
Scarborough Hospital
Disclosure

- Consultant:
  - Bard™ Canada
  - Boston Scientific ™ Canada
  - Edwards Life Sciences ™
  - Baylis™ Canada
  - Sigmacon ™
  - Diomed™
  - Dornier™
Outline

- Clinic Setting
- Pathophysiology
- Anatomy
- History
- Physical Exam
- Duplex Ultrasound
- Treatment Algorithm
Background

- 1 in 5 Europeans
- Approximately 25% of women have some type of lower extremity venous insufficiency
- 72% of European women over 60
- Approximately 15% of men have some type of lower extremity venous insufficiency
- 40% of European men over 60
CLINIC SETTING
Clinic Setting

- Not a regular Diagnostic Imaging Clinic
- A Cosmetic Medicine Environment
- Attractive, welcoming environment
- Bright “Brass & Glass” Setting
- Visit your nearest cosmetic medical clinic!
Clinic Setting

Wrong Clinic Setting!
Clinic Setting
Pathophysiology
Vein Valves

- One-way valves allow blood to flow against the force of gravity.
  - Flaps or "cusps" act as gates:
    - Open to allow flow toward the heart
    - Close to prevent backflow of blood
Venous Reflux

- Backflow causes pile-up of blood and increased pressure
- Vein becomes engorged:
  - High pressure
  - Thin walls
  - Little muscle support
- Diseased GSV can enlarge to diameters above 10mm
Failure of valves – reflux

- Blood falls down by gravity causing increased pressure
- Varicosities are formed
Venous System

Patient Educational Aid

VEINS

Normal venous valve

Venous valve with clot
Compartments of the Thigh

SC, Superficial compartment;
DC, deep compartment.
Great Saphenous Vein Anatomy
Small SV Anatomy

- Posteromedial superficial thigh vein
- Anterolateral superficial thigh vein
- Vein of Giacomini
- Saphenopopliteal junction
- Posterolateral tributary vein
- Lesser saphenous vein
- Dorsal venous arch
Perforating Veins

- Hunterian perforating vein
- Dodd perforating vein
- Boyd perforating vein
- Cockett perforating veins (I, II, III)
- Inframalleolar perforating vein

- Hunterian perforator insufficiency
- Competent Dodd perforating vein
- Boyd perforator insufficiency
Venous History
**Patient History**

- **What are symptoms**
  - Swelling
  - Heaviness (wooden legs)
  - Pain
  - Ulceration
  - Itching
  - Night cramps

- **Location of varices**
  - Vulvar/vaginal
    - Symptoms of pelvic congestion?
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Confidential Patient History for Leg Veins

Name ___________________________ Date of Birth (month/day) _____/_____/
Address __________________________________ City ______________________
Province ______ Postal Code ______________
Home Telephone ______________________ Work Telephone _______________
Health Card # ___________________ Version Code __________ (one or two letters on card)
Family Doctor __________________________ Referring Doctor (if any) __________
Would you like us to send a report to your family doctor? Yes No
How did you learn about our clinic? _______________________________________

Past Medical History

1. Have you ever been in the hospital as a patient? Yes No
   If yes, specify when and for what reason _______________________________

2. Have you ever had surgery of any kind? Yes No
   If yes, please specify when and what type of surgery ______________________

Vein History

1. Which leg is the most bothersome to you? Right Left Equal

2. Have you ever had your veins evaluated before Yes No
   If so, what doctor and when? _______________________________________
   Did this doctor perform any tests on your veins? (Example: Ultrasound)

3. Do you wear support hose prescribed by a doctor? Yes No
   If yes, what type and do they provide relief? ________________________

4. Have you ever had any vein surgery? (Stripping) Yes No
   If yes, what leg? Right Left Both

5. Have you ever had any vein surgery? (Stripping) Yes No
   If yes, what leg? Right Left Both
Relevant History

- Prior vein treatment(s)
- Prior history of DVT
  - History of multiple spontaneous abortions can indicate hypercoaguable state
- Family history of DVT
- Personal or family history of PVD or CAD
  - Patients do need to be counseled that the saphenous vein is potential bypass
Patient Expectations

- What are patient’s expectations
  - Symptom relief
  - Cosmetic
  - Both
Venous Physical Exam
Physical Exam

- Swelling
- Skin changes
  - Corona phlebectasia
    - Clusters of spiderveins
  - Hemosiderin deposition
  - Healed or open ulcers
- Location of varices
  - 360 degree viewing
  - Leads to detailed evaluation of highly suspect veins (e.g. ALT or SSV)
- Distal pulses
360 Degree View
External Rotation
“The BIC Pen”
CEAP Classification
CEAP Classification

- C: Clinical
- E: Etiology
- A: Anatomy
- P: Pathophysiology
CEAP Classification

- **C0**-no visible varicose veins
- **C1**-spider or reticular veins
- **C2**-varicose veins
- **C3**-edema
- **C4**-skin changes without ulceration
- **C5**-skin changes with healed ulceration
- **C6**-skin changes with active ulceration
CEAP Classification

- **E-Etiology**
  - C-congenital
  - P-primary disease
    - Not due to other cause
  - S-secondary
    - Usually due to prior DVT

- **A-Anatomy**
  - Which vein is involved
    - Superficial
    - Deep
    - Perforating

- **P-Pathophysiologic component**
  - Reflux
  - Obstruction
What is the Physical Appearance of Venous Insufficiency?
C1 Telangiectasias & Reticular veins
C2 Varicose Veins
C3 Edema
C4 Venostasis dermatitis
C4 Hyperpigmentation
C4 Atrophie Blanche
C4 Lipodermatosclerosis
C5 Healed Ulceration
C6 Current Ulceration
Venous Ultrasound
For those starting to treat these patients, participation in the duplex is essential.

Evaluate for deep venous pathology:
- Current/prior DVT
- Deep venous reflux

Evaluation of Superficial System:
- Done with patient standing
- Examiner positioning/comfort is important
Goals of Ultrasound Exam

- Determine highest point of reflux
- Identify anomalies/unusual vessels
- Establish treatment plan
- Useful tool to show to patients so that they understand treatment plan
Superficial Venous US Evaluation

- Gray scale transverse covering entire length of vein
  - Size of vein
  - Caliber changes
  - Location of tributaries
  - Location of perforators
  - Course of vein/anomalies
    - Duplicated system
    - Does it exit fascia
Great Saphenous Vein
Gray Scale Imaging
Great Saphenous Vein

Saphenofemoral junction
Superficial inferior epigastric vein
Anterior lateral tributary
Femoral vein
Deep femoral vein
Greater saphenous vein
Anterior tributary vein
Posterior arch vein
Dorsal venous arch
Small Saphenous Vein
Gray Scale Imaging
Small Saphenous Vein
Superficial Venous US Evaluation

- Color flow and duplex
  - Compression on varicosities to assess for reflux
    - Reflux less than 0.5 sec is physiologic
    - Greater than 0.5 sec is pathologic
Longitudinal Color Flow
Venous Duplex Assessment

Col 72%  Map 7
WF Low
PRF 1500 Hz
Flow Opt: Med V

BW  Pg
Col  Pg

SV Angle 60°
Dep 1.1 cm
Size 2.0 mm
Freq 4.0 MHz
WF Low
Dop 51%  Map 4
PRF 1515 Hz

LT GSV
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Duplex Assessment

Reflex Assessment:
In Standing (or steep reverse Trendelenburg if necessary)
- Reflex sources: GSV, SSV, Perforators, Tributaries, Other
- Reflex time: Rt: SFJ: _sec, SPJ: _sec, Other: 

Symbol:
~ Tortuosity
a Aneurysmal
md Min diameter of segment to be treated: _mm
Md Max. diameter of segment to be treated: _mm
A1 Optimal Access point(s) and Diameter(s): _mm
A2 _ mm
Sv Superficial Vein depth: <10 mm
P Significant Perforator
P-i Incompetent Perforator
T Significant Tributary
T-i Incompetent Tributary
DS/AS Dual or accessory saphenous

Note: If assessment is performed a few days before scheduled EVLT, map vein with skin marker now.
Vulvar and Lower Extremity Varicosities
End of Exam

- Determine Patient Expectations
- Risk factor assessment
- What is etiology of varicose veins
  - What is the highest point of reflux
- Treatment options
  - Stripping
  - Thermal ablation of incompetent vein
  - Ambulatory phlebectomy or sclerotherapy
Treatment Algorithm

- **GSV or SSV Insufficiency**
  - Endovenous Thermal Ablation

- **Isolated Branch Vein Varicosity**
  - Foam Sclerotherapy
  - Ambulatory Phlebectomy

- **Incompetent Perforator Vein**
  - US guided foam sclerotherapy
  - Endovenous Thermal Ablation