

THANKS AGAIN!

The Genesee Vascular Lab has been privileged to provide non-invasive vascular diagnostic services for the Rochester community for thirty-three years. We are indebted to you, our referring providers for your confidence in allowing us to serve your patients, your encouraging support and your cordial association. Thanks again.

Tom Penn and the Genesee Vascular Lab Staff

CALF VEIN THROMBOSIS

Overview

Venous ultrasound for deep vein thrombosis is probably the most frequently performed non-invasive vascular laboratory evaluation. Some vascular laboratories have limited venous interrogation to the proximal or supra-popliteal venous system. It has been the long term practice of the Genesee Vascular Lab to perform routine surveillance of the calf or infra-popliteal venous system. This practice is now mandated by the Intersocietal Accreditation Commission (IAC) of which the Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL) is a member. As noted in the 2007 ICAVL standards, Part II: Vascular Laboratory Operations Peripheral Venous, transverse, compression images of both the posterior tibial and peroneal veins in the evaluation of deep venous thrombosis are required. Calf vein thrombosis is defined as clot involving the deep veins of the calf, but not extending to the popliteal vein.

It is essential that the calf veins be evaluated. The most common indications are pain and edema. Venous ultrasound is non-invasive, accurate, readily available and provides considerable differential diagnostic information. Duplex venous scanning has a high degree of sensitivity and specificity. The incidence of inadequate calf vein examinations due to technical factors or body habitus is about 5%.

The primary concern is propagation to the proximal or supra-popliteal venous system with the inherent risk of symptomatic pulmonary emboli. Several studies show this incidence to be low at one to five percent. Symptomatic pulmonary emboli from calf veins is controversial. The clot load is small. Most studies that show a high association between calf vein thrombosis and symptomatic pulmonary emboli do not account for the fact that a more proximal clot could have embolized before the surveillance for calf vein clot was performed. Isolated calf vein clot occurs most frequently in the peroneal vein at about 70%. Posterior tibial, soleal and gastrocnemius vein clot occurs frequently. Anterior tibial vein clot is rare (1-3 %).

Although clot propagation and pulmonary emboli are the primary concerns, the differential diagnosis for calf pain and edema is extensive as is noted in Table I. Venous ultrasound is very helpful in elucidating other diagnoses as well as follow for clot lysis and the development of valvular reflux.

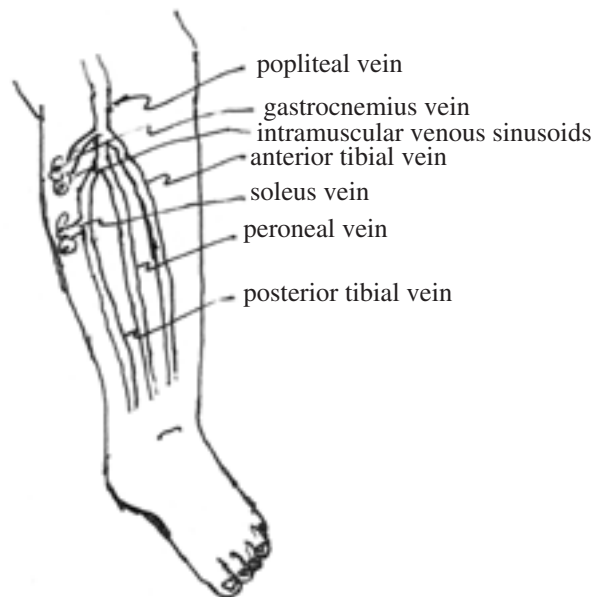
Table I

Calf Vein Thrombosis-Differential Diagnosis
• Baker's cyst
• Edema
• Superficial phlebitis
• Muscle/tendon injury
• Lymphadenopathy
• Arterial occlusion
• Hematoma

The Anatomy

The calf vein anatomy is as depicted in Figure 1. The veins that are examined are the popliteal vein, the paired peroneal and posterior tibial veins, soleal and gastrocnemius veins. The anterior tibial veins are usually not examined because clot is rare. Muscular sinusoids are another component of the calf veins. The sinusoids are thin walled, valveless venous lakes that run longitudinally with the soleus muscle bellies and coalesce to join the posterior tibial and peroneal veins. The gastrocnemius veins drain into the popliteal vein and the soleal veins into the posterior tibial vein.

Fig. 1: Calf Veins



Highlights

Calf vein thrombosis, or clot in the infra-popliteal venous system, is a frequent occurrence. There are many differences between infra-popliteal venous clot and supra-popliteal venous clot. A summary of calf vein thrombosis

is noted in **Table II**. The most noticeable differences are low incidence of propagation into the popliteal vein, low incidence of symptomatic pulmonary emboli, frequent clot lysis and minimal post-phlebotic changes.

**Table II**

### Summary of Calf Vein Thrombosis

- Isolated calf vein clot in about 30% of cases
- Low incidence of propagation into the popliteal vein (1-5%).
- Low incidence of symptomatic pulmonary emboli.
- Peroneal veins are most commonly involved.
- Popliteal vein is bifid in about 25% of cases.
- Clot lysis occurs in most calf veins in three months.
- Minimal post-phlebotic changes at three years
- Rare involvement of the anterior tibial veins.
- Ultrasound is accurate in diagnosis of clot and the differential diagnosis.

### Treatment

The treatment for supra-popliteal deep vein thrombosis is well established. Unfortunately, the treatment of isolated calf vein thrombosis is controversial. There is no consensus of opinion.

*Treatment option I:* The Agency for Health Research and Quality (AHRQ), the American College of Chest Physicians (ACCP) and the Institute for Clinical Systems Improvement (ICSI) recommends treating isolated calf vein thrombosis with heparin and oral anticoagulation for 6 to 12 weeks. This recommendation appears to be partly extrapolated from treatment for proximal supra-popliteal deep vein thrombosis. Oral anticoagulation has an approximate 2 percent annual risk of major hemorrhage plus minor hemorrhage.

*Treatment option II:* Since there is a low rate of propagation to the popliteal vein and the proximal venous system (1-5%), very low incidence of symptomatic pulmonary emboli and minimal post-phlebotic sequelae, many studies advocate serial duplex venous scans. The usual interval is 3 days and 7 days and possibly 14 days. Propagation usually occurs within 14 days.

The Genesee Vascular Lab has had extensive experience with serial ultrasound follow of isolated calf vein thrombosis. Findings to date mirror studies that advocate serial ultrasound follow for appropriate patients. The rate of propagation for patients with no permanent risk factors, cancer or idiopathic calf vein thrombosis is very low.

#### REFERENCES

J Vas Surg; 1998 Jul; 28 (1) 67-73, BMJ 2003; 326 (7400): 1180 (29 May), Archives of Physical Medicine and Rehabilitation; Vol 78, Issue 5, pages 538-539, Gottlieb, AJR; 1998, Gottlieb, Radiology; 1999, Circulation 1996, 93: 2212-2245, J Vas Surg 2007; Sept: 46 (3) 513-519, IAC Newsletter Vol I, Issue 2, 2008, J Vas Surg 2000; 31 (5), 895-900.

### SERVICES

The Genesee Vascular Lab provides non-invasive studies for:

- carotid arteries
- transcranial
- peripheral arterial
- peripheral venous
- abdominal vascular

With an expanded staff, we are now able to provide some of these exams on the same day of request, particularly carotid arteries and peripheral venous studies.

### REQUISITION FORMS

A completed requisition form is required for all vascular studies. This document details the type of exam, the indications for the exam, and any special considerations. Specific information such as symptoms, bruits, etc, is very helpful. "Rule out" indications are best not used. Requisitions with specific indications are also now required by all third party payers. An additional benefit for GVL is quality control and correlation studies. All GVL staff members are available to assist with making sure desired information is provided. Requisition forms are available from the office on request. They can also be printed from our website at [www.geneseevascularlab.com](http://www.geneseevascularlab.com). Requisitions generated by digital offices are acceptable. Emergent studies are performed on verbal request with the requisition to follow.

### TECHNICAL STAFF

The GVL technologist staff is well trained and experienced in non-invasive vascular diagnostics. All are Registered Vascular Technologists (RVT) as well as Registered Diagnostic Medical Sonographers (RDMS). All technical staff members are dedicated professionals who maintain membership in the Society of Vascular Technology as well as other professional organizations. They keep current by exceeding the annual continuing medical education requirements. The technical staff is dedicated to the care of their patients and the accuracy of non-invasive vascular diagnostics. GVL is indebted to Kevin Geary MD for providing back-up physician interpretation of studies.

### OFFICE STAFF

The office staff is dedicated to keeping the provider/patient interface with GVL as smooth as possible. They are skilled at multi-tasking while being knowledgeable and accommodating. Their long term service, 28 and 19 years respectively, is a testimonial to their devotion to patients, providers, and Genesee Vascular Lab.

### WEBSITE

Please visit our website at [www.geneseevascularlab.com](http://www.geneseevascularlab.com). This site was recently updated to include helpful information for our patients with regard to tests provided and any preparation. An enhanced feature is that a patient may now obtain driving directions to either of our locations by typing in his/her home address. Providers may print requisition forms directly from the website for convenience.

### PARKING

Parking is free at our Clinton Crossings (Westfall Rd.) and Linden Oaks offices. The Rochester Transit System bus (#11A) stops in front of the Westfall Office.

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### MISSION STATEMENT

The Genesee Vascular Lab mission is to provide accurate, timely vascular diagnostic studies for our patients and referring providers in a friendly, comfortable, and professional atmosphere. Accuracy and quality control are paramount.