

Twin Cities Edition

# M.D. NEWS

Special Feature



## Minnesota Vein Center

Offering Minimally Invasive Treatments to Patients  
with Symptomatic or Cosmetic Vein Problems

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## Offering Minimally Invasive Treatments to Patients with Symptomatic or Cosmetic Vein Problems

By Marian Deegan

When the Hackett-Hemwall Foundation in Madison sent a volunteer medical team to Honduras, Dr. Primepares G. Pal and his wife, nurse practitioner Jacqueline Pal, packed a portable ultrasound laptop in a backpack and joined them. The team treated 754 patients in 4-1/2 days. The Pals treated extreme cases of venous disease, including nonhealing leg wounds and ulcers caused by untreated superficial and perforator vein reflux disease.

“We are one of the few local clinics with the depth of procedural and modality experience to handle perforator vein disease in the Twin Cities,” Dr. Pal explains. “In Honduras, medical care for the rural and urban poor is much more limited. We saw hundreds of women who had been living with ulcerated leg wounds for years. They led physically active lives in less than ideal conditions while admirably tending their wounds. We were able to really help them.”

Although vein disease affects both men and women in all

age groups, 65% of people affected are women. Vein disorders typically develop between the ages of 30 and 70. Genetic propensity is the primary cause, though multiple pregnancies and occupations like teaching, which require long periods of standing, can exacerbate vein wall and valve problems.

Symptoms frequently go undiagnosed. “Women seldom express the fact that they’re having symptoms like leg heaviness and fatigue, ankle swelling or pain,” Jacqueline Pal explains. “They’ve dealt with this for years and assume it’s something they have to live with.” Even when symptoms are recognized, physicians may not be aware of the range of recent treatments available. Vein medicine is commonly associated with either the cosmetic treatment of spider veins or with painful saphenous vein stripping. Because stripping involves hospitalization with surgery and general anesthesia, long recovery time and a discouraging 40% recurrence rate, the risks of stripping can outweigh potential benefits.

**Dr. Pal using ultrasound to guide needle access during a Cooltouch endovenous ablation procedure**



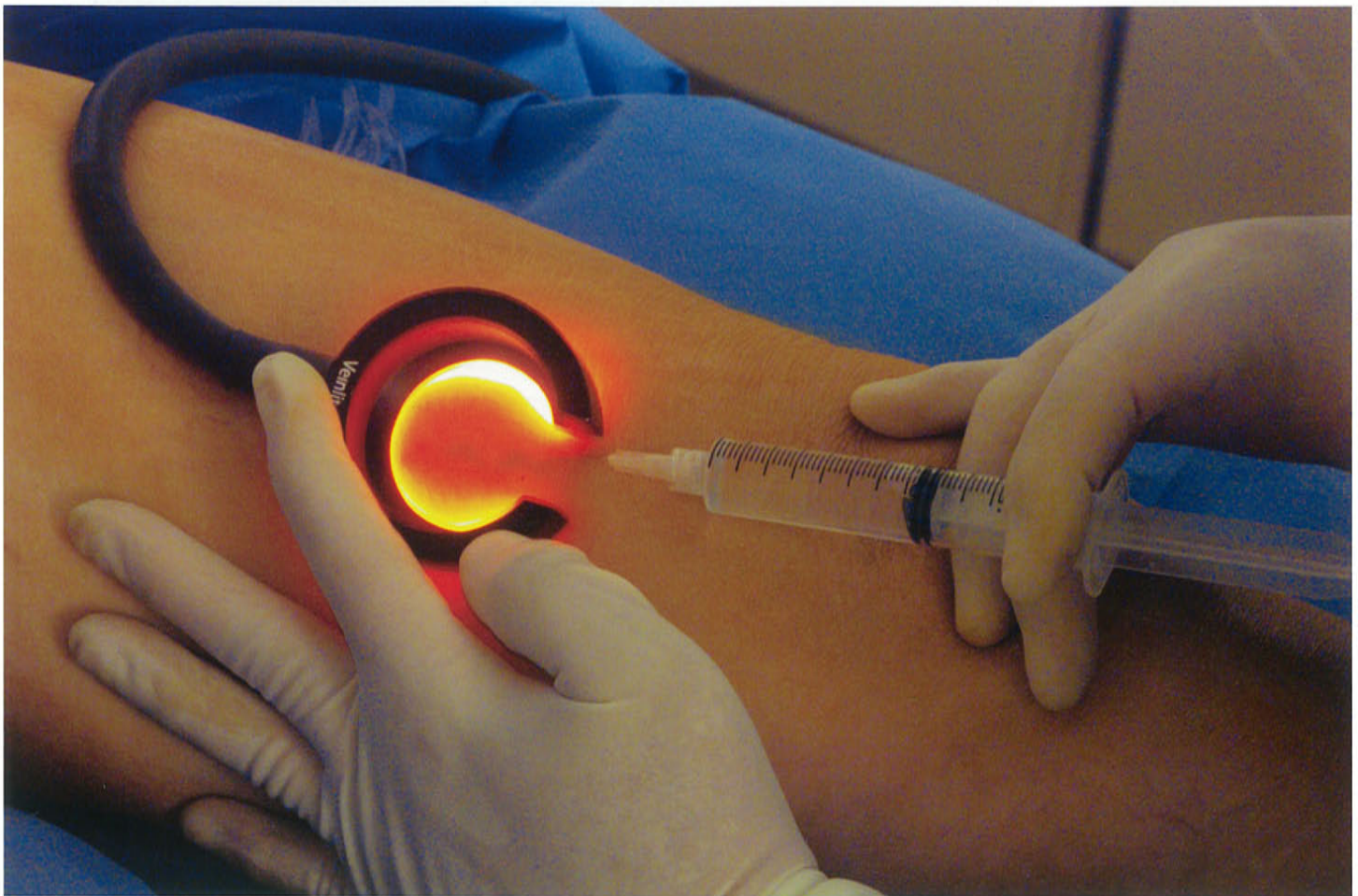


PHOTO BY DAVID GINSBERG

#### **Sclerotherapy of a reticular vein using a transilluminator**

However, new developments have changed the treatment of vein disorders dramatically. “Thanks to elegant state-of-the-art technologies developed in the 1990s and refined within the last few years,” Dr. Pal says, “today we can treat symptomatic and related cosmetic vein problems with minimally invasive procedures on an outpatient basis. This offers patients comfortable comprehensive clinic care with minimal recovery times.

“The principle of lower extremity superficial vein treatment is to find and treat the most proximal source of reflux before you deal with problems distally,” Dr. Pal explains. Blood flow from the leg back to the heart is conducted through a deep and a superficial vein system. About 80 to 90% of venous return from the lower extremities is through the deep veins, which are competent in most people. The superficial venous system resides in the superficial tissue compartment between the deep muscular fascia and the skin. The main superficial veins are the greater saphenous vein and the small saphenous vein. These veins and their interconnecting tributaries are subject to vein wall and valve failure, and are the targets of most therapy.

“Vein problems tend to be progressive,” Dr. Pal says. When valve damage occurs, blood in the leg begins to accumulate under pressure. The vein engorges and distorts, leading to chronic venous insufficiency. Without treatment, this condi-

tion could potentially lead to skin breakdown and ulceration in the lower extremities. Dermatologic conditions may develop. One extreme consequence of chronic venous insufficiency is dermal and subcutaneous tissue fibrosis, and eventual ulceration, referred to as lipodermatosclerosis.

Treatment modalities were somewhat limited for vein problems like varicose veins and chronic venous insufficiency until the 1990s introduced new developments in minimally invasive procedures. As endovenous catheter-based techniques progressed in pace with emerging ultrasound and laser technology, Dr. Pal’s vision of a comprehensive vein specialty offered in a comfortable clinical setting became reality.

The American Medical Association recognized phlebology as a self-designated specialty in 2005. Physicians currently working in this emerging area of medicine come from varied backgrounds. Their training may have been in internal medicine, anesthesiology, radiology or vascular surgery. Dr. Pal notes that although vascular fellowships are focused primarily on arterial work, many advances in vein medicine have been made by vascular surgeons like Dr. John Bergan, who trained a generation of vascular specialists now concentrating in vein work.

After an internship and residency in internal medicine at the University of Michigan in Ann Arbor, a fellowship in infectious

diseases at UCLA and a postdoctoral fellowship at UC-San Diego, Dr. Pal was introduced to vein work by a vascular surgeon who had studied under Dr. Bergan. Subsequently, Dr. Pal studied with three vein clinics, including work with vein medicine pioneer Dr. John Kingsley at Alabama Vascular. Today, Dr. Pal is an active member of the American College of Phlebology, a leading organization for vein specialists.

“The Minnesota Vein Center is a dedicated vein clinic designed to deliver advanced techniques for the treatment of vein disorders,” he explains. “We treat the entire spectrum of vein-related issues, from initial ultrasound scanning to venous ablations, ambulatory phlebectomy, injection sclerotherapy and ultrasound-guided sclerotherapy. Although our emphasis is on the treatment of medically related vein problems, when patients with varicose veins also have spider veins, they look to us for comprehensive treatment of both cosmetic and symptomatic issues. One of our strengths is our capability to use many different modalities to deal comprehensively with vein problems in a single clinical setting. Our treatment plans draw on state-of-the-art advances in phlebology to really finish the job. We want to take care of the whole problem for each patient.”

The Minnesota Vein Center’s emphasis on responsive patient care is also reflected in its acceptance of virtually all insurances and Medicare, along with assistance to patients in determining insurance coverage details.

During a patient’s first visit, Dr. Pal does a thorough diagnostic evaluation, including a duplex ultrasound scan when appropriate, and develops a treatment plan. Treatment is typically scheduled within a month of the diagnostic visit. Depending on the treatment, patients have a follow-up visit within three to four days and a second follow up later to monitor patient recovery.



**Dr. Primepares G. Pal and Jacqueline S. Pal, C-N.P.**

“The use of cutting-edge ultrasound technology in a clinical setting for preoperative diagnosis, intraoperative care and postoperative management of patients is a breakthrough,” Dr. Pal explains. “I don’t have to depend on reports and am able to perform ultrasound scans myself to get a clear picture of a patient’s vascular structure.” Ultrasound applications made critical contributions to both diagnostic accuracy and to the

ability to perform procedures in an office setting. Dr. Pal cites endovenous ablation as exemplary of the state-of-the-art procedures well suited to clinical practice.

“The development of endovenous ablation techniques in the 1990s was huge,” Dr. Pal observes. An alternative to saphenous vein stripping, thermal ablation uses radiofrequency or laser energy to collapse a diseased vein. With ultrasound guidance, a radiofrequency catheter or laser fiber is threaded through the refluxing vein and precisely positioned. Then, ultrasound guidance is used to anesthetize the vein with tumescent local anesthesia.

Enveloping the entire vein with dilute tumescent fluid accomplishes three things. Because this method results in effective analgesia, patients often find the experience nearly painless. The tumescent fluid compresses the vein and improves vein wall contact with the tip of the endovenous device. Most importantly, surrounding the vein with the reservoir of fluid acts as a heat sink. During venous ablation, the applied heat inside the vein is quickly dissipated through the wall of the vein, minimizing heat-related perivenous tissue injury.

Thermal energy is delivered to the vein wall by the tip of the radiofrequency or laser fiber as the endovenous device is withdrawn at a constant rate. Sufficient vein wall heating results in collagen contraction and denudation of the endothelium and subsequent fibrous occlusion of the vein.

The very first endovenous ablation system approved by the FDA used a heat generator and catheter with collapsible electrodes (the Closure System, VNUS Medical Technologies, San Jose, CA). When operated between 85-95° Celsius and introduced intraluminally, it efficiently closed veins ranging from 2 mm to 12 mm in diameter.

Radiofrequency catheters were followed by the development of fiberoptic catheters that delivered laser energy. The first generation of lasers emitted light with wavelengths from 810 nm to 980 nm. At this range of wavelengths, energy is absorbed by hemoglobin in red blood cells. Steam bubbles originating from heated blood resulted in heat-related damage to the inner vein wall and subsequent occlusion of the treated vein.

In 2005, the FDA approved the CoolTouch CTEV laser

**Dr. Pal reviewing ultrasound of venous insufficiency studies**

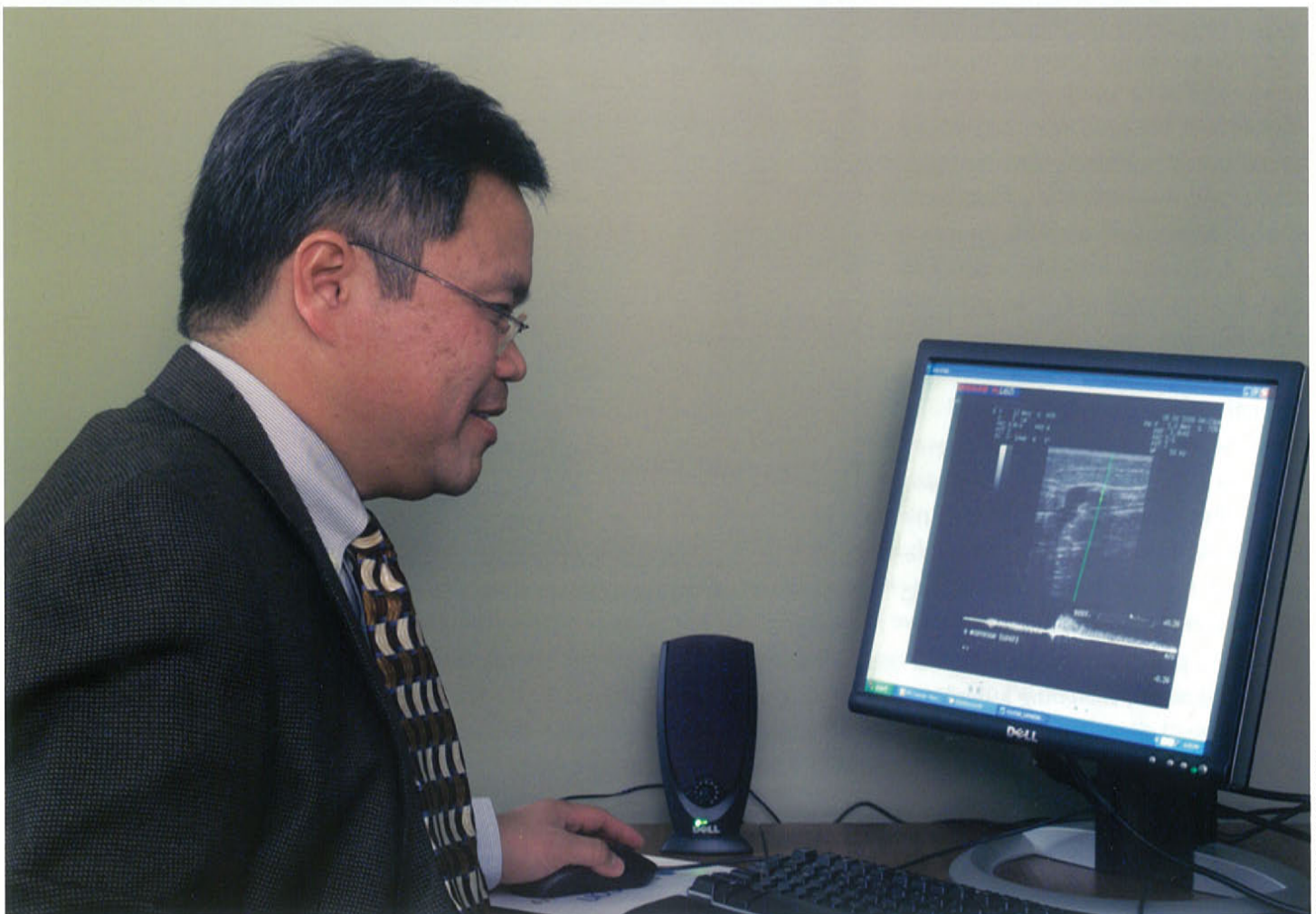


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**Minnesota Vein Center is located at 400 North Village Center Drive in North Oaks, MN.**

technology, which uses a laser with a wavelength of 1320 nm. At this wavelength, hemoglobin absorption is minimized, and water absorption is the dominant mechanism. The vein wall is closed by gentle heating at a lower temperature, translating into less frequent and fewer short-term adverse events.

To remove larger surface varicosities, Dr. Pal uses ambulatory phlebectomy, a procedure in which he has particular expertise. Performed in about an hour with local anesthesia, this procedure manipulates and extracts the diseased vein network through incisions in the skin. Phlebectomy success relies in part on the size of the incisions. With precision developed through years of concentrated practice, Dr. Pal is able to work with extremely small incisions of 1 or 2 millimeters. Because incisions are no bigger than a big needle stick, there's no suturing required. Incisions are covered with Steri-Strips for several days and the patient wears compression stockings for about one week. Within a month, many of Dr. Pal's patients can't even find the points of incision.

Sclerotherapy is a classic injection procedure commonly used in the treatment of spider veins, or telangiectasias. For Dr. Pal,

a variation of this treatment, ultrasound-guided foam sclerotherapy or endovenous chemical ablation, has also become an effective treatment for difficult cases such as neovascularization. When a jumble or zigzag of venous channels develops between vein segments, they can't always be closed with catheters or removed via phlebectomy. "In several cases where the problem can't be resolved surgically," Dr. Pal says, "we have successfully used endovenous chemical ablation to seal off the veins.

"When we started this clinic," Dr. Pal concludes, "I wanted to integrate state-of-the-art procedures into a comprehensive vein center emphasizing patient care. It is a challenge to talk about vein work. The AMA has only recognized phlebology as a distinct specialty since 2005. Phlebology fellowships are still in the works, and some of the most significant treatment advances are so recent that many physicians may not be aware of them. But I can't tell you how satisfying it is to be able to help people who have gone for years with undiagnosed vein problems. To guide our patients through a thorough streamlined treatment program and actually give them symptom resolution in a very short period of time is extremely rewarding." ■