

Arterial or venous?

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Pain, swelling, and ulceration are common symptoms of vascular disease of the lower extremities. Either venous or arterial disease can cause these symptoms, but it is rare for both to be responsible simultaneously. The nature of a patient's complaints is often the key to selecting the proper study. By obtaining a little information from the patient, the etiology can usually be narrowed by the physician to either the arterial or the venous system, thus avoiding unnecessary tests. Here are seven common complaints and how they can be correlated with the underlying pathophysiology:

"I can only walk a block before my calf tightens up."

Exercise pain is often a sign of arterial occlusive disease. The type of pain and its location are clues to the underlying pathology. Atherosclerotic disease is usually focally distributed and occurs in predictable locations. The most common location in the lower extremities is in the distal superficial femoral artery in the region of the adductor canal. Severe stenosis or occlusion in this location causes the symptoms we recognize as *intermittent claudication*. Patients seldom describe the symptoms as pain, but more often as *tightening*, *cramping*, or a *charlie horse*. Characteristically, the discomfort subsides with a few minutes rest and the patient can continue to walk a little further before the symptoms return. Sometimes, patients experience symptoms only when walking briskly or uphill. On examination, these patients may have weak or absent pulses at the ankle, but little else to indicate the presence of an arterial occlusion. Ultrasound can confirm the presence, location, and severity of the arterial insufficiency. Graded exercise on a treadmill may be necessary to correlate the symptoms with circulatory impairment. Spinal stenosis and nerve impingement can sometimes mimic the symptoms of arterial disease, but the distinction can usually be made in the vascular laboratory.

"My right leg 'fatigues' after walking only a block. After a little rest I can go on but only for a short distance."

Occlusive disease in the iliac arteries usually causes early

fatigue in the affected limb. If the patient continues to walk he or she may develop more focal discomfort in the calf, migrating to the thigh. Again, the symptoms subside with rest. Other clues in the history include hip pain and/or erectile dysfunction, suggesting blockage in the internal iliac or common iliac artery. On physical examination, there is usually a diminished or absent common femoral pulse and a stethoscopic bruit may be present in the lower abdomen or groin region. Ultrasound can locate the area of blockage and quantify the degree of arterial insufficiency. Conditions that can confuse the picture include spinal stenosis and arthritic changes in the hip.

"My foot hurts at night. I have to get up and dangle my leg over the bed."

These are symptoms of advanced arterial disease, usually involving more than one level of occlusion. The pain is always most severe in the distal foot and toes. Night pain in the calf or elsewhere in the extremity is not a symptom of arterial occlusive disease. Patients may have no rest pain during the day with their limbs dependent, but lose the gravity effect when recumbent and develop ischemic pain. Such patients often learn to sleep in a chair. This is a limb-threatening condition that needs prompt diagnosis and aggressive treatment to avoid limb loss.

"I have a sore on my toe and it won't heal."

If the patient has rest pain, as described above, toe or distal foot ulceration usually indicates impending limb loss. If the patient has little or no pain, the ulcer most likely was caused by local small vessel occlusive disease in the foot, as is often seen in diabetics. Such patients may have peripheral neuropathy and experience little or no pain. Individuals with multilevel occlusive disease almost always require surgical revascularization, whereas patients with small vessel disease may respond to local wound care. The distinction is easily made with diagnostic ultrasound.

"I have an ache in my calf and it is sore to touch."

Acute calf vein thrombosis, particularly of the gastrocnemius or soleal sinus veins, may produce pain, tenderness and edema in the affected area. There may or may not be a history of injury or trauma. Patients will sometimes describe long periods

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of sitting and inactivity, as might occur during extended plane or car trips, before such symptoms began. A relatively common abnormality that can mimic venous thrombosis is the presence of a Baker's cyst. This is caused by an extrusion of joint fluid from the knee joint, medial and superficial to the vasculature, producing inflammation and edema. The diagnosis of either condition can readily be made with ultrasound.

"I have an ulcer just above my ankle that won't heal."

Venous ulceration results from longstanding chronic venous insufficiency. It is the end result of venous hypertension caused by valvular incompetence in the deep and superficial venous systems. Recurrent petechial hemorrhages, loss of subcutaneous fat and scarring produces the so-called *stasis dermatitis*, in which setting ulceration occurs. Venous ulceration seldom, if ever, is caused by valvular incompetence solely in the superficial veins. The patient with a venous ulcer will usually have a history of past DVT. Some of these thrombosed veins will eventually recanalize, but

the delicate valves that protect the distal limb from venous hypertension will have been destroyed. This process is followed by breakdown of the valves in the perforator veins that join the deep and superficial systems through the fascia. Incompetent perforator veins then transmit the high-pressure venous drainage from the deep veins of the calf to the unsupported veins of the subcutaneous system, initiating the process of stasis dermatitis and ulceration. Ultrasound can recognize valvular incompetence and usually identify the perforating veins most responsible for the ulcer. This enables the surgeon to precisely ligate each perforator vein without the more radical incisions that were necessary in the past.

"My left leg is swollen."

Although most patients with lower extremity edema do not have venous thrombosis as its cause, unilateral edema, particularly on the left side, can be a sign of massive venous thrombosis, a potentially life-threatening condition. Iliofemoral venous thrombosis, sometimes called *milk leg* because of its occurrence in the early post-partum state, poses not only a risk of pulmonary embolism, but also can lead to long term disability from chronic venous insuffi-

ciency. Patients with lesser degrees of edema may also have deep vein thrombosis, particularly if there are predisposing risk factors. One's index of suspicion should be raised if there is a history of previous venous thrombosis, malignancy, or a recent injury or operation. It is important to exclude venous thrombosis as a cause of lower extremity edema because of the potentially serious outcome in the untreated patient.

Summary

Ultrasound technology has progressed over the years to where it can provide useful information to the clinician seeking an explanation for the common complaints that patients bring. Very often the presenting problem is clear-cut and calls for a particular arterial or venous assessment. At other times, however, the problem may be less clear and raises the question of which examination might provide the information necessary to properly determine a treatment plan. By understanding how an arterial or venous abnormality affects the circulation and correlating this knowledge with the patient's complaints, the clinician can usually select the type of ultrasound study that will answer the question – is it arterial or is it venous?

Vascular Diagnostics is published by Pacific Vascular, Inc. Dana Laursen and Robin Wyll--Editors; Keith Fujioka, RVT--Technical Advisor; Edwin Brockenbrough MD, John Diaconou MD and Michael Zammit MD--Medical Directors; Keith Fujioka--President and CEO. Pacific Vascular operates noninvasive vascular laboratories throughout the Puget Sound area. For more information or patient scheduling, please call (425) 486-8868 or 1-800-282-6516 (in WA). Visit our web site at <http://www.pacificvascular.com>. Reprints are available upon request.

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