

Clots

By Dr. Tom Welch

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When a trivial injury results in some minor bleeding, our body activates a system for stopping the bleeding. Our coagulation system is truly a wonder. As blood flows through arteries, veins, and organs, it (usually) is unimpeded. Yet, as soon as a blood vessel is damaged or opened, a powerful cascade is set in place, the ultimate result of which is a clot that stops the bleeding. As the injured tissue is

repaired, another cascade is activated in order to dissolve the clot. The entire process of clot formation—thrombosis—and clot dissolution—thrombolysis—requires the interplay of scores of individual proteins and cells, working in concert. As with any complex system, however, the thrombosis/thrombolysis mechanisms occasionally go awry.

One of the more common disruptions of the coagulation system is the formation of a blood clot in a large blood vessel in the absence of injury or bleeding. This condition is referred to as a deep vein thrombosis (DVT), and can have effects ranging from annoying to life-threatening.

The first sign of a DVT is usually swelling in the part of the body downward from the clot, often painless. A DVT in the large vessels of the leg, for example, may first show as painless swelling of the foot.

Once a DVT gets started, it often tends to grow in size and involve more of the vessel. On occasion, part of the clot can break loose and begin to travel elsewhere in the body. At this point, the clot becomes an embolism and dire consequences can ensue. Most concerning, the clot can become lodged in the lungs as a pulmonary embolism, resulting in severe pain, shortness of breath, and even sudden death.

Several factors can predispose one to the development of a DVT. Occasionally, an inherited defect in one of the components of the coagulation system may lead to a proneness to spontaneous clot formation. More commonly, prolonged positioning without movement is the culprit in DVT forma-

tion; this is why long airline flights in cramped seats are a notorious trigger for leg DVTs. Dehydration can also become a factor in DVT formation, by making blood cells more concentrated and "thick." Certain medications, such as oral contraceptives, may also predispose to the formation of spontaneous clots.

Backpackers' concerns

What about the backpacker? The nature of hiking makes leg DVTs an unlikely event, although travel to the trailhead itself can be a risk. Getting out of one's vehicle for a quick drink of water and a stretch is a wise preventive. There are, however, several reports of DVTs in the blood vessel of the upper arm, the subclavian vein, in backpackers.

The mechanics of most backpack shoulder straps result in continuous pressure on the subclavian vein. If one combines this with dehydration, limited arm movement, or other DVT risk factors, such as medication use, clots could develop in one or both arms.

Preventing DVTs during backcountry travel (including on the way to the trailhead) involves some simple steps. Ensuring adequate hydration is a major one—indeed, it seems important in preventing a host of wilderness medical disruptions. One should pay close attention to backpack fit, and adjust the shoulder or chest straps if one feels heavy pressure on the area just below the collarbone. The backpack should come off at rest stops, and vigorous range-of-motion exercises of the shoulder should be done to ensure circulation. If one has a personal or

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If DVT is suspected, (increased swelling of the arms), offloading the pack to one's companions, ensuring hydration, and planning trek termination for definitive care are the only practical options.

family history of DVTs, or is taking a medication that could increase the DVT risk, consultation with one's provider before a trek would be wise.

First aid options for backcountry DVTs are limited. If one were to notice increasing swelling of the arms, beyond the fairly typical slight finger swelling most of us experience, a DVT should be suspected. Offloading the pack to one's companions, ensuring hydration, and planning trek termination for definitive care are the only practical options. Although there is no evidence basis for the recommendation, taking a "baby aspirin" (81 mg) may be useful in attenuating progression of the clot, and has no real downside. In the event of symptoms of pulmonary embolism (cough, chest pain, shortness of breath, coughing blood), urgent evacuation is mandatory.

The CDC has a very helpful summary of DVT prevention available on its website, cdc.gov/ncbddd/dvt/facts.html. ▲

Tom Welch, MD, is a physician at Upstate Medical University in Syracuse and an active member of the Wilderness Medical Society. He is a licensed professional guide and certifying instructor for the Wilderness Education Association, and has guided groups in the Adirondacks, Montana, and Alaska. More information is available at his website and blog, adirondoc.com.



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