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Deep Vein Thrombosis

Interventional Radiology Clot-busting Treatment Prevents Permanent Leg Damage

The formation of a blood clot, known as a thrombus, in a deep leg vein can be a very serious condition that often causes permanent damage to the leg, known as post-thrombotic syndrome. Early treatment with blood thinners is important to prevent a life-threatening pulmonary embolism, but does not treat the existing clot.

Long-term studies show that about 50 percent of people treated with blood thinners alone develop post-thrombotic syndrome. [9-11] Physicians and patients need to be aware that blood clots cause permanent damage to the leg veins which can lead to serious disability. It is important for DVT patients to be evaluated by an interventional radiologist to determine if catheter-directed thrombolysis is needed to remove the clot.

Post-thrombotic Syndrome

Post-thrombotic syndrome is an under-recognized, but relatively common sequela, or aftereffect, of having DVT if treated with blood thinners (anticoagulation) alone, because the clot remains in the leg. Contrary to popular belief, anticoagulants do not actively dissolve the clot, they just prevent new clots from forming. The body normally dissolves a clot over time, but often the vein becomes damaged in the meantime.

A significant proportion of these patients develop permanent irreversible damage in the affected leg veins and their valves, resulting in abnormal pooling of blood in the leg, chronic leg pain, fatigue, swelling, and in extreme cases, severe skin ulcers. Many patients have to plan their daily activities around their legs, knowing that if they stand or exercise too long, their legs will swell or be painful.

While irreversible damage use to be considered an unusual, long-term sequela, it actually occurs frequently in about 50 percent of people and can develop within two months of developing DVT. [9-11] Clot removal via interventional catheter-directed thrombolysis in selected cases of DVT can improve quality of life and prevent the debilitating sequela of post-thrombotic syndrome.

Treatments

Catheter-directed Thrombolysis:

Catheter-directed thrombolysis is performed under imaging guidance by interventional radiologists. This procedure, performed in a hospital's interventional radiology suite, is

designed to rapidly break up the clot, restore blood flow within the vein, and potentially preserve valve function to minimize the risk of post-thrombotic syndrome. The interventional radiologist inserts a catheter into the popliteal or other leg vein and threads it into the vein containing the clot using imaging guidance. The catheter tip is placed into the clot and a "clot-busting" drug is infused directly into the thrombus (clot). The fresher the clot, the faster it dissolves—one to two days. Early removal of the blood clots is likely to give patients their best chance to avoid disabling symptoms such as pain, swelling, and ulcer formation in the long run. Any narrowing in the vein that might lead to future clot formation can be identified by venography, an imaging study of the veins, and treated by the interventional radiologist with balloon angioplasty or stent placement.

In patients in whom this is not appropriate and blood thinners are contraindicated, an interventional radiologist can insert a vena cava filter, a small device that functions like a catcher's mitt to capture blood clots, but allows normal liquid blood to pass. People with symptoms of DVT should first go to an emergency room to seek help, to receive initial treatment with blood thinners to prevent a pulmonary embolism. After treatment with blood thinners, if symptoms such as leg pain and swelling continue, patients should obtain a consult with an interventional radiologist for further evaluation.

DEEP VEIN THROMBOSIS FACTS

The deep veins that lie near the center of the leg are surrounded by powerful muscles that contract and force deoxygenated blood back to the lungs and heart. One-way valves prevent the back-flow of blood between the contractions. When the circulation of the blood slows down due to illness, injury or inactivity, blood can accumulate or "pool," which provides an ideal setting for clot formation. One in every 100 people who develops DVT dies. Recently, it has been referred to as "Economy Class Syndrome" due to the occurrence after sitting on long flights.

Prevalence of DVT

In the United States alone, 600,000 new cases are diagnosed each year.

Symptoms

Some of these include:

- Calf or leg pain or tenderness
- Swelling of the leg or lower limb
- Warm skin
- Increased visibility of surface veins
- Leg fatigue
- Discoloration of the legs

Efficacy

Clinical resolution of pain and swelling and restoration of blood flow in the vein is greater than 85 percent with the catheter-directed technique.[5-7]

Risk Factors

- Previous DVT or family history of DVT
- Immobility, such as bed rest or sitting for long periods of time
- Recent surgery
- Age above 40
- Hormone therapy or oral contraceptives
- Pregnancy or post-partum period
- Previous or current cancer
- Limb trauma and/or orthopedic procedures
- Coagulation abnormalities
- Obesity

Preventing "Economy Class Syndrome"

Sitting in one position for a long period of time can increase one's chances for DVT. To help prevent DVT on long trips:

- Drink lots of water, and avoid beverages that dehydrate (coffee, tea, alcohol).
- Get up and move around the aircraft cabin occasionally (aisle seats make this easier).
- Exercise your feet and legs four to five minutes every hour when seated.
- Wear support socks that apply the proper amount of compression to the lower legs.
- If you have circulation problems or a history of blood clots, consult your physician prior to flying.

PULMONARY EMBOLISM FACTS

Left untreated, a deep vein thrombus can break off and travel in the circulation, getting trapped in the lung, where it blocks the oxygen supply, causing heart failure. This is known as a pulmonary embolism, which can be fatal. With early treatment, people with DVT can reduce their chances of developing a life-threatening pulmonary embolism to less than 1 percent. Blood thinners like heparin and coumadin are effective in preventing further clotting and can prevent a pulmonary embolism from occurring.

- It is estimated that each year more than 600,000 patients suffer a pulmonary embolism (PE).
- PE causes or contributes to up to 200,000 deaths annually in the United States.
- One in every 100 patients who develop DVT die due to pulmonary embolism.
- A majority of pulmonary embolisms are caused by DVT.
- If pulmonary embolism can be diagnosed and appropriate therapy started, the mortality can be reduced from approximately 30 percent to less than 10 percent.

Symptoms of Pulmonary Embolism

Some symptoms of a pulmonary embolism are:

- Shortness of breath
- Rapid pulse
- Sweating

- Sharp chest pain
- Bloody sputum (coughing up blood)
- Fainting

The symptoms are frequently nonspecific and can mimic many other cardiopulmonary events.

About Interventional Radiologists

Interventional radiologists are doctors who specialize in minimally invasive, targeted treatments that have less risk, less pain and less recovery time compared to open surgery. They use their expertise in interpreting X-rays, ultrasound, MRI and other diagnostic imaging studies to understand, visualize and diagnose the full scope of the disease's pathology and to map out the procedure tailored to the individual patient. Then during the procedure, they image as they go to guide tiny instruments, such as catheters, through blood vessels or skin, to treat diseases at the site of the illness nonsurgically.

Interventional radiology is a recognized medical specialty by the American Board of Medical Specialties. Interventional radiologists complete preliminary training in Diagnostic Radiology and advanced training in Vascular and Interventional Radiology. The American Board of Radiology certifies their specialized training.

For Further Information

For more information on DVT, pulmonary embolism, or interventional radiology, visit the SIR Web site at www.SIRweb.org.

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