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## Deep venous thrombosis in the ED: You must update your practice now

A 90-year-old woman complains of leg pain and swelling, with a history of hormone replacement therapy use, hypertension, osteoarthritis, and recent eye surgery.

- A 19-year-old female student presents with left groin pain and reports birth control pill use and recent pneumonia.

- A 41-year-old personal trainer with recent knee surgery says he's had pain and swelling in his left leg for two weeks.

Would you suspect deep venous thrombosis (DVT) in any of these patients? In fact, each one was diagnosed with DVT at Seattle-based Harborview Medical Center's ED.

"DVT knows no boundaries," says **Cynthia Natiello**, RNC, BSN, CCRC, the facility's vascular research nurse. "Any patient population can experience a DVT."

If a DVT patient slips through the cracks in your ED, there is a risk of pulmonary embolism, which can be fatal, she warns. Approximately 2 million patients are diagnosed with DVT each year.<sup>1</sup> According to the Dallas-based American Heart Association, approximately 200,000 of this group die of pulmonary embolism.

### EXECUTIVE SUMMARY

According to just-released guidelines for deep venous thrombosis (DVT) from the American College of Emergency Physicians, D-dimer tests will increase in use, an isolated single lower-extremity ultrasound should not be used to exclude DVT, and fibrinolytics should be used only in a limb-threatening situation.

- Patients who come to the ED with DVT symptoms are now being treated as outpatients with administration of low molecular weight heparin and a follow-up ultrasound, instead of being admitted.
- Know risk factors for DVT, including recent surgery, limb trauma, and malignancy.
- Laboratory tests should be ordered to determine whether the patient has a hypercoagulable state, if risk factors are not identifiable when DVT is diagnosed.

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“We easily see 300 or more DVT cases a year in our ED,” Natiello says.

You will need to immediately update your DVT protocols based on a just-released clinical policy from the Dallas-based American College of Emergency Physicians (ACEP). The policy gives recommendations that will change the way you care for DVT patients in the EDs. These changes include the use of D-dimer assay testing to determine whether or not a patient has DVT — a radical change for most EDs. (See resource box on p. 127 to obtain policy.) In releasing the policy, ACEP said it was developed because of an “explosion” of published research and development of new diagnostic modalities and therapies relating to patients with suspected DVT.

Natiello says, “It is critical to follow protocols utilizing validated procedures to diagnosis DVTs in the ED.” She adds that her ED is developing a new

algorithm based on the new ACEP recommendations.

Gwinnett Medical Center in Lawrenceville, GA is also developing new DVT protocols based on the new guidelines, reports **Denise Proto**, RN, nurse educator for emergency services. “We will be incorporating D-dimer testing as appropriate, and the use of low weight molecular heparin,” she says.

If you don’t update your policies, you may face increased liability for a misdiagnosed DVT, which could result in patient morbidity or mortality from a pulmonary embolism, warns Natiello. She offers this frightening scenario: A patient arrives in your ED with a recent leg injury complaining of pain and swelling, is diagnosed with a leg sprain, and is sent home with instructions to ice and elevate the leg and take pain medications. The patient is later admitted to the hospital with respiratory failure and dies due to massive pulmonary embolism.

To dramatically improve care of patients with DVT, use the following current approaches:

• **Identify risk factors.**

Your No. 1 priority is to obtain a thorough health history so you can identify risk factors for DVT, says Natiello. “Often, the combination of these risk factors have a synergetic effect, resulting in a DVT,” she says. Risk factors include the following:

- history of DVT in either patient or family;
- surgery, immobilization, regional or general anesthetic in previous six weeks;
- malignancy with nonrecurrence or local recurrence only, or extensive regional tumors;
- pre-thrombotic (hypercoagulable) state;
- hormone therapy;
- recent pregnancy;
- obesity;
- limb trauma including soft tissue injury, bruise, contusion, sprain, fractures of the tibia, fibia, the femur, hip, or pelvis.

• **Use fibrinolytics only in rare cases.**

Fibrinolytics pose a significant risk of morbidity and mortality, cautions **Stephen J. Wolf**, MD, a member of the ACEP subcommittee that developed the new clinical policy for DVT and an ED physician at Denver (CO) Health Medical Center.

“Their use should be considered in the rare case where there exists a significant limb-threatening situation, where the vascular supply to the distal extremity is in question,” he says.

For example, fibrinolytics should be considered for a DVT patient with severe swelling and signs of arterial compromise, including severe pain, paresthesias, diminished or absent pulses, or skin pallor, he says.

• **Give suspected DVT patients a duplex ultrasound.**

This is the current standard of care, according to

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## SOURCES AND RESOURCE

For more information on treatment for deep venous thrombosis (DVT), contact:

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**The complete text of the American College of Emergency Physicians' (ACEP's) clinical policy for treatment of deep venous thrombosis in the ED is available free on the ACEP web site ([www.acep.org](http://www.acep.org)). Click on "Clinical Policies" and scroll down to "Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients Presenting With Suspected Lower-Extremity Deep Venous Thrombosis."**

Natiello. "Although the venogram is the gold standard for diagnosis of DVT, it is not widely used for diagnosis because it's an invasive procedure and has risks of adverse events," she explains.

However, a single lower-extremity ultrasound cannot rule out DVT, even if the patient doesn't have obvious risk factors, stresses Wolf.

A negative ultrasound result may allow patients with moderate to high risk of DVT to be discharged from the ED, but a repeat ultrasound is needed in five to seven days to completely rule out DVT, Wolf explains. "This is a practice that often falls by the way-side," he says.

To increase compliance, Wolf suggests the following:

— Emphasize the risks of failing to get follow-up care.

— Offer to perform the second ultrasound in the ED.

— Schedule the second ultrasound directly with radiology, so the patients don't need appointments with their primary care physicians.

### • Add D-dimer assay testing to your ED's protocols.

The ACEP guidelines recommend the use of D-dimer assay tests to determine whether patients have DVT, Wolf says. "This brings the published research to the patient's bedside by providing EDs with guidance on how to incorporate this relatively new laboratory test into their diagnostic algorithms," he says.

Although some EDs already are using D-dimer assay testing, most only now are beginning to implement this important diagnostic tool, he adds.

"These tests are absolutely going to become more prevalent in the ED," Wolf predicts. "As EDs become more comfortable with the D-dimer's role, its use will go up, and the need for more time-consuming or invasive tests, such as computed tomography, ventilation/perfusion lung scan, and invasive angiogram, will go down," he says.

### • Determine if DVT patients have a hypercoagulable state.

If you cannot readily identify any risk factors for patients who have been diagnosed with a DVT, advocate for the ordering of lab tests to identify if the patient has a hypercoagulable state, advises Natiello.

One patient developed a DVT after a two-hour flight, says Natiello. "The immobility on the flight in itself may not have been enough of a risk factor in developing the DVT," she says.

However, lab results showed that the patient was positive for a hypercoagulable state, Natiello says. "The immobility combined with the hypercoagulable state resulted in a DVT," she explains.

### • Know the difference between cellulitis and DVT.

When assessing a patient for possible DVT, it is important to rule out cellulitis, says Natiello. Symptoms of DVT may include pain, erythema, and swelling, she adds.

With cellulitis, the presentation is a little different, Natiello says. "The extremity may be inflamed, hot to the touch, with purulent drainage," she says. "It is not always painful, and swelling may be present but localized to the foot."

### • Be familiar with the administration of low molecular weight heparin.

At Harborview's ED, vascular technologists who perform duplex ultrasounds are on-call only until 9 p.m., says Natiello. After hours, ED nurses administer low molecular weight heparin to patients who present with DVT symptoms if ultrasound is unavailable, and they teach patients the proper technique to self-administer injections, she says.

"These patients generally go home if they are stable, and the vascular lab contacts the patient to return the next day for the duplex ultrasound," she explains.



If the patient is diagnosed with a DVT, arrangements are made to see an anticoagulation pharmacist and follow up with a primary care physician, says Natiello.

"Not so long ago, the majority of DVT patients were admitted and placed on intravenous unfractionated heparin and coumadin," she says.

If ultrasound is not available, the patient has a low risk for DVT, and the patient has access to follow-up care, then low molecular weight heparin can be used until the ultrasound can be obtained expeditiously, according to Wolf.

Otherwise, the patient probably still should be admitted, he says. "Unfortunately, many patients do not have easy access to follow-up care," Wolf says. "For them, the ED is their primary care physician."

Administering low molecular weight heparin in the ED allows patients to be treated at home instead of being admitted, which decreases costs and speeds recovery, says Natiello.

"Low molecular weight heparin, as a newer anticoagulant for the treatment of DVT, is becoming a standard of care in the ED," she says.

## Reference

1. Hirsh J, Hoak J. Management of deep vein thrombosis and pulmonary embolism. A statement for healthcare professionals — Council on Thrombosis (in consultation with the Council on Cardiovascular Radiology), American Heart Association. *Circulation*. 1996; 93:2,212-2,245. ■

## Follow these steps for patients with DVT

Here are the steps taken when a patient with suspected deep venous thrombosis (DVT) presents at Seattle-based Harborview Medical Center's ED, according to **Cynthia Natiello**, RNC BSN, CCRC, the facility's vascular research nurse:

1. ED nurses take a health history and perform a thorough assessment, beginning with the patient's presenting symptoms. For example, if the patient reports pain and swelling, the ED nurse would ask when the pain and swelling began and would assess the intensity. Because injury is a risk factor for DVT, patients are asked if they recall any precipitating incident prior to the pain and swelling. If patients have chest pain and shortness of breath with unknown etiology, and they don't have pain or swelling, patients still are asked about DVT risk factors.

2. The ED physician reviews the patient's health

history and does a thorough assessment, including symptoms of chest pain and/or shortness of breath indicative of a pulmonary embolism.

3. If a DVT is suspected, validated diagnosis procedures are done such as duplex ultrasound and a pretest stratification in D-dimer.

4. If a DVT is confirmed and the patient is stable, the physician orders outpatient anticoagulation medications such as enoxaparin to be self-administered every 12 hours for approximately two weeks. In addition, patients will receive oral warfarin. ED nurses teach the patient about anticoagulation medications, including treatment purpose, length of treatment, side effects, and proper technique in self-administration of subcutaneous injections and blood draws.

5. If the patients are determined to be unstable, such as with symptoms of a pulmonary embolism, they may be admitted and administered intravenous unfractionated heparin and warfarin. ■

## Take critical steps when a trauma patient arrives

If your facility isn't a Level 1 Trauma Center, you probably don't care for trauma patients with multiple injuries on a daily basis. That's exactly why you must be familiar with the signs and symptoms that occur when a patient starts to decompensate, advises **Sharon S. Cohen**, RN, MSN, CEN, CCRN, trauma clinical nurse specialist at Broward General Medical Center in Fort Lauderdale, FL.

"The key is, what do you need to treat very quickly to get the patient to surgery right away?" she says.

Caring for trauma patients requires you to shift your

### EXECUTIVE SUMMARY

When caring for trauma patients with life-threatening injuries, know which interventions must be done before patients are taken to surgery.

- Although tachycardia is the key clinical sign of early shock, it will not be present in patients taking beta-blockers.
- A longboard does not protect a trauma patient's spine, so you must utilize spinal precautions to prevent further injury.
- Use the Glasgow Coma Scale to assess neurological status after a head injury, and maintain a systolic blood pressure of more than 90 mmHg.