Collaborating to Treat Venous Thromboembolism

Involving the emergency department in interventional management of VTE.

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Despite advances in pharmacologic options and enhanced attention and interest driven by quality concerns and public reporting of hospital data, the incidence of venous thromboembolism (VTE) (comprising deep venous thrombosis [DVT] and pulmonary embolism [PE]) has not declined during the past 30 years. In fact, due to the aging United States population, the obesity epidemic, and advances in the long-term management of chronic diseases associated with an increased risk of VTE, the incidence of VTE may now be on the rise.[1-3] It is estimated that 2 million cases of VTE occur annually in the United States, with 350,000 to 600,000 new cases diagnosed (two-thirds DVT, one-third PE).[2,4-6]

Further contributing to the public health and economic impact of VTE, for the remainder of their lives, these patients will remain at risk of developing postthrombotic syndrome (PTS) (chronic, painful venous insufficiency of the lower extremities) (Figure 1) and experiencing recurrent DVT (Figure 2). Whether they have acute disease or chronic complications with DVT or PE or painful leg ulcers, many of these patients ultimately present to the emergency department (ED). VTE has become a high-visibility concern in the ED because it is the cause of 100,000 deaths yearly,[4] the third most common life-threatening cardiovascular disease in the United States (only behind myocardial infarction and stroke),[7] and is the leading preventable cause of in-hospital death.[2]

IMPACT OF THE ACCP GUIDELINES

Meanwhile, recent guideline updates from specialty organizations including the American College of Chest Physicians (ACCP),[8] the American Academy of Family Physicians/American College of Physicians,[9,10] and the Society of Interventional Radiology[11,12] have recommended more aggressive treatment of proximal lower extremity DVT than the simple anticoagulation therapy that is usually initiated in the ED. In particular, the ACCP recommends thrombolytic therapy for selected patients with extensive acute proximal DVT "if appropriate expertise and resources are available" in order to "reduce acute symptoms and postthrombotic morbidity."[8] Although thrombolysis for DVT without PE is not a treatment that is ordinarily pursued in the ED, these guidelines expand the post-ED DVT therapeutic armamentarium for hospitalists beyond simple anticoagulation.

According to the guidelines, early thrombolytic treatment is potentially appropriate for patients with: (1) extensive iliofemoral DVT, (2) symptoms for < 14 days, (3) good functional status, and (4) life expectancy of ≥ 1 year.[8] For these patients, the ACCP guidelines recommend pharmacomechanical thrombolysis (lysis plus

Figure 1. A patient with PTS presenting to the ED 28 months after treatment of left leg DVT with anticoagulation therapy alone.

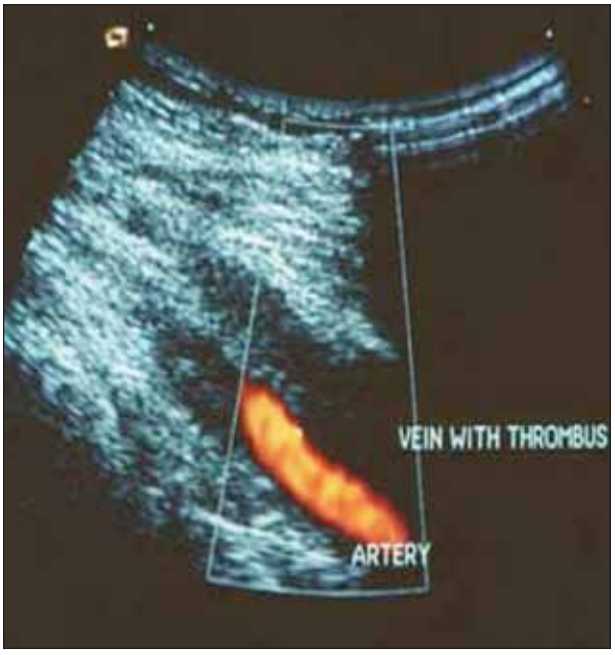

Figure 2. Color flow ultrasound image demonstrating absence of flow in a lower extremity vein, which is consistent with acute DVT.

thrombus fragmentation with or without aspiration) instead of catheter-directed thrombolysis (CDT) alone, again "if appropriate expertise and resources are available" to shorten treatment time.[8] It is this approach to which emergency physicians were recently introduced, for the first time in a systematic fashion, in a review article in the *Annals of Emergency Medicine*.[13]

Another factor affecting the contemporary emergency physician's thinking about VTE is chronic crowding and prolonged boarding of inpatients in the ED. Emergency physicians are more interested than ever in treatment strategies for any disease that safely reduce hospital length of stay, thereby creating more vacant beds in the hospital to house patients admitted from the ED. By reducing the likelihood of PTS, endovascular techniques could also attenuate future ED utilization by current patients with DVT.[13]

The typical course of ED treatment of acute proximal DVT is anticoagulation and admission. Although outpatient treatment of DVT to shorten hospital length of stay has become much more common during the past decade and is supported by the guidelines,[8] most patients with more proximal clots are admitted for at least a day or two to help ensure good compliance and follow-up with anticoagulation therapy. Treatment of acute DVT in the ED is considered essential to reduce the risk of PE.

The ACCP guidelines recommend early anticoagulation at a grade 1A level of evidence for objectively confirmed DVT and at a grade 1C level of evidence for high clinical suspicion of DVT, with a short-term course of subcutaneous low-molecular-weight heparin, subcutaneous pentasaccharide, or intravenous unfractionated heparin. Non-vitamin-K–dependent anticoagulation is continued until the international normalized ratio from treatment with warfarin (initiated at the same time) is ≥ 2 on 2 consecutive days.[8]

EARLY MANAGEMENT OF DVT

Besides reducing the risk of clot propagation and PE, early management of DVT also favorably affects the patient's risk of subsequent PTS.[14] This concern has contributed to the greater emphasis on early thrombolytic management in extensive proximal DVT. Recurrence of DVT in the same leg (the most important predictor for PTS)[15-17] and occurrence of the other symptoms of PTS are directly correlated with residual thrombus burden after the initial treatment. Although in contemporary practice, thrombolysis for VTE in the ED is limited to the treatment of acute PE with hemodynamic compromise, a practical interpretation of the 2008 ACCP guidelines suggests that ED management of certain patients with acute extensive iliofemoral DVT might appropriately include referral to a vascular surgeon or interventional radiologist for consultation about the possible long-term benefit of early endovascular thrombolysis.

Single-use disposable catheters that allow the combination of CDT and mechanical thrombus fragmentation/aspiration to be completed in a single treatment session, often eliminating the need for postprocedural intensive care unit monitoring and limiting lytic exposure, may be optimal. An approach such as isolated segmental pharmacomechanical thrombolysis[18] with the Trellis peripheral infusion system (Covidien, Mansfield, MA) is particularly appealing to emergency physicians, who will appreciate its safety, efficiency, and innovation.

The ACCP guidelines consistently refer to the advantages of endovascular therapy "if appropriate expertise and resources are available."[8] The collaboration between interventional radiology and the ED, which is typically limited to peripherally inserted central catheter line placement and percutaneous abscess drainage, is likely in many facilities never to have been encouraged or even initiated with respect to proximal DVT management.

The collaboration between vascular medicine and the ED is most often focused on arterial insufficiency, and emergency physicians may be unaware that some of those same consultants might offer interventional management of DVT. If indeed "appropriate expertise and resources are available" at a facility, the ED should be made aware of that capability. If that capability is to be exercised successfully, it must be available around the clock to the ED,

which is constantly under pressure to improve patient throughput and patient and family satisfaction.

ED-BASED REFERRAL SYSTEM

To initiate and support an ED-based referral system for interventional DVT management, several specific issues should be addressed: (1) provider education about the procedure and its advantages over simple anticoagulation therapy,[13] (2) agreement on the types of patients suitable for referral (as mentioned later), (3) delineation of a plan of action for referral (ie, the emergency physician introduces the concept of anticoagulation alone vs possible intervention, then the interventionist evaluates the patient in detail and, if appropriate, conducts the consent discussion), and (4) involvement of the facility's hospitalists, because the interventional evaluation will typically occur after the ED decision to admit has already been made.

There are no data on which to base screening criteria for suitability for interventional management in ED patients with DVT. However, the ACCP guidelines generally recommend referral for consideration of CDT in selected patients with extensive acute proximal DVT who have a low risk of bleeding.[8] According to the 2009 quality improvement guidelines from the Society of Interventional Radiology, CDT is contraindicated in patients with a hemorrhagic disorder, an anatomical lesion that is prone to bleeding, or those with an absolute contraindication to anticoagulant therapy.[12] Among patients who might be expected to gain substantial benefit from thrombolysis are those with significant iliofemoral clot burden, acute phlegmasia (symptom onset < 10 days) requiring aggressive and urgent intervention to decrease compartment pressures and resolve ischemia, and patients with occluded veins secondary to May-Thurner syndrome (iliac vein compression).[19]

However, the other types of patients who should be considered for referral for possible endovascular therapy from the ED should be discussed when establishing a new referral plan.[13] For example, for young patients with acute DVT but who are in otherwise good health with a normal life expectancy, prompt clot resolution may provide disproportionate benefit by returning them more quickly to work. In addition, because it can be assumed that such patients will have a longer post-DVT life span than older DVT patients, greater benefit might be derived from the reduction of the likelihood of PTS, which can occur many years after the index DVT.

Secondly, older patients with terminal disease, for whom catastrophic PE could foreshorten the remaining life span, might be candidates for aggressive clot removal. Such a strategy could allow resumption of plans to arrange one's affairs or to see family as planned when the terminal diagnosis was made. Finally, a pharmacomechanical approach could be considered as a more definitive alternative to inferior vena cava filter placement in patients with contraindications to anticoagulation, although this approach deserves prospective study and would have to be balanced with the small but finite risk of extra-clot lysis.[19]

CONCLUSION

If the capabilities of the facility, the interest and enthusiasm of the interventionist, and the willingness of emergency physicians to make a referral call can all be aligned, the ED is a promising source of early screening and referral of candidates for interventional therapy. Increased awareness of VTE issues by emergency physicians may enhance the current opportunity for initiating multidisciplinary discussions that could result in a program that has potential to benefit patients and improve hospital and ED throughput. ■

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