Epidemiology of VTE in the US: The Opportunity for Prevention Looms Large

Robert Pendleton, MD
Associate Professor of Medicine
Director University Healthcare Thrombosis Service
Co-Director University of Utah Hospitalist Program
University of Utah Medical Center

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Venous thromboembolism (VTE), encompassing both deep-vein thrombosis (DVT) and pulmonary embolism (PE), is a major public health problem. VTE strikes an estimated 1 million people, including up to 300,000 deaths annually in the United States. In fact, VTE leads to more deaths than breast cancer, AIDS, and highway fatalities combined. Ethnicity and advanced age are independent risk factors for VTE; as an example, the annualized incidence rate of VTE is 1:10,000 patient/years in people less than 30 years of age compared to 1:100 patient/years in patients over the age of 80. An aging population, increasingly sensitive diagnostic imaging, and a rise in other associated risks (e.g. obesity), will likely lead to increasing VTE rates in the coming decades.

Perhaps the greatest risks associated with VTE are active cancer and an acute illness leading to hospitalization and/or surgery (hazard ratio of 7 to 22). In fact, 32% of those diagnosed with VTE have cancer, 26% of VTE events are diagnosed in the hospital, and 37% are diagnosed within the 3 months after hospitalization or surgery. Routine implementation of effective primary VTE prophylaxis in these at-risk patients (RRR of approximately 60%) could, therefore, ease the clinical and economic burden that VTE imposes on the healthcare system. The burden of VTE, availability of effective prevention, and demonstrated lack of routine implementation in U.S. hospitals has led national regulatory agencies to recognize VTE prevention as an important patient safety initiative. In an analysis by the Agency for Healthcare Research and Quality, VTE prevention was the number one ranked patient safety practice and is now endorsed by the National Quality Forum and the Joint Commission. In fact, hospitals are required to report performance on VTE prevention in the post-surgical setting as it relates to the surgical care improvement project (SCIP). This performance data has been widely available to consumers over the past year on Hospital Compare (http://www.hospitalcompare.hhs.gov). These current regulatory requirements focus on the appropriate risk assessment and implementation of VTE prevention in surgical patients, yet medical patients account for half of all hospital related VTE and twice the number of fatal events. As such, within the next two years risk assessment and prophylaxis for all hospitalized patients will emerge as a regulatory standard.

Importantly, electronic alerts, computer decision support, and manual human screening and alerts have all been demonstrated to be effective in increasing prophylaxis use and reducing hospital-associated VTE.

Our challenge to reduce VTE does not stop with regulatory requirements. Our current "one dose fits most" during the period of hospitalization strategy for VTE prevention may not be sufficient. We need to continue identifying strategies to deliver the most aggressive measures to those at the highest risk. Further, our healthcare system is one of dynamic change and hospitalization is increasingly avoided in sick patients and those who are admitted have diminishing lengths of stay. As we shift our care environment away from the acute care hospital, VTE events are now most commonly noted in the outpatient setting soon after hospitalization. With a change in healthcare delivery, our strategies to reduce VTE must too evolve wherein VTE prevention is not simply addressed at the time of admission, but rather throughout the continuum of healthcare which may include the time of discharge, admission to a skilled nursing facility, or at home during heightened periods of risk.

VTE prevention is an important initiative and one more than worthy of pursuit. However, despite marked improvements in our understanding of how to reduce the burden of VTE, our strategies must continue to evolve to meet the challenges of a changing population and evolving healthcare system.

Suggested References:

Geerts, et al. Prevention of venous thromboembolism: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). CHEST (2008); 133: 381s-453s.
This is the consensus guideline by the American College of Chest Physicians (ACCP). Considered by many to be the "authoritative" source of information on VTE prevention, new guidelines by the ACCP should be coming later this year.

The Surgeon General's Call to Action to Prevent Deep Vein Thrombosis and Pulmonary Embolism 2008. Available at: www.natfonline.org/call-to-action-on-dvt-2008.pdf
This is a national Call to Action by the Surgeon General to foster greater prevention efforts.

Spyropoulos A. Emerging Strategies in the Prevention of Venous Thromboembolism in Hospitalized Medical Patients. CHEST 2005; 128:958-969.
This is a good review on DVT prevention focusing on the medically-ill patient. Issues such as the optimal evidence-based dosing of medications and cost are discussed.

King CS, Holley AB, Jackson JL et al. Twice versus three time's daily heparin for thromboembolism prophylaxis in the general medical population: a meta-analysis. CHEST 2007; 131: 507.
There is no prospective RCT comparing different dosing regimens of heparin in medically ill patients. This meta-analysis looks at event rates and concludes that for most patients thrice daily heparin may provide a better overall risk: benefit profile than less aggressive dosing regimens.

Dentali F, Douketis JD, Gianni M, et al. Meta-analysis: Anticoagulant prophylaxis to prevent symptomatic venous thromboembolism in Hospitalized medical Patients. Annal Intern Med 2007; 146: 278-288.
Many RCT's use surrogate endpoints such as asymptomatic VTE on screening studies. This meta-analysis looks at clinically overt symptomatic events and concludes that pharmacologic prophylaxis reduces symptomatic events, including fatal PE, by 50-60% in medically-ill patients.

Warkentin T.E. et al. Treatment and Prevention of Heparin-induced thrombocytopenia: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th edition); *CHEST;* 133(suppl): 240s-38
Heparin-induced thrombocytopenia is an important complication of heparin exposure. This guideline reviews the commonness of HIT and provides recommendations on the frequency of required platelet count monitoring

Creekmore F, Pendleton RC, et al. The Incidence and Economic Implications of Heparin Induced Thrombocytopenia when Preventing Venous Thrombosis in Medical Patients. Pharmacotherapy 2006; 26(10): 1438-1445.
This large single institution study reports the commonness of HIT and provides an analysis of the cost implications of HIT when occurring in these medically-ill patients.

Spencer FA, Lessard D, et al. Venous thromboembolism in the outpatient setting. Arch Intern Med. 2007;167(14):1471-5.
The epidemiology of VTE appears to be changing. Most (approximately 60%) diagnosed VTE events occur either during a hospitalization or during the 30-days after hospital discharge. This has implications about the need to prophylax during hospitalization. In the era of reducing length of hospitalization, this data also prompts us to address length of prophylaxis issues.

Pendleton R, Wheeler M, and G Rodgers. Venous Thromboembolism Prevention in the Acutely Ill Medical Patient: A Review of the Literature and Focus on Special Patient Populations. A J Hematology 2005; 79:229-237.
This review discusses the current literature on medically-ill DVT prevention and includes strategies to address pharmacologic prophylaxis in patients with severe obesity and renal impairment.

Suggested Web Resources:

Hospital Compare: http://www.hospitalcompare.hhs.gov

This is a public forum of reported quality indicator data that can provide hospital-to-hospital comparisons as well as national benchmarks. Current data includes DVT prevention in surgical patients.

National Quality Forum: http://www.qualityforum.org/

The National quality forum has endorsed VTE prevention as a key patient safety practice. Currently additional VTE prevention measures (beyond surgical patients) are undergoing testing and feedback. You can check here to see the status of these and other measures.

Society of Hospital Medicine Website on VTE prevention mentoring
http://www.hospitalmedicine.org/AM/Template.cfm?Section=Home&CONTENTID=11323&TEMPLATE=/CM/HTMLDisplay.cfm

This is a Society of Hospital medicine site which features a QI support network including a mentoring program to help individual hospital's succeed in DVT prevention initiatives.