Deep Venous Thrombosis and Venous Thromboembolism Prophylaxis

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KEYWORDS

• Venous thromboembolism • Deep venous thrombosis • Risk factors
• Management strategies • Prophylaxis

KEY POINTS

- Venous thromboembolism (VTE) affects up to 25% of hospitalized patients, with up to 30% of those experiencing complications.
- Risk stratification is important in choosing therapy for prevention and management of VTE.
- Management of VTE depends on precipitating factors and future risk of VTE progression versus bleeding.
- Low-molecular-weight heparin is the preferred anticoagulant for initial treatment of VTE.

Venous thromboembolism (VTE), which includes deep venous thrombosis (DVT) and pulmonary embolism (PE), remains an all too familiar risk for surgical patients, occurring in up to 25% of those hospitalized.[1] These patients are a unique population who possess all 3 components of Virchow triad (stasis, hypercoagulability, and endothelial injury), completing the triad known to be the cause of thrombus formation. Despite validated guidelines, the problem is frequently left inappropriately addressed, leaving patients at risk for a process that can lead to significant morbidity and mortality. Fifty percent of all DVTs are asymptomatic, but approximately 30% will have additional complications.[2]

For some patients, a DVT is a transient episode (ie, the symptoms resolve once the disease is successfully treated). For others, it can lead to a PE, which occurs in more than one-third of patients with DVT.[1,2] PE causes sudden death in up to 34% of patients,[3] particularly when one or more of the larger pulmonary arteries are completely blocked by clot. Most of those who survive do not have any lasting effects; however, if the embolus in the lung fails to completely dissolve, chronic pulmonary

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hypertension may eventually occur, causing chronic shortness of breath and varying degrees of heart failure.

The Surgeon General's First Call to Action to Prevent Deep Vein Thrombosis and Pulmonary Embolism came in 2008 and estimated 350,000 to 600,000 Americans each year have a DVT and/or PE. Furthermore, at least 100,000 deaths are attributed to DVT/PE each year.[3] Of those who survive, many go on to have complications with serious and negative impacts on quality of life. DVT and PE are estimated to be the number one preventable cause of death in hospitalized patients. To offset this risk, the Surgical Care Improvement Project states in its guidelines that all surgical patients should have thromboprophylaxis ordered and administered within 24 hours of an operation. The Joint Commission also requires that all surgical patients receive anticoagulation, reflecting measures adopted by the Centers for Medicare and Medicaid Services, starting May 1st, 2009.[4]

Despite initiatives and mandates, VTE prophylaxis is underutilized in the United States. A 2009 analysis by Franklin Michota,[5] citing data from a study by Brigham and Women's Hospital in 2000, revealed that only 34% of high-risk patients receive appropriate prophylaxis. An article published in 2014 by the *Journal of the American College of Surgeons* about adopting mandatory VTE risk stratification and administration similarly revealed that only 58.5% of surgical patients at risk received VTE prophylaxis.[4] Why? The reasons cited are as follows:

1. There is a fear of anticoagulant-associated bleeding.
2. There is a lack of awareness regarding VTE.
3. It is thought that guidelines are based on risks and benefits of prophylaxis in clinical trials that exclude recommendations for certain subsets of patients.
4. Individual risk assessment is necessary, making a protocol difficult to reinforce.

The following sections are intended to address each of these cited reasons individually.

BLEEDING RISK

The International Medical Prevention Registry on Venous Thromboembolism investigators developed a scoring system to calculate the risk of bleeding in medical patients.[6] **Table 1** shows the bleeding risk factors identified for purposes of this study.

Scores greater than or equal to 7.0 were associated with a 7.9% risk of any bleeding and a 4.1% risk of major bleeding.[6] If the risk of bleeding is greater than the risk of VTE, then chemical prophylaxis can be avoided.

The ninth edition of the American College of Chest Physicians' (ACCP) guidelines, revised and published in 2012, includes a consideration of the bleeding risk in patients receiving anticoagulants. They did not assess how the risk of bleeding would influence every recommendation because it would be unlikely to change the recommendation, there are few data assessing outcomes in patients with differing risks of bleeding, and because of the lack of validated tools for stratifying bleeding risk. For extended-duration anticoagulation, recommendations are based on 4 primary risk groups for VTE and 3 risk groups for major bleeding (**Table 2**). The estimated total of recurrent VTE versus major bleeding for each of the 12 combinations is shown in **Table 3**.[7]

LACK OF AWARENESS REGARDING VENOUS THROMBOEMBOLISM

Table 4 is a reproduction of the Venous Thromboembolism Update by Joseph Caprini, MD, and summarizes the incidence and percent of complications of VTE in an attempt to underscore the significance of VTE and associated complications.[8]