



Venous Thromboembolic Events in an Orthopaedic Practice

The prevalence of deep vein thrombosis (DVT) in perioperative orthopaedic patients is high, ranging from 50% to 70% in unprotected total joint patients and from 23% to 34% in hip fracture patients who are receiving thromboprophylaxis. A variety of anticoagulant options are available for these patients including aspirin, pneumatic compression devices, warfarin, low-molecular-weight heparin, unfractionated heparins, and factor Xa inhibitors. These agents provide different and unique prophylaxis based on their mechanism of action. Currently, the standard of care following major orthopaedic elective or traumatic procedures is to prescribe chemoprophylaxis and/or mechanical prophylaxis during the postoperative period. However, the types of agents employed vary as do the complication rates. Factors that influence the choice of DVT prophylaxis agents include patient-specific issues and risk factors, potential local wound problems, wound bleeding, and local or distant hematoma. Agent choice is impacted by physician-determined goals which may include prevention of asymptomatic thromboembolic events, prevention of only symptomatic thromboembolic events, or prevention of pulmonary embolism. In the past 5 years, controlled studies involving large numbers of patients using venography as an end point have demonstrated the superiority of low-molecular-weight heparins and factor Xa inhibitors over alternative options with regard to total venous thromboembolic events (VTE).

Although many orthopaedic surgeons regard asymptomatic events as insignificant and only consider symptomatic VTE or pulmonary embolus to be significant, this issue of the Journal points out some concerns of this approach and highlights diagnosis and management options. General surgeons and internists who treat patients with venous stasis ulcers and post-thrombotic syndrome (PTS) are very concerned with the incidence and morbidity of all forms of VTE. In reviewing these articles, the following observations are of interest:

1. There are profound societal implications of VTE;
2. VTE may impact on patients' functions and quality of life;
3. There are significant disparities in many orthopaedic practices and published guidelines (1);
4. The clinical ramifications of PTS may be profound; and
5. Stratification as a determinant of prophylactic management may be of extreme importance.

Post-thrombotic syndrome is a relatively neglected entity within the orthopaedic community and deserves attention. The fact that many orthopaedic surgeons feel that PTS is not only overrated but of insignificance must be contrasted with the regard which general surgeons and internists have for this entity. The incidence of asymptomatic DVT after total hip arthroplasty of the lower extremity is 50–70%. However, the incidence of symptomatic VTE or pulmonary embolus is very low. PTS may occur following either symptomatic or asymptomatic VTE and produces lower extremity pain, aching, heaviness, swelling, varicosities, skin hyperpigmentation, dermatitis, and ulceration. It is estimated that PTS may affect 15 million patients in North America, and 4% of these patients will develop significant venous ulceration. The clinical significance of this problem is discussed in Dr. Caprini's article.

In addition, Dr. Caprini discusses the importance of thrombosis risk factors and provides a helpful total risk factor score which predicts the incidence of DVT. Patients at low risk with a 2% incidence do not require specific measures of prophylaxis and ambulate early. These patients

typically have none or one risk factor. Patients with two risk factors have a 10–20% incidence of DVT, are considered to be at moderate risk, and should be treated with elastic stockings or intermittent pneumatic compression, low-molecular-weight heparin, or factor Xa inhibitor. Patients with three to four risk factors have a 20–40% incidence of VTE; patients with five or more risk factors have a 40–80% incidence. These patients require significant prophylaxis for low-dose fractionated heparin, low-molecular-weight heparin, warfarin, or factor Xa inhibitors. Caprini underscores the significance of venous thromboembolic events, either symptomatic or asymptomatic. Of importance to the orthopaedic surgeon is the fact that an asymptomatic VTE may have a profound effect on future orthopaedic procedures and the patient is at a significantly increased risk after any VTE, known or unknown. The existence of an asymptomatic VTE predisposes the patient to symptomatic thrombosis and increases the risk of fatal or nonfatal pulmonary embolus.

PTS is significant. It may occur following a symptomatic or an asymptomatic thrombosis. In either case, thrombosis of the delicate venous valvular system causes irreversible and progressive damage. In asymptomatic patients, the damage may be insidious with symptoms presenting many months later. Once valves have been damaged, increased venous pressure produces stasis, symptoms, and possible ulceration. Once PTS occurs, the underlying pathology cannot be altered; however, pressure garments can decrease symptoms and may delay further deterioration. Even with symptomatic management, however, the patient is at risk for future thromboembolic episodes. If these observations are true, then orthopaedic surgeons have an obligation to document that the orthopaedic procedures have not produced asymptomatic VTE and they must recognize symptomatic problems. This approach may require radical changes in VTE prophylaxis programs which will have clinical and practice significance.

The current gold standard for VTE prophylaxis is outlined by Dr. Geerts in *Chest* (1). These guidelines are based on a consensus methodology using the peer-reviewed literature. Orthopaedic patients at risk for VTE should be treated with appropriate prophylactic management programs. Optimal treatment of at-risk patients is still debated by orthopaedists; however, the majority of the peer-reviewed data supports the use of low-molecular-weight heparin, factor Xa inhibitors, and therapeutic Coumadin. Aspirin, dextran, foot and leg compression, and intermittent pumping devices are not first-line management options for at-risk patients and their efficacy is not well delineated for many orthopaedic procedures.

The editorial board hopes you enjoy this issue of the Journal.

Reference

1. Geerts, W. H., Heit, J. A., Clagett, G. P., et al. Prevention of venous thromboembolism. *Chest* 119(suppl. 1): 132S–175S, 2001.

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