AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

RECONSTRUCTION • SPORTS MEDICINE • TRAUMA • TECHNOLOGY

Position Statement: The Use of VTED Prophylaxis in Foot and Ankle Surgery

Position Statement

There is currently insufficient data for the American Orthopaedic Foot & Ankle Society (AOFAS) to recommend for or against routine VTED prophylaxis for patients undergoing foot and ankle surgery. Further research in this field is necessary and is encouraged.

The American Orthopaedic Foot & Ankle Society is a medical specialty society whose 2,000 members are orthopaedic surgeons specializing the surgical and non-operative treatment of injuries, disease, and other conditions of the foot and ankle. The AOFAS promotes quality patient care through education, research and training of orthopaedic surgeons and other health care providers, and serves as a resource for government, industry and the health care community on issues concerning the medical and surgical care of the foot and ankle.

Background

Venous thromboembolic disease (VTED), encompassing both deep venous thrombosis (DVT) and pulmonary embolism (PE), is a potentially fatal complication of orthopedic surgery. In hip replacement surgery, for instance, the historical incidence of VTED in patients not receiving prophylaxis is as high as 69%.[1,2] This decreases dramatically with various prophylactic measures.[3] Prophylaxis, however, especially by chemical means, is not without risk, including the risk of major bleeding.

VTED can also occur in patients undergoing foot and ankle procedures, although with less frequency than in knee and hip arthroplasty. The incidence is difficult to determine, given the diversity of foot and ankle procedures as well as the wide range of their magnitude and complexity. It is also confounded by the fact that the thrombotic endpoint varies in the literature (e.g. clinical[4] versus phlebographic[5] detection and proximal versus distal location). In one study examining Achilles tendon repair, the overall incidence of phlebographically confirmed DVT was 36% in patients not receiving prophylactic anticoagulation.[6] The incidence of proximal DVT was only 6%. These rates were not significantly different compared to patients who received prophylactic anticoagulation. Meanwhile, in a much larger study that examined clinically symptomatic disease, the rate of VTED was under 1% in over 45,000 patients undergoing ankle fracture surgery.[7]

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Risks and Benefits of VTED Prophylaxis

The decision to implement anti-thrombotic prophylaxis, as well as the measures used to do so, should be based upon a patient specific risk/benefit analysis. This takes into consideration a patient's risk for VTED as well as the potential risks and side effects of prophylactic measures.

There are several risk factors for VTED. Prior thromboembolic disease and a hypercoagulable state have been identified as strong risk factors. Additional potential risk factors that have been cited include, but may not be limited to, history of recent malignancy, family history of VTED, obesity, oral contraceptive use, multi-trauma, age > 60 years, venous stasis/varicose veins, and prolonged immobilization.[8,9] Nevertheless, the strength of these factors as risk factors likely depends on the procedure performed, and their correlation with foot and ankle procedures has not been robustly investigated.[9] Obesity, for instance, has not been shown to be an independent thrombotic risk in all cases.[10] Graded risk assessments have been used in other specialties but have not been validated in foot ankle surgery.[8]

Several different modalities of VTED prophylaxis are available for patients undergoing foot ankle surgery.

Mechanical prophylaxis such as elastic compression stockings and sequential compression calf pumps or foot pumps on the contralateral extremity can be utilized intra-operatively and continued post operatively through the duration of the hospital stay.[11,12] While the true efficacy of this modality in foot and ankle surgery is unknown, complications are negligible and compression pumps may be considered in both the outpatient and in-patient setting. The duration of the surgical procedure for which these are beneficial is unknown, as is the optimal duration of their use post-operatively.

Chemical prophylaxis includes the use of anti-coagulants such as warfarin, unfractionated heparin, and low molecular weight heparins (LMWHs). It also includes aspirin, which is an antiplatelet agent. Aspirin, warfarin, and LMWHs may be continued beyond the hospital or outpatient stay and thereby offer more prolonged protection. The specific indications for the use of these agents in foot and ankle surgery remain undefined. For instance, one investigation failed to demonstrate a statistically significant difference between the incidence of both proximal and distal DVT in patients who underwent Achilles tendon repair and were randomized to receive either dalteparin or placebo.[6] Another, investigation, however, demonstrated that for patients requiring prolonged immobilization for treatment of either an Achilles rupture or leg fracture, the use of riviparin resulted in a statistical decrease of only the distal DVT rate.[5] Both of these studies are limited due to their small numbers.

In yet another study of 1,540 ambulatory patients with ankle fractures requiring open reduction and internal fixation, the incidence of thromboembolic events was 2.99%, with 2.66% involving a deep venous thrombosis, and 0.32% involving a nonfatal pulmonary embolism.[13] In this study, the clinically detectable thromboembolic event was not influenced by the use of thromboprophylaxis. To this end, the recent guidelines published by the American College of Chest Physicians even suggest no prophylaxis rather than pharmacologic thromboprophylaxis in low risk patients with isolated lower-leg injuries requiring leg immobilization.[14]

Chemical prophylaxis, however, has risks. The associated risks may be substantial, and include both major and minor bleeds. Major bleeds result in significant morbidity and can be life threatening. These include intra-ocular and intra-cranial bleeds, as well as major bleeds at the surgical site or in the gastrointestinal (GI) tract that may require transfusion. Minor bleeds that do not require transfusion can also occur at the surgical site or GI tract and can still result in substantial morbidity for the patient. Anti-coagulation may also result in increased wound drainage and hematoma, which in turn may lead to longer hospital stays increased risk of surgical site infection. Finally, heparin based chemoprophylaxis carries the risk of heparin induced thrombocytopenia (HIT), a potentially fatal side effect characterized by abnormal platelet activation. Patients with HIT may develop DVT, PE, leg ischemia, bleeding, stroke, and myocardial infarction. HIT has been reported to occur more frequently following orthopedic surgery compared to other types of surgery.[9,15]

An alternative to medical prophylaxis is the utilization of inferior vena cava (IVC) filters. Indications for these devices include patients at high risk for VTED who have a specific contra-indication to anti-coagulation and patients who have sustained a pulmonary embolism despite therapeutic anticoagulation. These are not indicated as first line prevention against thrombosis or embolism and do not prevent the development of a deep vein thrombosis. They also are not without risk, including the risk of vessel injury, hemorrhage, migration, fistula formation, pneumothorax, and thrombosis.[16]

Conclusion

There is currently insufficient data to recommend for or against routine VTED prophylaxis for patients undergoing foot and ankle surgery. We do recommend, however, that patients be assessed pre-operatively for VTED risk. If sufficient risk factors are present, VTED prophylaxis may be considered and weighed against the potential risks of prophylaxis. Acceptable options for prophylaxis include mechanical and chemical agents. Exactly what constitutes sufficient risk, however, especially in the absence of substantial risk factors, remains undetermined. Further, the optimal means and duration of prophylaxis is also undefined.

The AOFAS recognizes that further research in this field is necessary and strongly encourages future investigations into VTED and foot and ankle surgery.

Definitions

Venous thromboembolic disease (VTED). A clinical spectrum of pathologic clotting that encompasses both deep venous thrombosis and pulmonary embolism (see below).

Deep venous thrombosis (DVT). The formation of a blood clot, or thrombus, in one of the deep veins of the body.

Pulmonary embolism. A pulmonary embolism is a sudden blockage of one or more of the arteries in your lung by a blood clot that has travelled from another body part (e.g. the leg).

Mechanical prophylaxis. The use of external, physical devices to prevent the occurrence of VTED. These include elastic compression stockings worn on the legs and also sequential compression pumps that cause the blood to continue flowing through the veins of the leg.

Chemical prophylaxis. The use of pharmacologic agents to prevent the occurrence of VTED. These include medications taken by mouth (e.g. aspirin and warfarin) and those administered by an injection (enoxaparin).

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