

Consultation Corner

Managing Deep Vein Thrombosis in the Medicare Population

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Introduction

Venous thromboembolic disease (VTE) (deep vein thrombosis [DVT] and/or pulmonary embolism [PE]) is a common and potentially catastrophic disorder. Not only is there significant risk of mortality, but quality of life, which tends to improve within 4 months of appropriate therapy, actually deteriorates in one-third of patients with DVT regardless of therapy.¹ Despite the existence of several effective methods of prevention, many patients at risk for VTE do not receive appropriate prophylaxis. Luckily, there are a number of effective and safe therapeutic alternatives for the management of acute DVT that effectively reduce the associated risk of serious morbidity and mortality. However, prompt recognition and close follow-up are required to improve outcomes.

Risk Factors for the Development of VTE

There are multiple risk factors for the development of VTE (Table 1).² Advanced age, malignancy, prolonged bed rest, major orthopedic or oncologic surgery, major co-morbid medical conditions (stroke, congestive heart failure), and obesity are important risk factors. The Medicare patient population often has many of these risk factors in concert, resulting in a dramatic increase in the risk of VTE. Therefore, it is critical that the physician anticipate the level of risk and provide appropriate methods to reduce such risk.

Prophylaxis of DVT

Options for prevention of DVT range from early mobilization, mechanical (graduated compression stockings, intermittent pneumatic compression devices), and pharmacologic prophylaxis (subcutaneous adjusted-dose unfractionated heparin [UFH]; low-molecular-weight heparin [LMWH]; adjusted-dose warfarin). The decision as to which method to utilize depends on the level of risk of DVT and the potential hazards of prophylaxis. For example, patients preparing to undergo total knee arthroplasty are advised to receive perioperative LMWH, fondaparinux, or adjusted-dose warfarin.² However, in younger patients undergoing laparoscopic cholecystectomy, early ambulation and mobilization may be all that is required.¹

Recent data obtained from a retrospective review of the medical records of 3778 Medicare patients (mean age 66 years) from 38 US medical centers over a 3-year period revealed that only 85% of patients received appropriate VTE prophylaxis following total joint-replacement surgery. More frighteningly, among patients with newly established VTE, <50% maintained parenteral therapy with LMWH or UFH until

Table 1.
Risk Factors for the Development of VTE*

- Surgery (especially orthopedic joint replacement)
- Trauma (particularly spine, long-bone fractures, closed head trauma)
- Prolonged immobility
- Malignancy
- Prior VTE
- Advancing age
- Obesity
- Oral contraceptives and estrogen replacement therapy
- Acute medical illness
- Inflammatory bowel disease
- Varicose veins
- Inherited/acquired thrombophilic disorders
- Central venous catheterization

*VTE=venous thromboembolic disease, which is comprised of deep vein thrombosis (DVT) and/or pulmonary embolism (PE).

the International Normalized Ratio (INR) was ≥ 2.0 on warfarin.³ It is these modern data that underscore the need for a complete understanding of the risks of failing to provide adequate prophylaxis and inadequate therapy among patients at risk for VTE.

The use of electronic alerts for VTE risk to physicians upon the admission of a patient to the hospital has demonstrated a dramatic reduction in subsequent development of DVT and PE.⁴ These electronic alerts prompted physicians to provide adequate VTE prophylaxis for patients. As electronic physician order entry systems become more prevalent in hospitals, they will provide a straightforward and powerful method of reducing major morbidity and mortality among high-risk Medicare-eligible patients.

Diagnosis and Management of DVT

The diagnosis of DVT often begins with duplex ultrasonography of the lower extremity veins.⁵ Performed by skilled medical personnel in accredited vascular noninvasive laboratories (see: www.icavl.org). If venous duplex ultrasonography is normal and the clinical suspicion persists, options for imaging the lower extremity and central pelvic veins include magnetic resonance venography⁶ and computerized tomographic arteriography.⁷ In patients with suspicion of isolated calf vein thrombosis, in whom the proximal lower extremity veins are normal, sequential venous duplex ultrasonography over the course of 2 to 3 weeks, performed to identify propagation of thrombi into the popliteal vein, is a reasonable strategy. If no propagation is noted after 2 to 3 weeks of repeated duplex ultrasound surveillance, no further testing or therapy is required.

Treatment of acute DVT is based on the assessment of the risks and benefits of therapy. In those patients whose bleeding risk is acceptably low, treatment with a parenteral agent immediately upon the time of diagnosis is critical. Classically, during hospitalization of patients for ~5 days, administration of intravenous (IV) UFH and overlap with oral vitamin K antagonists (commonly warfarin in the United States) until the INR is ≥ 2.0 for 2 consecutive days has been the predominant

strategy for acute management of patients with acute iliofemoral DVT.⁸

Unfractionated heparin is a difficult agent to administer. The pharmacokinetics of UFH are unpredictable and the drug requires frequent assessment of its anticoagulant effect via repetitive activated partial thromboplastin time (aPTT) testing. Recently, many prospective, multicenter, randomized, trials have demonstrated similar, or even superior efficacy and safety of LMWHs administered subcutaneously over IV UFH.⁹ Several advantages of this strategy are evident:

- LMWHs offer a predictable dose-response curve;
- LMWHs do not require monitoring in the majority of patients; and
- LMWHs may allow for outpatient management for many.¹⁰

Overlap of subcutaneous LMWHs with oral vitamin K antagonists is critical, given the prolonged half-life of Factor II (prothrombin). The duration of oral vitamin K antagonists for the treatment of DVT is a controversial issue. Most have agreed that longer courses of therapy offer a greater reduction in the risk of recurrent DVT, shown to occur in ~30% of patients within the first 3 to 5 years after diagnosis.¹¹ A recently published meta-analysis of studies evaluating the duration of anticoagulation for DVT revealed that patients treated for ≥ 6 months had a statistically significant reduction in recurrent VTE compared to those patients treated for ~3 months.¹²

With the advent of retrievable inferior vena cava filters (IVCF), there has been a surge in the use of these devices in patients who may not truly require them.¹³ Despite the temptation and clear efficacy in reducing the subsequent risk of PE, systematic use of IVCFs increases the risk of DVT and has no impact on survival, even when following patients 8 years after their initial thrombotic event.¹⁴ Therefore, strict indications for the use of IVCFs must be followed (Table 2).

Newer agents for primary therapy of DVT are being developed. Currently, the synthetic pentasaccharide agent, fonda-

Table 2.

Absolute Indications for Placement of Inferior Vena Cava Filters

- Active or recent bleeding, preventing safe initiation of anticoagulant agents
- New or recurrent PE during adequate therapy with anticoagulant agents
- Propagation of DVT during adequate therapy with anticoagulant agents
- Survival after massive PE

parinux, has been shown to reduce the risk of recurrent PE in patients with an acute PE,¹⁵ as well as primary therapy for acute DVT.¹⁶

Newer devices and pharmacologic agents to dissolve proximal deep vein thromboses are being developed and tested in an effort to reduce the risk of acute PE and prevent the long-term complications of DVT, specifically chronic venous insufficiency (CVI). Given that DVT results in CVI in a large proportion of patients within 3 years of diagnosis, intervention with catheter-delivered thrombolytic therapy may result in prevention of venous valvular dysfunction and CVI.¹⁷ In a series of patients with DVT, catheter-directed thrombolytic therapy resulted in preservation of venous valvular function in 44% of patients compared to only 13% of patients who received systemic thrombolysis.¹⁸ However, most candidates for this aggressive form of treatment are younger than the Medicare population because the hemorrhagic risk tends to increase with age.

Conclusions

Deep vein thrombosis is a common and serious disorder in the Medicare population. Understanding the risk factors for the development of DVT will allow for appropriate preventive measures. If an acute DVT is documented, prompt therapy is required to prevent propagation of the thrombus and PE. With the data supporting the safety and efficacy of LMHWs as initial therapy of acute DVT, many patients may be candidates for

outpatient anticoagulation. Inferior vena cava filters are helpful in certain clinical scenarios, but should not be systematically used as therapy for DVT. MPM

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