Management of venous thromboembolism

Why not treat it at home?

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Management of venous thromboembolism (VTE) changed greatly after publication in 1996 of landmark randomized controlled trials that revealed that most outpatient treatment of deep vein thrombosis (DVT) using low-molecular-weight heparin (LMWH) was as efficacious and safe as conventional hospital-based treatment with intravenous unfractionated heparin.[1,2] Although these clinical trials were conservative in assessing patient eligibility for outpatient DVT therapy (approximately one third of the total population screened were eligible), later observational studies in a variety of health care environments determined that about 75% of patients could be successfully treated at home.

These patients' short-term clinical outcomes were similar to those described in clinical trials.[3,4] Additional experiences included patients with DVT treated in emergency departments and discharged home. In 2004, the seventh American College of Chest Physicians' Conference on Antithrombotic Therapy supported with a grade 1C recommendation use of LMWH for initial treatment of DVT in outpatient settings rather than use of unfractionated heparin in hospital.[5]

Exclusionary criteria

The well established cost savings and improved quality of life resulting from outpatient management of DVT has raised the issue of who should *not* be treated at home. Douketis (**page 217**), after careful review of level I and II evidence from well designed clinical studies, has established four major clinical exclusionary criteria for outpatient DVT treatment: presence of massive DVT, presence of concurrent symptomatic pulmonary embolism, high risk of anticoagulant-related bleeding, and presence of acute comorbid conditions and other factors that would necessitate hospitalization.

Careful patient selection and risk stratification (whether implicit or explicitly defined in a protocol) remain central to successful implementation of outpatient-based VTE treatment. In addition to the well validated absolute clinical exclusionary criteria described by Douketis, other absolute and relative clinical exclusionary criteria have been published by operating outpatient VTE treatment programs.[6] These criteria include conditions that might increase risk of bleeding or denote subgroups of patients for whom treatment with fixed, weight-adjusted, unmonitored doses of LMWH have not been adequately studied in clinical trials.

Additional absolute clinical exclusionary criteria include patients who have had recent (within 2 weeks) strokes or transient ischemic attacks, hypertensive emergencies, severe renal dysfunction (creatinine clearance <30 mL/min), or a history of heparin sensitivity or heparin-induced thrombocytopenia. Additional relative clinical exclusionary criteria include patients who have an acquired or congenital hypercoagulable state, underlying liver disorder, or a history of familial bleeding disorder, and patients who are older than 75 years, morbidly obese, or pregnant.

Psychosocial and socioeconomic exclusionary criteria also limit outpatient treatment of DVT with LMWH. These criteria include a history of noncompliance with medical therapy; an unstable home environment; a history of substance abuse; an inability to pay for LMWH; an inability to care for themselves and no family member, friend, or nurse to care for them; a language barrier; and lack of access to a clinic or telephone. Although most of these barriers can be overcome using home health services, socioeconomic criteria can have a pivotal role in deciding whether patients are eligible for outpatient treatment in rural or inner-city hospital environments.

Risk stratification

One risk-stratification scheme for outpatient-based DVT treatment uses low-, moderate-, and high-risk categories.[6] Low-risk patients have no exclusionary risk factors and can be treated with LMWH completely in outpatient settings. High-risk patients have one absolute or many relative exclusionary risk factors and require inpatient treatment using nomogram-based intravenous unfractionated heparin or LMWH. Patients at moderate risk have relative exclusionary risk factors or home-health or third-party payer issues and can be treated initially as inpatients with LMWH (often under observation) and considered for early discharge.

In addition to protocols using LMWH that have careful patient selection criteria and implicit or explicit risk-stratification strategies, determinants of successful outpatient-based VTE treatment include having a dedicated anticoagulation clinic or equivalent with home health service support, an individual physician or small group of physicians who have developed expertise in anticoagulant management, and a support system for data management and patient monitoring.

Future of VTE management

What does the future hold for VTE management and patient selection criteria, especially in outpatient settings? Recent labeling changes for the LMWH enoxaparin specify a dose of 1 mg/kg subcutaneously daily for patients with creatinine clearance below 30 mL/min. This means patients with severe renal failure and VTE can be considered for outpatient treatment or can have shorter stays in hospital. More clinical studies are needed for this group of patients.

Pregnant patients with DVT and patients with DVT and cancer can be treated with long-term full-dose LMWH as outpatients, but will likely require monitoring, such as testing anti-Xa levels for LMWH dose adjustments. The synthetic pentasaccharide fondaparinux has recently been approved for initial treatment of both DVT and pulmonary embolism in a fixed dose of 7.5 mg subcutaneously daily (except for the extremes of weight), further simplifying outpatient VTE treatment. In one study,[7] about 15% of patients with acute hemodynamically stable pulmonary embolism were successfully treated partly as outpatients with fondaparinux, thus opening the door to outpatient treatment for this group of patients.

Newer, more selective antithrombotic agents that do not require monitoring during long-term treatment of VTE and have recently completed or are nearing completion of advanced clinical trials (eg, the oral direct thrombin inhibitor ximelagatran and the synthetic pentasaccharide idraparinux that can be administered in a fixed dose once weekly) might further facilitate outpatient treatment of VTE and expand patient selection criteria. A brave new world has begun as outpatient-based treatment of VTE is now the emerging standard of care. *Why not* to treat at home, as opposed to *whether* to treat at home, is now the question.

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