



**OBJECTIVE:**

To review the risk factors for venous thromboembolism (VTE) and bleeding in acutely-ill hospitalized medical patients and to recommend thromboprophylaxis options based on the risks of thrombosis and bleeding.

**BACKGROUND:**

VTE is a frequent cause of preventable morbidity and mortality in patients hospitalized with medical illness. Thromboprophylaxis in medically-ill patients has been shown to be safe and effective.

The **risk of developing VTE** is affected by a patient's underlying medical condition as well as the presence of other co-morbidities. Risk factors for VTE in medically-ill patients include: age >70 years, previous VTE, immobility  $\geq 3$  days, stroke, active cancer, known thrombophilia, sepsis, acute inflammatory conditions, acute infectious disease, recent surgery or trauma <1 month, obesity (body mass index >30), hormone therapy, and respiratory or cardiac failure.

The **risk of developing bleeding** is significantly increased if the patient has an active gastroduodenal ulcer, previous bleeding (<3 months before hospitalization), advanced age, severe renal failure (creatinine clearance (CrCl) <30 mL/min), hepatic failure, active cancer, or low platelet count (<50  $\times 10^9$ /L).

Decisions regarding anticoagulant thromboprophylaxis in acutely-ill hospitalized medical patients should be made after consideration of risk factors for both VTE and bleeding.

A number of scoring systems have been proposed to estimate risk of VTE in hospitalized medical patients. From a population perspective, a recent Markov model suggests that prophylaxis was cost-effective for an average medical inpatient with a VTE risk of  $\geq 1.0\%$ .

**THROMBOPROPHYLAXIS OPTIONS:**

Acutely-ill hospitalized medical patients at increased risk of VTE who are not bleeding or at high risk of bleeding should receive anticoagulant thromboprophylaxis generally with a subcutaneous (SC) low molecular weight heparin (LMWH):

- dalteparin 5,000 U SC once daily
- enoxaparin 40 mg SC once daily
- tinzaparin 4,500 U SC once daily
- fondaparinux 2.5 mg SC once daily

Unfractionated heparin (UFH) 5,000 U SC twice daily may also be a consideration. However, LMWH is generally preferred over UFH because of less frequent dosing and lower risk of heparin-induced thrombocytopenia (HIT).

Acutely-ill hospitalized medical patients at low risk of VTE and those who are bleeding or at high risk of bleeding, should not receive anticoagulant thromboprophylaxis. In this latter situation, properly measured and fitted elastic compression stockings (ECS) or intermittent pneumatic compression (IPC) devices should be used. When the bleeding risk decreases, one of the anticoagulant thromboprophylaxis options above should be started.

**SPECIAL CONSIDERATIONS:**

- **Direct oral anticoagulants** (apixaban, dabigatran, edoxaban, rivaroxaban): These agents should generally not be used for prophylaxis in medically ill hospitalized patients, due to a lack of data to date to support their effectiveness and safety in this patient population.
- **Duration of prophylaxis:** Anticoagulant thromboprophylaxis should generally continue until acute care hospital discharge and not be extended beyond the period of hospitalization.
- **Under- and over-weight:** Dose reduction should be considered for patients with weight <40 kg; dose increase should be considered for patients with weight >100 kg. For patients weighing over 120 kg, even higher doses should be considered.

	<40 kg	40 to 100 kg	101 to 120 kg
dalteparin	2500 U once daily	5000 U once daily	5000 U BID
enoxaparin	30 mg once daily	40 mg once daily	40 mg BID
tinzaparin	3500 U once daily	4500 U once daily	4500 U BID

- **Renal impairment:** In patients with CrCl <30 mL/min, a dose reduction of enoxaparin to 30 mg SC once daily (or use of UFH) should be considered. No dose adjustment for dalteparin, tinzaparin or UFH is needed in patients with impaired renal function. Fondaparinux should not be used in patients with CrCl <30 mL/min.
- **Stroke:** Patients with ischemic stroke can generally receive thromboprophylaxis with LMWH as for most other medical patients. For limited mobility stroke patients with a contraindication to LMWH at prophylactic doses, mechanical thromboprophylaxis should be used until LMWH can be started. IPC appears to be more effective than ECS in stroke patients with immobility. Both IPC and ECS are associated with skin breaks and, therefore, should be used optimally.

**OTHER RELEVANT THROMBOSIS CANADA CLINICAL GUIDES:**

- Cancer and Thrombosis
- Central Venous Catheter Related Venous Thrombosis
- Unfractionated Heparin and Low molecular weight Heparin

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