THROMBOPROPHYLAXIS AFTER ORTHOPEDIC SURGERY

Thrombosis Canada
Thrombose Canada

TARGET AUDIENCE: All Canadian health care professionals.

OBJECTIVE:

To summarize a practical approach to the prevention of venous thromboembolism in various patient groups undergoing orthopedic surgery or with lower extremity fractures.

ABBREVIATIONS:

DVT	deep vein thrombosis
LMWH	low-molecular-weight heparin
PE	pulmonary embolism
PO	by mouth
SC	subcutaneously
VTE	venous thromboembolism

BACKGROUND AND RATIONALE FOR THROMBOPROPHYLAXIS:

Patients undergoing hip and knee arthroplasty or with hip fracture or major lower extremity injuries are at particularly high risk for venous thromboembolism (VTE), and the routine use of thromboprophylaxis has been standard-of-care for many years. Before thromboprophylaxis was widely used, deep vein thrombosis (DVT), which is often clinically silent, occurred in 40-60% of these patients (see DVT: Diagnosis and DVT: Treatment guides); pulmonary embolism (PE) occurred in 5-10% of patients; and fatal embolism was one of the most common causes of death. The use of evidence-based thromboprophylaxis in these patients has been shown to reduce the risk of DVT by at least 50% and, as a result, major and fatal VTE are now very uncommon. A large number of clinical trials have assessed many different thromboprophylaxis modalities in these patients. For patients undergoing major orthopedic surgery, the risk of symptomatic VTE continues for weeks to several months after discharge. Numerous clinical trials have demonstrated that continuing thromboprophylaxis for approximately one month reduces symptomatic VTE compared with stopping at discharge.

Patients who have had spine surgery, knee arthroscopy, lower limb amputation or isolated lower extremity fractures are generally at lower risk of VTE than those mentioned above and there are many fewer studies of thromboprophylaxis.

This summary will suggest common, effective prophylaxis options. It is not designed to discuss comprehensively all possible options. In some cases, alternative options may also be considered.

Suggested Thromboprophylaxis in Orthopedic Surgery Patients

Patient Group	Prophylaxis Options*		Duration
Hip or knee arthroplasty	Rivaroxaban Apixaban Enoxaparin Dalteparin Tinzaparin	10 mg by mouth (PO) daily 2.5 mg PO twice daily 30 mg subcutaneously (SC) twice daily or 40 mg SC daily 5,000 U SC daily 4,500 U SC daily or 75 U/kg daily	14-35 days
Hip fracture	Enoxaparin Dalteparin Tinzaparin	Pre-op: 30 mg SC daily Post-op: 40 mg SC daily Pre-op: 2,500 U SC daily Post-op: 5,000 U SC daily Pre-op: 3,500 U SC daily Post-op: 4,500 U SC daily	14-35 days
Major orthopedic trauma	Low-molecular-weight heparin (LMWH) (enoxaparin 30 mg SC twice daily, dalteparin 5,000 U SC once daily, or tinzaparin 4,500 U SC once daily) when hemostasis is evident Mechanical method if high risk for bleeding with switch to LMWH when bleeding risk decreases		Until discharge (including rehabilitation)
Spine surgery: a) Uncomplicated b) Complicated (cancer, leg weakness, prior VTE, combined anterior/posterior approach)	a) Mobilization alone b) LMWH once daily starting the day after surgery		Until discharge (including rehabilitation)
Isolated below-knee fracture	None, if outpatient or overnight hospital stay LMWH once daily if inpatient		Until discharge (including rehabilitation)
Knee arthroscopy: a) low risk b) higher risk (major knee reconstruction, prior VTE)	a) None b) LMWH once daily		5-30 days
Lower extremity amputation	LMWH once daily		Until discharge (including rehabilitation)
Other: bedrest, incision & drainage, etc.	LMWH once daily		Until discharge

* Recommendations assume the patient has body weight 40-100 kg and creatinine clearance $\geq$ 30 mL/min. Patients outside these parameters may require dosage modification or an alternative prophylaxis method.

ADDITIONAL SUGGESTIONS:

Start of thromboprophylaxis: For most elective orthopedic surgery patients in whom thromboprophylaxis is recommended, anticoagulant prophylaxis should start at least 12 hours after surgery (usually the morning after surgery). For hip fracture patients in whom surgery may be delayed, commencing the thromboprophylaxis shortly after admission is suggested.

Patients at high risk of bleeding: For the occasional orthopedic patient who has a high risk of bleeding, we suggest the use of a mechanical method of thromboprophylaxis until it is safe to convert to an anticoagulant method.

Duration of thromboprophylaxis: Although the optimal duration of thromboprophylaxis is not known for any orthopedic surgery group, extended prophylaxis for 14-35 days is recommended for patients undergoing hip and knee arthroplasty or hip fracture surgery. Therefore, for most of these patients, this implies a period of post-discharge prophylaxis. Within this duration range, we suggest longer duration for patients who are at greater than usual risk for VTE, including those with bilateral arthroplasty, previous VTE and substantially impaired mobility at discharge. Most orthopedic surgery patients who go to rehabilitation should continue thromboprophylaxis at least until they are discharged from rehab.

Pre-discharge Doppler ultrasound screening for asymptomatic deep vein thrombosis is not recommended.

PEDIATRICS:

There are no studies to evaluate the safety and efficacy of thromboprophylaxis of orthopedic surgery or casting in children. Each child should be evaluated on an individual basis regarding risk, including family history of thrombosis.

REFERENCES:

Falck-Ytter Y, Francis CW, Johanson NA, et al. Prevention of VTE in orthopedic surgery patients. Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(2 Suppl):e278S-325S.

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