THROMBOPROPHYLAXIS: NON-ORTHOPEDIC SURGERY

Thrombosis Canada
Thrombose Canada

OBJECTIVE:

To outline a practical approach for the prevention of venous thromboembolism (VTE) in patients undergoing non-orthopedic surgery.

BACKGROUND:

VTE is a common and yet generally preventable cause of post-operative morbidity and mortality.

The use of graduated compression stockings (GCS), intermittent pneumatic compression (IPC), low-dose unfractionated heparin (UFH), and low molecular weight heparin (LMWH), combined with early ambulation, have all been shown to reduce post-operative VTE to varying degrees in patients undergoing surgery.

GENERAL PRINCIPLES OF PROPHYLAXIS:

1. Thromboprophylaxis decisions rely on a consideration of the balance in the risks of VTE and bleeding, both of which are affected by procedure-specific and patient-specific factors.
2. Patients not at low VTE risk without a high bleeding risk should receive pharmacological (anticoagulant) thromboprophylaxis:
   - Suggest using LMWH or UFH (see anticoagulant dosing on page 4)
   - The use of direct oral anticoagulants (e.g. apixaban, dabigatran, edoxaban, rivaroxaban) has not been well evaluated for thromboprophylaxis in the non-orthopedic surgical setting for thromboprophylaxis
3. Patients not at low VTE risk with a high bleeding risk features (see 4, below) should receive mechanical thromboprophylaxis:
   - Intermittent Pneumatic Compression (IPC) devices OR
   - Properly fitted bilateral, calf-length Graduated Compression Stockings (GCS), if IPC devices are not available

   Mechanical thromboprophylaxis should be used continuously except for bathing and walking (for IPC devices).
4. Strong contraindications to pharmacologic thromboprophylaxis (high risk bleeding features) include clinically important bleeding, severe thrombocytopenia, and untreated major bleeding disorders; while relative contraindications to anticoagulant thromboprophylaxis include recent intracranial hemorrhage, recent paraspinal bleeding, and recent high bleeding risk surgery.
5. For most elective non-orthopedic surgery patients in whom pharmacological thromboprophylaxis is recommended thromboprophylaxis should be initiated when hemostasis is achieved (for patients without a high risk of bleeding consider starting within 12

hours of surgery). In patients in whom mechanical thromboprophylaxis is recommended, start at the beginning of the procedure. For patients admitted to hospital before surgery assess for pre-operative anticoagulation (see **Clinical Guide Thromboprophylaxis: Hospitalized Medical Patients).**

6. Although the optimal duration of thromboprophylaxis is not well defined, patients with a moderate or high risk for VTE should receive thromboprophylaxis at least until discharge from hospital. Extended duration thromboprophylaxis (up to 30 days) may be considered in select populations.

THROMBOPROPHYLAXIS APPROACHES IN NON-ORTHOPEDIC SURGERY:

Three general accepted approaches to thromboprophylaxis in patients undergoing non-orthopedic surgery exist.

A. Group-based: This approach provides standard thromboprophylaxis to all patients who "belong to" a large group (e.g. abdominal-pelvic surgery, spine surgery, etc.) unless there is a specific patient contraindication. This approach has been adopted by many hospitals in developing their own prophylaxis guidelines.

B. Individualized: This strategy is based on individual patient risk assessment using a formal risk assessment model like the Caprini score (http://thrombosiscanada.ca/resources/prevent/). In general, the estimated VTE risk and thromboprophylaxis recommendations using this approach are similar to the group-based approach.

C. The American Society of Hematology (ASH) 2019 guidelines for management of VTE use a blended approach that incorporates both group-based and individualized recommendations, as summarized in **Table 1** below.

Risk of bleeding assessments have not been validated in a formal model for surgical patients.

It is suggested that every institution have a written policy for thromboprophylaxis and, where possible, that thromboprophylaxis protocols be embedded into routinely used electronic or paper order sets.

Evidence is lacking as to whether thromboprophylaxis is needed in neonates and children who have non-orthopedic surgery. However, there may be high-risk cohorts in whom thromboprophylaxis may be considered. Consultation with a pediatrician or hematologist with expertise in pediatric thrombosis is recommended.

TABLE 1: SURGICAL SITE-SPECIFIC RECOMMENDATIONS:

PATIENT GROUP	ASH GUIDELINE PANEL RECOMMENDATION	NOTES
General surgery	Suggests pharmacological thromboprophylaxis*	• May not apply to patients undergoing laparoscopic cholecystectomy • Consider extended duration thromboprophylaxis (e.g. up to 30 days) for high risk cancer surgery
Neurosurgical	Suggests against pharmacological thromboprophylaxis**	• May not apply to patients at higher risk for VTE
Transurethral resection of the prostate or Radical prostatectomy	Suggests against pharmacological thromboprophylaxis**	• May not apply to other urological procedures and/or in patients at higher risk for VTE
Trauma	Suggests pharmacological thromboprophylaxis if low risk of bleeding* Suggests against pharmacological thromboprophylaxis if high risk of bleeding**	• Consider extended duration thromboprophylaxis (e.g. until discharge from rehab centre)
Gynecological surgery	Suggests pharmacological thromboprophylaxis*	• Consider extended duration thromboprophylaxis (e.g. up to 30 days) for high risk cancer surgery
Cardiac or Major vascular surgery	Suggests pharmacological thromboprophylaxis or no pharmacological thromboprophylaxis	• Follow institutional thromboprophylaxis policies • May not apply to patients at higher risk for VTE

*As noted in General Principles, when pharmacological thromboprophylaxis is recommended, LMWH or UFH is suggested over the use of DOACs

**In patients not receiving pharmacological thromboprophylaxis, mechanical thromboprophylaxis should be used initially. Bleeding risk should be reassessed frequently with consideration of pharmacological thromboprophylaxis at that time if appropriate.

ANTICOAGULANT DOSING:

LMWH usual doses:

- dalteparin 5,000 U SC once daily
- enoxaparin 40 mg SC once daily
- tinzaparin 4,500 U SC once daily
- nadroparin 2,850 U SC once daily

LMWH for weight <40 kg (reduce to next lower pre-filled syringe dose):

- dalteparin 2,500 U SC once daily
- enoxaparin 30 mg SC once daily
- tinzaparin 2,500 U SC once daily (~75 U/kg)

LMWH for weight >100 kg (double the usual dose):

- dalteparin 5,000 U SC BID
- enoxaparin 40 mg SC BID
- tinzaparin 4,500 U SC BID or ~75 U/kg daily
- nadroparin 2,850 U SC BID

LMWH with severe renal dysfunction (CrCl <30 mL/min):

- enoxaparin 30 mg SC once daily
- no dosage reduction for dalteparin or tinzaparin

Unfractionated heparin is usually given as 5,000 U SC BID or TID (in higher risk patients).

OTHER RELEVANT THROMBOSIS CANADA CLINICAL GUIDES:

- Thromboprophylaxis: Orthopedic Surgery
- Unfractionated Heparin, Low Molecular-Weight Heparin, and Fondaparinux

RELEVANT THROMBOSIS CANADA CLINICAL TOOL:

- Order Set: Extended Thromboprophylaxis for Patients after Abdomino-Pelvic Cancer Surgery (http://thrombosiscanada.ca/resources/prevent/)

REFERENCES:

1. Anderson DR, et al. American Society of Hematology 2019 guidelines for management of venous thromboembolism: prevention of venous thromboembolism in surgical hospitalized patients. Blood advances. 2019;3:3898-944.
2. Caprini JA. Thrombosis risk assessment as a guide to quality patient care. Dis Mon 2005;51(2-3):70-78.
3. Gould MK, et al. Prevention of VTE in nonorthopedic surgical patients: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest 2012;141(2 Suppl):e227S-277S.

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