

GUIDELINE FOR USE OF LOW-MOLECULAR WEIGHT HEPARINS[†]

1. Outpatient Treatment

- Low molecular weight heparin will be given for a minimum of 5 days during initiation of warfarin therapy for DVT/PE patients
- Discontinue LMWH once INR greater than 2.0 (for INR target range 2.0-3.0) or 2.5 (for INR target range 2.5-3.5) for two consecutive days, including a dose on the second day within the target range.
- LMWH dosing based on actual body weight.

Agent	Dose	Indication	Comments
Tinzaparin (Innohep™)	175 IU/kg SQ q24h	Treatment of DVT / PE* Treatment of DVT/PE in patients with active malignancy*	No maximum dose for body weight required Treat with low molecular weight heparin therapy ONLY for duration of treatment (no warfarin)
Enoxaparin (Lovenox™)	1 mg/kg SQ q12h 1 mg/kg SQ q12h 1.5 mg/kg SQ q24h 30 mg IV bolus followed by 1 mg/kg SC q12h	Unstable angina/NSTEMI* Treatment of DVT / PE (<i>alternate therapy</i>) Acute myocardial infarction with thrombolytic	Usual duration of treatment, 2–8 days until clinical stabilization for cardiac indications BID dosing recommended for patients with complicated thromboembolic disorders. See tenecteplase (TNKase®) protocol Dose based on actual body weight with no upper limit dosing cap.
Dalteparin (Fragmin™)	200 IU/kg SQ q24h 100 IU/kg SQ q12h 120 IU/kg SQ q12h	Treatment of DVT (<i>alternate therapy</i>) Unstable angina/NSTEMI	BID dosing recommended for patients with high bleeding risk. Dose based on actual body weight with no upper limit dosing cap.

2. Prophylaxis

The Calgary Health Region Anticoagulation Management Service **does not** accept patients who require low-molecular-weight heparin for routine outpatient prophylaxis. The doses and guidelines listed below are **for information only**. For more information, please see the Calgary Health Region Acute Care Low Molecular Weight Heparin Regional Guidelines.

Agent	Dose	Indication	Comments
Enoxaparin (Lovenox™)	40 mg sc daily 30 mg sc q12h	Abdominal, colorectal, or neurosurgery prophylaxis* DVT/PE prophylaxis in medical patients* DVT/PE prophylaxis in surgical cancer patients* Prophylaxis in major trauma*	See DVT Prophylaxis in Neurosurgery Departmental protocol
Dalteparin (Fragmin™)	2500 IU sc daily 5000 IU sc daily	DVT/PE prophylaxis in orthopedic or hip surgery* DVT/PE prophylaxis in orthopedic or hip surgery* Extended out-of-hospital prophylaxis after orthopedic* procedures	2500 IU 6 hrs post-op (if hemostasis confirmed) then 5000 IU daily Start 12 – 24 hours post-op (if hemostasis confirmed) Post-op total hip replacement/revision duration up to 35 days Post-op knee replacement 10 days minimum

[†] This protocol applies to AMS management of LMWH only, use of unfractionated heparin is not addressed here, but may be an appropriate alternative for some indications and in patients with poor renal function.

*Calgary Health Region Pharmacy and Therapeutics Committee approved indication

3. Monitoring Guidelines

- a. Baseline: CBC, PT/INR, aPTT (*optional*)
- b. First 2 weeks of LMWH: CBC days 3,5 then every 2 – 3 days
- c. Ongoing therapy: CBC weekly for weeks 3 and 4 then every 2 – 4 weeks
- d. Anti-factor Xa activity to assess potential accumulation*:
 - 3 – 5 hours post-dose (peak level) for patients with:
 - significant renal impairment
 - pregnancy
 - Patient should have received LMWH for 72 hours prior to initial test
 - Accepted range for anti-factor Xa levels measured 4 hrs after treatment doses LMWH:
 - q12h LMWH = 0.6-1.0 IU/mL
 - q24h LMWH < 1.7 IU/mL

**Note: Routine use of Anti-factor Xa monitoring is not recommended as a therapeutic range has not been validated and access to timely testing is limited.*

4. Use of LMWH in patients with renal dysfunction

- a. General statements
 - **Unfractionated heparin should be considered the alternative of choice for patients with renal insufficiency (CrCl < 30 mL/min) or unstable renal function**
 - Low molecular weight heparins are eliminated primarily by the kidneys
 - Monitoring of renal function of patients who are receiving any LMWH for an extended period should be considered and therapy reassessed with renal function changes
 - Full DVT/PE treatment doses of LMWH are not recommended for patients receiving hemodialysis, due to lack of information in this population.
- b. Tinzaparin
 - Tinzaparin has been shown to be safe at full treatment doses for up to 30 days for patients with CrCl ≥ 20 mL/min.
- c. Dalteparin
 - Little published information, likely safe at prophylactic doses.
- d. Enoxaparin
 - Dosage adjustment is required for patients with severe renal impairment (CrCl < 30 mL/min) and may be considered in patients who have renal characteristics close to those with severe renal impairment:
 - Prophylaxis of postoperative DVT for hip and knee orthopedic surgery: 30 mg sc once daily
 - DVT prophylaxis for abdominal, colorectal surgery or for medical patients: 20 mg sc once daily
 - DVT treatment with or without PE: either 1 mg/kg sc once daily or 0.75 mg/kg once daily
 - Acute coronary syndrome: 1 mg/kg once daily
 - For elderly patients follow guidelines for renally impaired above
 - For dosing of patients with extremes of body weight - safety and efficacy of enoxaparin in high weight (>120 kg) and low weight (< 45 kg) patients have not been determined, recommended individual clinical and lab monitoring in this group.

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