VTE Prophylaxis Standing Orders

Venous thromboembolism following SCI is a source of significant morbidity and mortality. Virtually all of the research into treatment has focused on prophylaxis to prevent venous thromboembolism in this high-risk population.

Guidelines based on best evidence for DVT prophylaxis in SCI include the use of sequential compression devices for 2 weeks and anticoagulants for 8 to 12 weeks after injury.¹

There is evidence in the literature that 5000 IU of unfractionated heparin (UFH) delivered subcutaneously every 12 hours may not be sufficient in this population to provide adequate protection. The research suggests that low molecular weight heparin (LMWH) is more effective and should be considered the standard of treatment, particularly given the lower risk of bleeding complications.¹

Physical measures, in particular gradient pressure stockings and intermittent pneumatic compression, are designed to reduce the impact of stasis that results from the SCI patient’s lower extremities being immobilized for a prolonged period of time; to date; such devices have been shown to have a positive, but limited, impact. There is an intuitive benefit to combining treatments (i.e., pharmacologic with mechanical treatment) and limited evidence supporting this has emerged; however, the current evidence suggests that pharmacologic measures are the more important of the two.¹

To assist in this as a standard of Practice many centres have preprinted orders with direction on how to manage SCI Patients to prevent DVT. An example of this is on the following pages.

VTE Prophylaxis Standing Orders

Date: ____________________  Time: _______________

VTE Prophylaxis  Patient Weight: ____ kg  Platelet count: ____ x 10^9/L  on (Date): __________

Refer to VTE Risk Assessment and Thromboprophylaxis Recommendations

**RISK ASSESSMENT:**

A. **LOW RISK:**
   - [ ] Early ambulation; no anticoagulant or mechanical prophylaxis

B. **MODERATE OR HIGH RISK:** Order anticoagulant prophylaxis unless contraindicated (indicate reason):

**CONTRAINDICATION(s) TO ANTICOAGULANT PROPHYLAXIS:**

- [ ] Active Bleeding of clinical significance requiring intervention
- [ ] High risk of serious bleeding or bleeding into a critical site (e.g. intracranial, intraspinal, pericardial, intraocular, retroperitoneal, intra-articular)
- [ ] Known major bleeding disorder or acquired coagulopathy (consider Hematology consult)
- [ ] Platelet count less than 50 x 10^9/L (consider Hematology consult)
- [ ] History of heparin-induced thrombocytopenia (HIT) See Footnotes and Precaution 7 on reverse of page 5
- [ ] Patient already receiving therapeutic anticoagulation
  - Other contraindication (specify): __________________________
  - Reassess daily to start anticoagulant prophylaxis when contraindication resolves

**ANTICOAGULANT PROPHYLAXIS:** See Footnotes and Precautions 6 to 9 on page 4

Give first post-op dose 24 hours after admission to PAR.

A. **Traumatic Spinal Cord Injury**
   - [ ] enoxaparin 30mg SUBCUT BID (contraindicated if epidural or intrathecal catheter to be placed or in situ; dalteparin should be used in these patients)

B. **Non-Traumatic Spinal Cord Injury** *OR* Spinal Column Injury without SCI
   - [ ] dalteparin 5000 units subcutaneous daily at 10:00 until discharge *OR*
   - [ ] for patients with severe renal impairment, heparin 5000 units subcutaneous Q12H until discharge *OR*
     - Other: ________________________________
     - Reason: ________________________________

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Prescriber’s Signature_________________________ Printed Name_________________________ College ID_________________________

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Monitor patients with epidural catheter receiving anticoagulant prophylaxis for symptoms and signs of spinal hematomas

Epidural catheter should not be removed within 18 hours of a dose of dalteparin or 10 hours of a dose of heparin. After epidural catheter removal, dalteparin or heparin should not be given for at least 2 hours.

Mechanical prophylaxis: (when anticoagulant prophylaxis contraindicated or in conjunction with anticoagulant prophylaxis in very high risk patients (multiple trauma or acute SCI) as per ACCP 2008 guidelines)

☐ Thigh-length graduated compression stockings (GCS)
☐ Sequential compression device (SCD)
☐ Mechanical prophylaxis contraindicated (see page 4 for a list of contraindications)
  ▪ Apply to lower limb(s) continuously until anticoagulant prophylaxis starts or discharge
  ▪ Interrupt for skin care, assessments, toileting and ambulation only

LMWH Precautions:

- Patients receiving post-operative prophylactic LMWH (dalteparin) and continuous epidural anaesthesia are NOT to receive concomitant antiplatelet agents (ASA, NSAIDS, ticlopidine, or clopidogrel) or other anticoagulants (treatment doses of unfractionated heparin, warfarin, or dextran).
- Inform physician if hemoglobin drops by 10g/L or more between POD 1 and 2, 2 and 3, OR if hemoglobin is 80g/L or lower at any time.
- Stop LMWH if bleeding from any site (e.g. nose bleed, GI bleed, incision bleed, hematoma) and inform physician.
- Inform physician if platelet count drops by more than 50% from baseline or is 100 x 10⁹/L or lower at any time.
## VTE RISK ASSESSMENT AND THROMBOPROPHYSAXIS RECOMMENDATION

### PATIENT RISK GROUPS
(satisfaction of any one or more of the listed criteria)

<table>
<thead>
<tr>
<th>Low Risk Group</th>
<th>Thromboprophylaxis Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day surgery(^1) without any VTE risk factors (see below)</td>
<td>Early Ambulation</td>
</tr>
<tr>
<td>No reduction in mobility compared to usual state</td>
<td></td>
</tr>
<tr>
<td>Surgical procedure with a total anesthetic and surgical time of less than 60 minutes with no risk factors for VET (see below)</td>
<td></td>
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<table>
<thead>
<tr>
<th>Moderate or High Risk Group</th>
<th></th>
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<tbody>
<tr>
<td>Any medical or surgical patient having had or are expected to have significantly reduced mobility for 3 or more(^2,3)</td>
<td>LMHW (heparin if eGFR less than 10 mL/min)(^4-9)</td>
</tr>
<tr>
<td>Medical patients with ongoing reduced mobility (compared to their usual state) AND have one or more risk factors for VTE (see below)(^2,3)</td>
<td></td>
</tr>
<tr>
<td>Surgical Procedure with a total anesthetic and surgical time of 60 minutes or longer(^3,6)</td>
<td></td>
</tr>
<tr>
<td>Acute surgical admission with an inflammatory or intra-abdominal condition(^3,6)</td>
<td></td>
</tr>
<tr>
<td>Surgical patients with one or more risk factors for VTE (see below)(^3,6)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Obstetrical Patients with Increased Risk</th>
<th>Consider LMHW (heparin if eGFR less than 10 mL/min)(^4-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having one or more risk factors for VTE (see below)</td>
<td></td>
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<tr>
<td>Pregnancy-related risk factors:</td>
<td></td>
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<tr>
<td>Ovarian hyperstimulation</td>
<td></td>
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<tr>
<td>Hyperemesis gravidarum</td>
<td></td>
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<tr>
<td>Multiple pregnancy</td>
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<tr>
<td>Preeclampsia</td>
<td></td>
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<tr>
<td>Emergency caesarean section</td>
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</tbody>
</table>

### RISK FACTORS FOR VTE

- Age 60 years or over
- Active cancer and cancer treatment
- Previous VTE
- Critical Care admission
- Obesity (BMI over 30kg/m\(^2\))
- Known thrombophilia
- First degree relative with VTE
- Varicose veins with phlebitis
- Estrogen-containing oral contraception
- Hormone replacement therapy
- One or more significant medical conditions:
  - Sepsis or severe acute infection
  - Heart disease
  - Respiratory pathology
  - Inflammatory condition
  - Rheumatological disease
  - Nephrotic syndrome
  - Antiphospholipid syndrome

### CONTRAINDICATIONS FOR MECHANICAL PROPHYLAXIS

- Acute stroke with immobility (unable to walk independently to the toilet)
- Peripheral vascular disease with absent pedal pulses
- Severe peripheral neuropathy
- Skin breakdown, ulcers, gangrene, cellulitis, or dermatitis
- Skin grafting within last 3 months
- Allergy to stocking or compressions cuff materials
- Unable to size or apply properly due to deformity, recent surgery or trauma
1. Day surgery includes patients admitted and discharged within 24 hours for an elective surgical or invasive procedure.

2. In medical patients receiving anticoagulant prophylaxis, the NNT to prevent symptomatic DVT is 212 and non-fatal PE is 300; the NNH for major bleed is 430. There is no evidence for mechanical thromboprophylaxis in medical patients.

3. In surgical patients receiving anticoagulants prophylaxis, the NNT to prevent symptomatic DVT is 20-106 and non-fatal PE is 110-150; the NNH for major bleed is 70-100. There is weak evidence for using mechanical thromboprophylaxis alone and weaker evidence for combining anticoagulant and mechanical prophylaxis to improve efficacy.

4. First post-op dose of anticoagulant should be given after hemostasis is achieved and as soon as it is safe to do so (usually 12-24 hours after surgery). This should take into account the risks of bleeding, thrombosis and timing of subsequent surgery.

5. Prophylaxis for up to 30 days after surgery is recommended in those having hip replacement or hip fracture surgery, and up to 14 days after total knee replacement. Consider prophylaxis for up to 30 days after abdominal or pelvic surgery for cancer and in patients with multiple risk factors for VTE.

6. Heparin 5000 units subcutaneous Q12H should be used if patient is awaiting urgent surgery and is a candidate for neuroaxial blockade. Refer to Peri-operative Pain Service or Anesthesia regarding timing of epidural catheter insertion and removal.

7. LMWH and heparin should not be given in patients with HIT. Consider consulting Hematology/Internal Medicine regarding the use of alternative agents (e.g. fondaparinux or argatroban).

8. If eGFR is 10 to 30 mL/min AND expected LOS is longer than 10 days, consider using heparin instead of dalteparin.

9. Suggested dosing for dalteparin and heparin in patients with extremes of weight and/or severe renal impairment:

<table>
<thead>
<tr>
<th>Weight range</th>
<th>dalteparin (if eGFR 10 mL/min or above)</th>
<th>heparin (if eGFR less than 10 mL/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 kg or less</td>
<td>2500 units subcutaneous once daily</td>
<td>2500 units subcutaneous Q12H</td>
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<tr>
<td>41 kg to BMI 40 kg/m²</td>
<td>5000 units subcutaneous once daily</td>
<td>5000 units subcutaneous Q12H</td>
</tr>
<tr>
<td>BMI over 40 kg/m²</td>
<td>5000 units subcutaneous Q12H</td>
<td>5000 units subcutaneous Q8H</td>
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