SUBJECT: Venous Thromboembolism Prophylaxis Guidelines

SUPERSEDES: Revised
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Purpose:

Standardize practices for the treatment of trauma patients and establish guidelines for the administration of venous thromboembolism prophylaxis in high-risk patients.

Establish a consensus for administration of chemical VTE prophylaxis in patients who are to undergo invasive procedures, or have high risk injuries.

Definitions:

High risk patients: those anticipated to be hospitalized for >24 hours and have 1 or more of the following risk factors:

- Multiple system trauma
- Traumatic brain injury with GCS <12
- Major vascular injury to neck, thorax, abdomen, or extremities
- Multiple rib fractures
- Pelvic fracture
- Long bone fracture
- Spinal fracture
- Anticipated immobilization >24 hours
- History of venous thromboembolism (DVT/PE)
- History of hypercoagulable disease
- History of or current diagnosis of cancer
- Obesity (BMI >30)
- Tobacco use within 1 month
- Critical illness

Procedure:

1) Sequential compression devices should only be used for patients not receiving chemical VTE prophylaxis.
   a. SCDs are contraindicated in legs with fractures prior to fixation.
   b. SCDs are contraindicated in legs with external fixators or large open wounds.
   c. SCDs may be used on fractured lower extremities following open reduction and internal fixation.
2) Relative contraindications to **INITIAL** chemical VTE prophylaxis include:
   a. Uncontrolled blood loss
   b. Coagulopathy
   c. Non-operative management of liver, spleen, and renal injuries
   d. Intracranial hemorrhage
   e. Spinal cord hematoma

3) All high-risk patients who do not have a contraindication should be started on enoxaparin (heparin is reserved for GFR <30 and patients with epidurals):
   a. GFR >30 ml/min: enoxaparin (Lovenox) 0.5mg/kg SQ q12 hr (maximum starting dose 60mg q12 hr)
   b. GFR <30 ml/min: weight <90kg: heparin 5000 units SQ q8hr
      weight >90kg: heparin 7500 units SQ q8hr

4) Management of enoxaparin (Lovenox) dosing for trauma patients:
   An “Anti-Xa assay” should be ordered to be drawn 4 hours following the 3rd dose of enoxaparin (Lovenox)
   a. If <0.2, increase dose 10mg each dose and recheck Anti-Xa assay after 3 doses.
   b. If 0.2-0.4, no adjustment necessary. No further anti-Xa levels needed.
   c. If >0.4, reduce dose by 10mg each dose and recheck after 3 doses.

5) **Patients with a history of HIT/HITT** – Fondaparinux is preferred
   a. If wt >50kg and GFR >50: 2.5mg daily
   b. If GFR 30-50: use with caution (consider dose reduction)
   c. If GFR <30: use is contraindicated

6) **IVC Filters**
   a. **IVC INSERTION**: Filters will be placed within 48 hours of time of consult in patients who meet the following criteria:
      1. The patient has a documented DVT and cannot be fully anticoagulated.
      2. The patient cannot receive prophylactic doses of anticoagulation for at least 5 days (rare)
b. **IVC REMOVAL:** When it medically appropriate to start prophylactic doses of anticoagulation:
   1. If there is no contraindication, perform a bilateral lower extremity venous duplex. If negative for DVT, schedule retrieval of the IVC filter during the same admission. OR
   2. If the patient is cleared for prophylactic doses for anticoagulation, but the doses are being held for frequent trips to the operating room, the IVC filter may be left in place. When the series of operations are complete, a bilateral lower extremity venous duplex should be performed. If negative, schedule retrieval of the IVC filter during the same admission.

7) **Initiation of anticoagulation for at-risk patient populations:**
   a. **Solid Organ Injury**
      1) In the non-operative management of liver, spleen, and renal injuries, VTE prophylaxis may be initiated after:
         a) Initiate the day of injury for grade I injuries.
         b) 24 hours without significant blood loss for grade II/III injuries.
         c) 48 hours without significant blood loss for grade IV/V injuries.

b. **Traumatic Brain Injury**
   1) Chemical VTE prophylaxis should be initiated 24 hours following stable head CT
   2) Chemical VTE prophylaxis should be initiated 48 hours following craniotomy.
   3) VTE prophylaxis should not be held for EVD/ICP monitor placement or removal.

c. **Spinal fractures and spinal cord injuries (SCI)**
   1) Patients with spine fractures or SCI may be started on VTE prophylaxis once the spine surgeon has deemed that there is no emergent need for surgical decompression or stabilization. (usually 24 hours – attending discussion required for 48-hour delay)
   2) Patients with spinal cord hematoma may be started on VTE prophylaxis once cleared by the spine surgery team. (usually 24 hours – an attending discussion is required for a 48-hour delay)
   3) If surgery is planned, VTE prophylaxis will be held the night before operation and resumed 24 hours post-operatively.

d. **Chemical VTE prophylaxis should not be held for non-spine musculoskeletal injuries or procedures.**
e. Regional anesthetic catheter placement for pain control (e.g. epidural) or lumbar drain

1. Before Puncture:
   a. Prophylactic enoxaparin (Lovenox) should be held 12 hours
   b. Therapeutic enoxaparin (Lovenox) should be held 24 hours
   c. IV heparin should be held 4-6 hours
   d. SC heparin should be held 8-12 hours
   e. Fondaparinux should be held 36-42 hours
   f. INR should be <1.6

2. While epidural/lumbar drain is in place, appropriate weight based dosing of heparin should be used. (see section 3b)

3. After removal of epidural catheter/lumbar drain:
   a. Heparin should be held 1 hour
   b. Enoxaparin (Lovenox) should be held 4 hours
   c. Fondaparinux should be held 6-12 hours
   d. Coumadin/ novel anticoagulants should not be started until after catheter removal
References:


