VANDERBILT UNIVERSITY

MEDICAL CENTER

DIVISION OF ACUTE CARE SURGERY

Practice Management Guidelines for Venous Thromboembolism Prophylaxis

I. Purpose

To prevent pulmonary embolism (PE) and deep vein thrombosis (DVT) in trauma patients

II. Risk Factor Categories

High Risk Factors	Very High Risk Factors
• Age > 60 years • GCS < 9 for > 4 hours • PMH of venous thromboembolism (VTE) • Lower extremity fracture • Multiple spinal fractures • Pregnancy	• Spinal cord injury with paraplegia or quadriplegia • Complex or multiple (≥ 2) lower extremity fractures • Major pelvic fracture • Multiple (≥ 3) long bone fractures (≥ 1 in the lower extremity) • Age ≥ 75 years with any high risk factor • Abdominal or lower extremity venous repair or ligation

III. VTE Prophylaxis Protocol for Trauma Patients

A. All trauma patients should have sequential compression devices (SCDs) placed on bilateral lower extremities, unless an injury prohibits its use.

B. All trauma patients, unless otherwise specified, should receive VTE prophylaxis with weight-based enoxaparin.

Current patient weight	Enoxaparin initial dose	Axa Monitoring Required
<50 kg	30 mg q12h	Yes
50 – 89 kg	30 mg q12h	No
90 – 129 kg	40 mg q12h	Yes
130 – 179 kg	60 mg q12h	Yes
≥ 180 kg	80 mg q12h	Yes

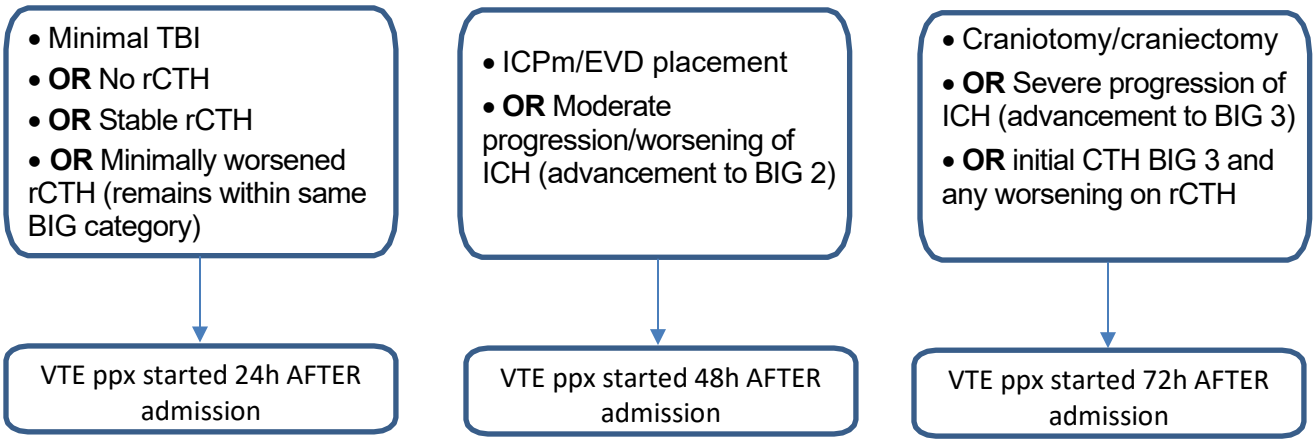
C. If receiving subcutaneous heparin, patients with a BMI ≥ 40 kg/m^2 and who do not have an epidural catheter or paravertebral block in place, a higher dose of 7500 units q8h is recommended.

D. VTE prophylaxis should NOT be held for patients with an elevated baseline INR due to liver dysfunction.

E. No doses of VTE prophylaxis will be held for operative procedures except for spine and neurosurgical operative cases or unless requested by the attending.

IV. Exceptions to VTE Prophylaxis Protocol

A. Traumatic Brain and Spine injuries



BIG* 1	BIG 2	BIG 3
• Isolated pneumocephalus • Non-displaced skull fracture • Unilateral SDH <4 mm • Single IPH < 4 mm • SAH	• Unilateral SDH 5-7 mm • Bilateral SDH <4 mm • Single IPH 5-7 mm • Multiple IPH <4 mm • EDH 1-7 mm • IVH trace or < 2mm	• Any SDH >8 mm • Any IPH > 8 mm • EDH > 8 mm • IVH > 2mm

*Brain Injury Guideline (BIG)

BIG

a. Patients with an intraspinal hematoma should have VTE prophylaxis started within 48 hours of admission unless otherwise specified by the Ortho Spine or Neuro Spine teams.

b. For patients requiring an operative spine intervention, VTE prophylaxis can be

given until the night before surgery. It should be held the morning of surgery and may be resumed 24 hrs post-operatively unless otherwise specified by the operating team.

c. For patients on the minimal spine pathway OR preliminarily nonoperative with only upright imaging pending, VTE prophylaxis may be initiated.
d. Patients with an ICP monitor or external ventricular drain should preferentially receive enoxaparin for prophylaxis.

B. Epidural, Paravertebral Block or Lumbar Drain Placement

a. Enoxaparin will not be used 12 hours prior to epidural, paravertebral block or lumbar drain placement while the catheter is indwelling, or for 4 hours after removal.
b. Heparin 5000 units Q 8 hrs and SCDs may be substituted for enoxaparin during the indwelling time.
c. After removal of the drain, patients should be changed to the appropriate weight-based enoxaparin dosing if eligible.

C. Renal Impairment

a. For patients with a significant rise in SCr (> 50%) or a creatinine clearance < 30 mL/min, subcutaneous heparin may be substituted for enoxaparin.
b. In patients on renal replacement therapy, heparin is recommended over enoxaparin.

V. LMWH Anti-factor Xa (Anti-xa) Level Monitoring

A. An Anti-xa level should be drawn in patients with the following characteristics:
   a. Weight <50 kg or ≥ 90 kg
   b. All patients in the very high risk factor group
B. Anti-xa level peaks should be drawn 4 hours after the administration of enoxaparin. These labs should be ordered after the third dose of enoxaparin.
   a. To order in Epic: LMW Heparin Assay (must time correctly)
   b. Goal peak is 0.2 to 0.4 IU/mL.
      i. If Anti-xa level is drawn appropriately and below the goal range, increase the dose to the next syringe size.
      ii. If Anti-xa level is drawn appropriately and above goal range, decrease to the next syringe size.
         1. If already at 30 mg q12h, reduce to 30 or 40 mg q24h.
         2. If anti-xa level remains above goal range despite changing to q24h dosing, then change to subcutaneous heparin 5000 units Q 8 hrs.
   c. If the enoxaparin dose is adjusted to a dose that differs from empiric weight-based doses (see table in section III) based on anti-Xa monitoring, anti-Xa levels should be monitored weekly and doses adjusted per guidance above.
   d. For patients who achieve goal anti-Xa on their empiric weight-based dose (see table in section III), no further anti-Xa monitoring is needed.

VI. Surveillance

a. Routine lower extremity duplex ultrasound should be completed 72 hrs after admission and weekly thereafter for four weeks in patients who are in the very high risk factor group. After four weeks, may decrease frequency to lower extremity ultrasound every two weeks.

VII. IVC Filter Placement

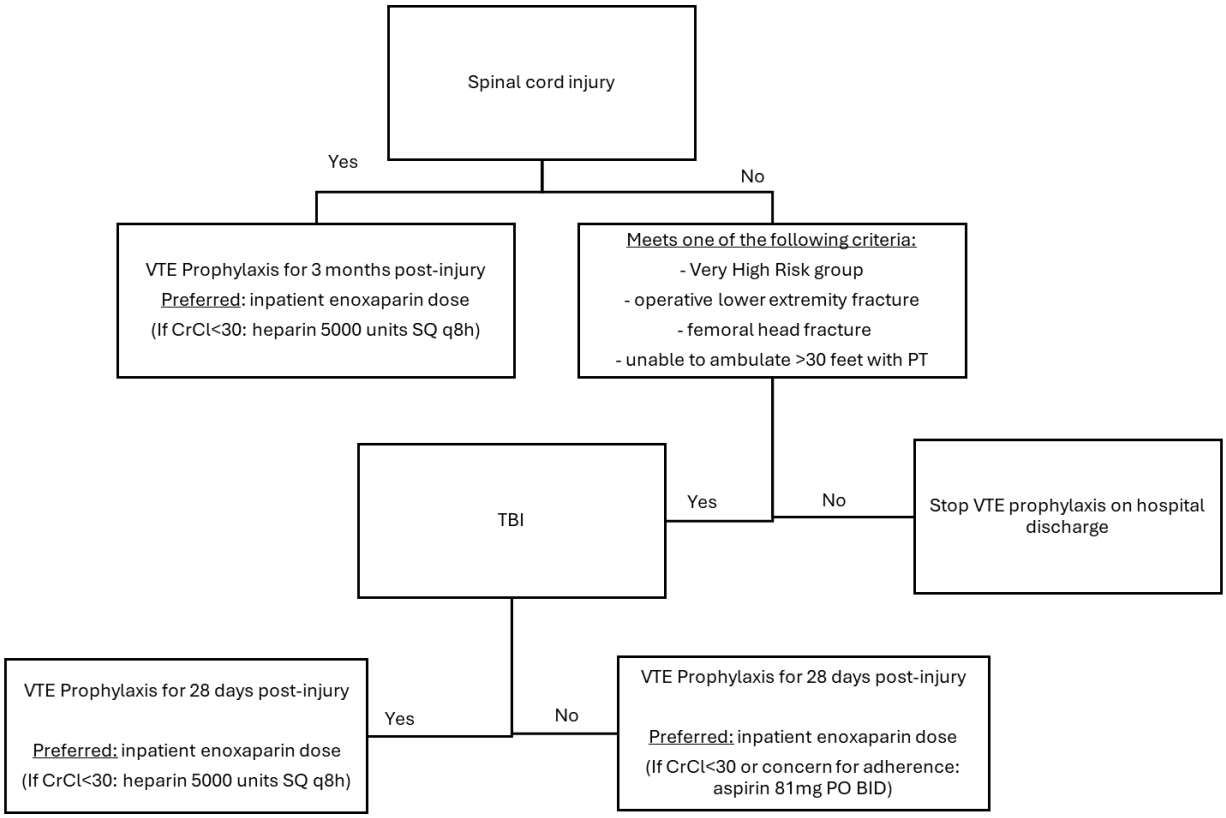
A. Refer to IVC filter protocol (see IVC Filter Placement PMG)
   a. A prophylactic IVC filter may be considered in patients with paraplegia or quadriplegia; IVC, iliac, or femoral venous ligation/repair; severe pelvic fracture with lower extremity long bone fracture; AIS head ≥ 3 with contraindication to anticoagulation; or high risk patients with contraindication, failure, or

complications of anticoagulation.

b. Indications for a *therapeutic* IVC filter include patients with known PE or lower extremity DVT and contraindication, failure, or complication of anticoagulation, among other indications.

VIII. Post-Discharge VTE Prophylaxis

a. Certain patients remain at a high risk of VTE even after hospital discharge. See the figure below for patients who should receive VTE prophylaxis after discharge:



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Updated December 2024

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