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

Risk Factors	High Risk Factors	Very High Risk Factors
• Age > 40 years • ISS > 9 • Blood transfusions • Surgical procedure within 72 hrs • Immobilization • Malignancy • Extensive soft tissue trauma • Hormone therapy • Obesity • AIS ≥ 3 (any region)	• Age > 60 years • ISS > 15 • GCS < 9 for > 4 hours • Major venous injury/repair • 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 • COVID-19 positive

III. Physical Exam Findings

A. PE- tachycardia, tachypnea, MS changes, diaphoresis

B. DVT- extremity pain, fever, localized edema/swelling, warmth/erythema

IV. Lab and Radiology Findings

A. Blood gas – respiratory alkalosis, hypoxemia

B. CXR – nonspecific, peripheral wedge defect

C. Extremity Duplex – occlusive/non-occlusive thrombosis

D. CT angio Chest – filling defect(s)

V. VTE Prophylaxis Protocol for Trauma Patients

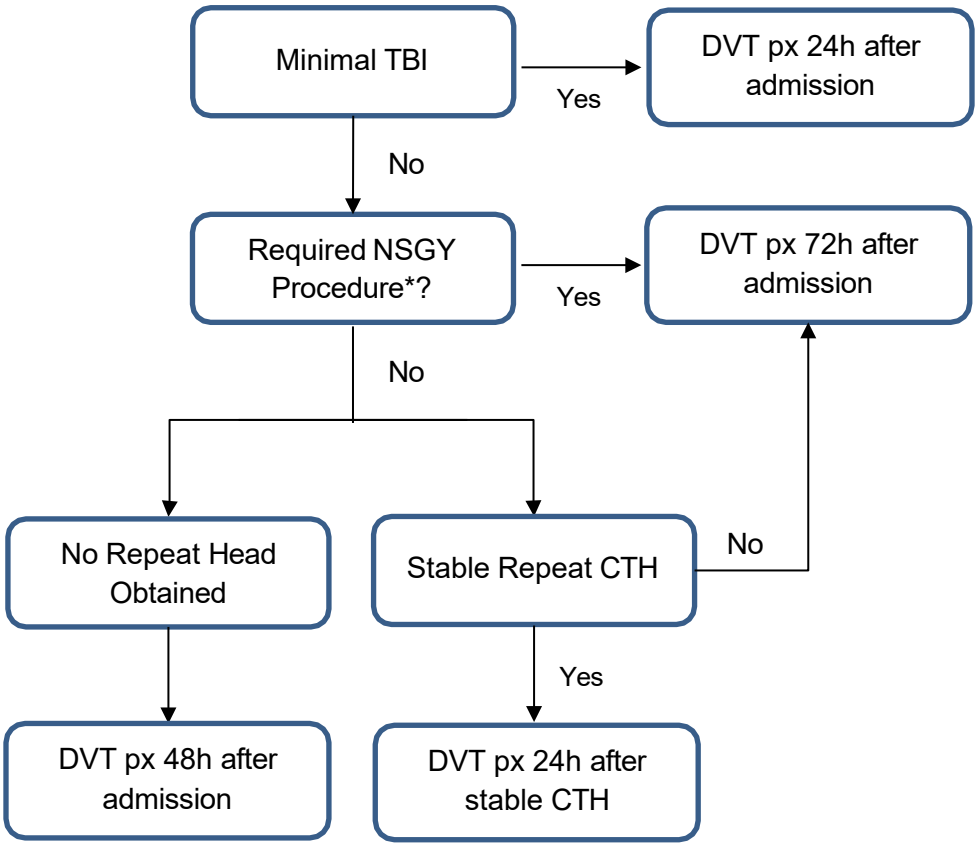
A. All trauma patients, unless otherwise specified, should receive VTE prophylaxis with weight-based enoxaparin.

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

B. 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.
C. VTE prophylaxis should NOT be held for patients with an elevated baseline INR due to liver dysfunction.
D. No doses of VTE prophylaxis will be held for operative procedures except for spine and neurosurgical operative cases or unless requested by the attending.

VI. Exceptions to VTE Prophylaxis Protocol

A. Traumatic Brain and Spine injuries



*NSGY procedures include craniotomy, burr holes, SEPS drains, ICP monitors, and EVDs.

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 should be held the morning of surgery and may be resumed 24 hrs post-operatively unless otherwise specified by the operating team.
c. Enoxaparin is preferred in these patient populations, as well. However, patients with one of the above conditions and an ICP monitor, extraventricular drain, or spinal drain in place should receive heparin 5000 units Q 8 hrs. After removal of the ICP monitor or drain, patients should be changed to the appropriate weight-based enoxaparin dosing.

B. Epidural or Paravertebral Block Placement

a. Enoxaparin will not be used 12 hours prior to epidural or paravertebral block 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. Renal Impairment

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

VII. 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. Once the goal range is reached, no further monitoring needed

VIII. Surveillance

a. Routine lower extremity duplex ultrasound should be completed 72 hrs after admission and weekly thereafter in patients who are in the very high risk factor group.

IX. 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.

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