

The University of Arkansas for Medical Sciences
ACS Clinical Practice Management Guideline

SUBJECT: Venous Thromboembolism Prophylaxis (DVT/PE)

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PURPOSE: Guidelines for administering venous thromboembolism (VTE) prophylaxis in trauma and emergency general surgery patients.

DEFINITIONS:

- HIT: Heparin-induced thrombocytopenia: an immune-mediated adverse drug reaction caused by the emergence of antibodies that activate platelets in the presence of heparin. It is strongly associated with thromboembolic complications involving both the arterial and venous systems and requires full anticoagulation with a non-heparin anticoagulant.
- LMWH: Low molecular weight heparin (Enoxaparin). Administered subcutaneously. Half-life 4.5 hours. Preferred over UFH because of improved efficacy in preventing VTE and a more than 10-fold reduction in HIT
- 4 T's Score: a scoring system that can identify patients at high, intermediate, or low risk of developing HIT. Heparinoids should immediately be discontinued in both high-risk and intermediate-risk patients. Low-risk patients only need continued platelet monitoring.
- UFH: unfractionated heparin. Given via subcutaneous injection for VTE prophylaxis q8 hr. Half-life = 1.5 hours (30 min if given IV)
- VTE: venous thromboembolism = pulmonary embolism (PE) & deep vein thrombosis (DVT)

PROCEDURES:

- 1) All trauma and emergency general surgery patients who do not have a contraindication should be started on chemical VTE prophylaxis:

Trauma Patient Group	Time to Hold	Initial Enoxaparin Dosing	Maintenance Enoxaparin Dosing
Trauma without SOI, TBI, SCI AND no renal dysfunction	-	0.5 mg/kg q12 hr*	
Solid Organ Injury (liver, spleen, kidney) Grade I-II Grade III-IV Grade V	No hold HOLD x 24 hr HOLD x 48 hr	0.5 mg/kg q12 hr*	
> 60y/o & SDH/Epidural hematoma >5mm OR contusion/IVH >2cm OR midline shift OR worsening CT head	HOLD x 24h after stable CT head	30 mg q12 hr x 48h	0.5 mg/kg q12 hr*
< 60y/o & TBI	HOLD x 24h after stable CT head	0.5 mg/kg q12 hr *	

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Bolt/craniectomy/craniotomy/EVD placement/spine epidural hematoma	HOLD 24h after placement OR surgery	30 mg q12 hr x 48h	0.5 mg/kg q12 hr *
Spine or SCI injury requiring surgery	Hold 1 dose before surgery	30 mg q12 hr before surgery	0.5 mg/kg q12 hr 24 hrs post op
GFR < 30 mL/min OR RRT	-	30 mg QHS	
*max 60 mg BID			

EGS Patient Group	Enoxaparin Dosing
Emergency Surgery Pts	0.5 mg/kg q12 hr (max 60 mg BID)
Elective Cases	
BMI < 40	40 mg QHS
BMI > 40	40 mg q12 hr
GFR < 30 mL/min or RRT	30 mg QHS

2) Enoxaparin (LMWH) Monitoring

- a. Routine Anti-Xa monitoring is **NOT required** unless:
 - i. Patients > 65 YO
 1. An Anti-Xa Assay should be ordered 4 hours AFTER the 3rd dose of LMWH (either 0100 or 1300, depending on when LMWH was started)
 - ii. Patients > 130 kg
 1. An Anti-Xa Assay should be ordered 4 hours AFTER the 3rd dose of LMWH (either 0100 or 1300, depending on when LMWH was started)
 - iii. Patients with ESRD
 1. An Anti-Xa Assay should be ordered on day 7 of admission, 4 hours AFTER the morning dose of LMWH, to assess for clearance
 2. An Anti-Xa Assay should be ordered the morning BEFORE any procedure/surgery
- b. Adjusting the enoxaparin dose based on Anti-Xa levels:
 - i. If < 0.2, increase the enoxaparin dose by 10 mg and recheck the anti-Xa after three doses of the new regimen
 - ii. If 0.2–0.4, no adjustment is necessary, and no further anti-Xa levels are needed unless there is a change in renal function or the patient's clinical status.
 - iii. If > 0.4, reduce the enoxaparin dose by 10 mg and recheck the anti-Xa after three doses of the new regimen.

3) Sequential compression devices (SCDs) should be used for patients **not receiving enoxaparin chemical VTE prophylaxis**

- a. SCD indications
 - i. Patients with contraindications to VTE prophylaxis (listed in #1 above)
- b. SCD contraindications:
 - i. legs with fractures before fixation (may be used following ORIF)
 - ii. legs with external fixators
 - iii. legs with large open wounds

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iv. known leg DVT

4) For patients with a history of HIT/HITT – Fondaparinux is preferred (UFH & LMWH are contraindicated)

- a. If weight > 50 kg and GFR > 50 mL/min: 2.5 mg SQ daily
- b. If GFR 30-50 mL/min: use with caution (consider dose reduction)
If GFR <30 mL/min: use is contraindicated

5) IVC Filters

- a. **IVC INSERTION:** Filters will be placed within 24 hrs of consultation in patients who have a documented DVT and cannot be fully anticoagulated. Vascular surgery or interventional radiology can place IVC filters.
- b. **IVC REMOVAL:** When it is medically appropriate to start VTE prophylaxis:
If there is no contraindication, perform a bilateral lower extremity venous duplex.
If negative for DVT, schedule retrieval of the IVC filter during the current admission OR prior to discharge - schedule to return for removal.

6) Epidural or lumbar drain

- i. Before Puncture:
 - 1. Prophylactic LMWH should be held for 12 hours
 - 2. SC UFH should be held for 8-12 hours
 - 3. INR should be < 1.6
- ii. While an epidural or lumbar drain is in place:
 - 1. Appropriate weight-based dosing of UFH & SCDs should be used (section 3b) until after the epidural or lumbar drain is removed
 - 2. Daily LMWH may be used as an alternative if an epidural or lumbar drain is in place
- iii. After removal of epidural or lumbar drain:
 - 1. LMWH (prophylactic or therapeutic) should be held for 4 hours
 - 2. UFH (IV or SQ) should be held for 1 hour
 - 3. Fondaparinux should be held for 6-12 hours

7) At Hospital Discharge

- a. Patients with the following injury or medical conditions will be prescribed an additional 21 days of LMWH VTE prophylaxis at discharge (same dose and frequency as during hospitalization)
 - i. Spinal cord injury resulting in paraplegia or tetraplegia
 - ii. Lower extremity long bone fractures (not fibula)
 - iii. Unable to ambulate or plantar flex because of pelvis or lower extremity injuries
- b. If the patient refuses to take (or is unlikely to be compliant with) LMWH injections after discharge, 81mg ASA q12 hours can be used as an alternative (except for patients with complete spinal cord injuries, who are at the highest risk for VTE and should be strongly encouraged to continue LMWH).

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