Adult Venous Thromboembolism (VTE) Prophylaxis Clinical Practice Guideline

Adult Inpatient Antithrombosis Stewardship Pharmacist: Monday-Friday 0800-1630

- **505-764-7638 (Spectralink) or on TigerConnect**

Adult Inpatient Antithrombosis Service Pharmacist: 7 days/week (including holidays) 0700-1730

- **505-764-7637 (Spectralink) or on TigerConnect**

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I. **Purpose**:

A. This document serves as a clinical guideline for primary prevention of venous thromboembolism (VTE) in adult patients hospitalized for ≥ 24 hours or who may qualify for primary VTE prophylaxis upon discharge.

B. It should be coupled with, and not supersede, clinical judgment.

C. An individual patient's clinical status or broader clinical judgment may warrant further individualization of the practices delineated in this document.

II. Background and rationale for VTE prophylaxis

A. Hospitalization has been associated with an 8-fold increased risk of VTE[1] and many of these events may be prevented with the implementation of evidence-based prophylactic modalities.[2,3]

B. Nearly 60% of VTE events occur in patients who have experienced a recent hospitalization, surgery or acute illness. [4]

C. Current societal guidelines suggest the use of validated quantitative risk assessment models (RAMs) to identify hospitalized patients that are at risk of venous thromboembolism. [2,3]

III. Best practices for primary VTE prevention in hospitalized patients

A. All hospitalized adult patients should be assessed for thrombotic and bleeding risk upon admission and regularly throughout the hospital stay. [3]

B. Prior to verification of any anticoagulant, a pharmacist should always obtain an accurate weight, assess relevant labs (e.g., SCr, CBC) and determine appropriateness of the chosen agent.

C. Always ensure use of a recent weight when considering weight-based dose adjustments.

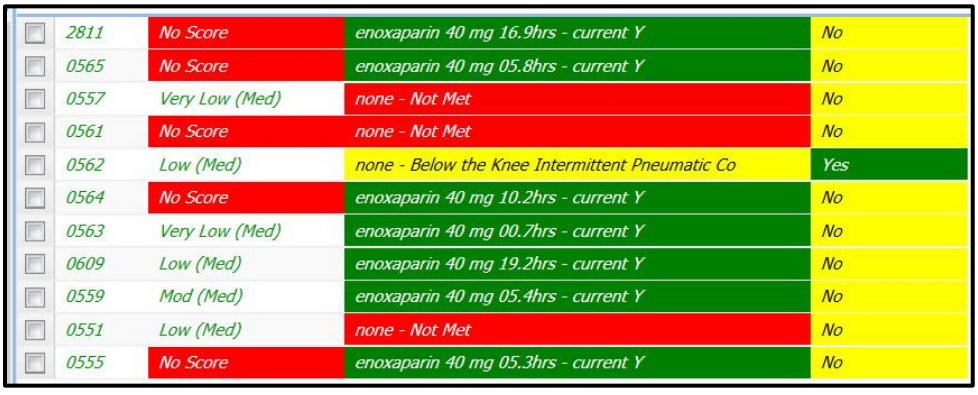
   i. Dry body weight should be used when calculating BMI for VTE prophylaxis dose adjustments in severely fluid overloaded patients.

D. Assessments for ongoing appropriateness of primary VTE prophylaxis should take into consideration the type, dose and duration of prophylaxis. [5]

E. Efforts should be made to prevent prolonged gaps in primary VTE prophylaxis, such as around surgeries or procedures.

F. Pharmacists, nurses and prescribers are encouraged to use electronic health record (EHR)-based tools such as the VTE dashboard shown below, which may be accessed in Powerchart via "Custom Views", to optimize VTE prophylaxis.

   i. Care teams that utilize a cache patient list may also incorporate this information into their digital and printed patient lists.



2811	No Score	enoxaparin 40 mg 16.9hrs - current Y	No
0565	No Score	enoxaparin 40 mg 05.8hrs - current Y	No
0557	Very Low (Med)	none - Not Met	No
0561	No Score	none - Not Met	No
0562	Low (Med)	none - Below the Knee Intermittent Pneumatic Co	Yes
0564	No Score	enoxaparin 40 mg 10.2hrs - current Y	No
0563	Very Low (Med)	enoxaparin 40 mg 00.7hrs - current Y	No
0609	Low (Med)	enoxaparin 40 mg 19.2hrs - current Y	No
0559	Mod (Med)	enoxaparin 40 mg 05.4hrs - current Y	No
0551	Low (Med)	none - Not Met	No
0555	No Score	enoxaparin 40 mg 05.3hrs - current Y	No

IV. Absolute and relative contraindications to primary VTE prophylaxis in medical and surgical patients (Table 1)

Medical reasons patients may not be able to receive or MAY not warrant ***pharmacologic*** prophylaxis:	Medical reasons patients may not be able to utilize or MAY not warrant ***SCDs***[a]:
Active or recent significant bleeding	Significant arterial insufficiency or ischemic
Known bleeding disorder	Vascular disease
Thrombolytics in prior 24 hours	Massive edema or weeping of the legs
Thrombocytopenia (<50K) or platelet dysfunction	Recent skin grafts
Intracranial or spinal surgery in prior 48 hours	Severe cellulitis or dermatitis
Hemorrhagic stroke in prior 48 hours	Infected leg wound or limb gangrene
Post-op bleeding concerns	Recent vein ligation
Potential surgery/procedure within next 12 hours (use SCDs at minimum if possible)	Severe lower limb injury
Anticipated admission < 24 hours	External devices (e.g., fixators, traction, wound vac, dressing)
Hypertensive crisis	

[a] Unilateral application of sequential compression devices (SCDs) is reasonable as long as no contraindication(s) to placement on the unaffected leg exist

V. Medical patients[3]

A. IMPROVE VTE and Bleed Risk Assessment

i. Acutely ill medical patients are an extremely heterogenous population, making risk assessment extremely important in identifying the highest risk patients that will derive the most benefit and incur least harm, as well as identifying low risk patients who do not warrant exposure to prophylaxis.

ii. Certain clinical situations may warrant patient care actions that differ from what the risk assessment may suggest. Rationale for any deviations should be documented by the provider.

iii. Click **here** for an online calculator of the IMPROVE VTE (and Bleed) Risk factor Assessment

Table 2- IMPROVE VTE Risk Assessment[6]

	Points
Previous VTE	3
Known thrombophilia	2
Current acute lower limb paralysis or paresis due to stroke, etc.*	2
Active cancer	2
ICU stay	1
Complete immobilization ≥ 1 day	1
Age ≥ 60 years	1

Score	VTE risk	Recommendations
≥ 1	At-risk	VTE prophylaxis is strongly recommended

Table 3- IMPROVE BLEED Risk Assessment[7]

	Points
Estimated CrCl 30–59 ml/min	1
Male gender	1
Age 40–85	1.5
Current cancer	2
Rheumatic disease	2
Central venous catheter	2
Intensive Care /Critical Care Unit stay	2.5
Estimated CrCl <30 ml/min	2.5
Hepatic failure (INR >1.5 not on AC)	2.5
Age ≥85	3.5
Platelet count <50,000	4
Bleeding in 3 months before admission	4
Active gastroduodenal ulcer	4.5

Score	Bleed risk	Recommendations
≥ 7	High	Consider use of SCDs vs. pharmacologic prophylaxis until bleed risk is lower

Table 4- VTE Prophylaxis Regimens for At-Risk Medical Patients [a, b, c]

	Preferred Option	Alternative Option
At-risk (IMPROVE score ≥ 1)	Enoxaparin 40 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
Special populations/situations		
CrCl 15- 30 mL/min (Not on dialysis)	Enoxaparin 30 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
ESRD (CrCl <15 ml/min) or on dialysis	Heparin SQ at appropriate prophylactic dose for weight	
Extreme obesity (BMI > 40 kg/M^2)	Enoxaparin 0.5 mg/kg SQ q 24 hrs	Heparin 7500 units SQ q 8 hrs [e]
Low body weight (weight < 50 kg, BMI < 18.5 kg/M^2)	Heparin 5000 units SQ q 8-12 hrs [d]	Enoxaparin 30 mg SQ q 24 hrs
High bleeding risk (IMPROVE bleed score ≥ 7, active bleed, PLT < 50,000, etc.)	Perform risk/benefit assessment in consideration of SCDs vs. pharmacologic prophylaxis. Note: factors associated with a higher bleeding risk are often also associated with higher thrombotic risk	

[a] Fondaparinux 2.5 mg SQ daily is an option if needed, but use restricted to patients with CrCl > 50 ml/min in the setting of a documented pork allergy, religious beliefs precluding pork products, and/or active/recent HIT. Provider will need to call pharmacy to obtain.

[b] Rivaroxaban 10 mg PO daily may be considered for at-risk medical patients with CrCl > 30 ml/min who are refusing both SCDs and injectable prophylaxis. Use is restricted and provider will need to call antithrombosis steward or pharmacist to obtain.

[c] Includes cancer patients and aligns with NCCN[8] and ASCO[9] guidelines. Note that CNS malignancy or CNS metastases are not absolute contraindications for VTE prophylaxis. Clinicians should use shared decision making with patient and weigh the risks and benefits of pharmacologic prophylaxis in cancer patients

[d] May consider BID dosing if weight is very low (i.e., < 40 kg)

[e] For patients with a BMI >60, calculate dose according to the following equation and administer in the subcutaneous fat of the lateral aspect of upper arm every 12 hours:
Unfractionated heparin dose = (71.34 x weight in kg) + (83.75 x height in inches) – 3467.59[10]

VTE prophylaxis initiation and duration considerations in medically ill patients

A. Medical patients who warrant DVT prophylaxis should have prophylaxis initiated as soon as they are determined to be at risk and should receive prophylaxis throughout their hospitalization with minimal interruptions in therapy.
B. Extended VTE prophylaxis beyond hospital discharge is an evolving practice.
C. Hospital-acquired VTEs can occur up to 90 days following hospital discharge, which suggests that extended duration VTE prophylaxis may be indicated in certain individuals.[11]
D. If extended duration VTE prophylaxis is indicated, the patient is low bleed risk and amenable, and access to the medication is confirmed, consider use of formulary agents with evidence for extended prophylaxis[12,13]
    i. Enoxaparin 40 mg SQ once daily for 6-14 days total
    ii. Rivaroxaban 10 mg PO once daily for 31-39 days total

VI. Surgical patients

A. VTE and Bleed Risk Assessment

i. Surgical patients are a more homogenous population (compared to medical patients). Most, but not all, are at sufficient risk to warrant VTE prophylaxis.

ii. To identify at-risk patients, all surgical patients should have a VTE risk assessment prior to and after surgery to determine need for VTE prophylaxis

iii. Click here for an online calculator of the CAPRINI Risk Assessment

iv. Note that the Caprini VTE risk assessment model[14] has not been validated in orthopedic surgery populations but may be used as a guide to identify patients who may warrant more assertive VTE prophylaxis.

   a. Most orthopedic surgery patients will have a Caprini score of at least 3 (e.g., age > 40, surgery > 45 minutes) and will warrant VTE prophylaxis

   b. Evidence- based prophylactic regimens specific to orthopedic patients are listed in table 9

v. All surgical patients should also undergo a bleeding risk assessment, and if bleeding risk outweighs VTE risk, then use of mechanical prophylaxis is preferred

Table 5- Risk factors for major bleeding among surgical patients[15]

General risk factors
Active bleeding Previous major bleeding Known, untreated bleeding disorder Severe renal or hepatic failure Thrombocytopenia Acute stroke Uncontrolled systemic hypertension Lumbar puncture, epidural, or spinal anesthesia within previous 4 h or next 12 h Concomitant use of anticoagulants, antiplatelet therapy, or thrombolytic drugs
Procedure-specific risk factors
Abdominal surgery Male sex, preoperative hemoglobin level < 13 g/dL, malignancy, and complex surgery defined as ≥ 2 procedures, difficult dissection, or more than one anastamosis *Pancreaticoduodenectomy* Sepsis, pancreatic leak, sentinel bleed *Hepatic resection* Number of segments, concomitant extrahepatic organ resection, primary liver malignancy, lower preoperative hemoglobin level, and platelet counts *Cardiac surgery* Use of aspirin or clopidogrel within 3 d before surgery BMI > 25 kg/m^2, non-elective surgery, placement of five or more grafts, older age, renal insufficiency, operation other than CABG, longer bypass time *Thoracic surgery* Pneumonectomy or extended resection
Procedures in which bleeding complications may have especially severe consequences
Craniotomy Spinal surgery Spinal trauma Reconstructive procedures involving free flap

Table 6- Caprini VTE risk assessment for surgical patients[15]

1 point	2 points	3 points	5 points
Age 41-60	Age 61-74	Age ≥ 75	Acute spinal cord injury (< 1 month)
Acute MI (<1 month)	Central venous access[d]	Established thrombophilia[b]	Elective lower extremity arthroplasty
BMI > 25	Immobile > 72 hrs	HIT	Hip, pelvis, or leg fracture (< 1 month)
CHF exacerbation (<1 month)	Leg plaster cast or brace	Personal history of VTE	Stroke (< 1 month)
History of inflammatory bowel disease	Malignancy[c]	Family history of VTE (1st degree relative)	
Procedure with local anesthesia	Surgery- arthroscopic		
Swollen legs or varicose veins	Surgery > 45 minutes[a]		
Sepsis (< 1 month)			
Serious lung disease ex. pneumonia (<1 month)			
Females only			
Oral contraceptives or HRT			
Pregnancy or postpartum (< 1 month)			
History of unexplained stillborn infant, spontaneous abortion (≥3), premature birth with toxemia or growth restricted infant			

[a] Includes arthroscopic and laparoscopic procedures
[b] e.g., APLA, Prot C def
[c] Excludes skin cancer, except for active melanoma
[d] Includes PICC and implanted port

Table 7- Caprini VTE score interpretation

Points	VTE Risk	Recommendation
0	Very low	Early and frequent ambulation
1-2	Low	SCDs
3-4	Moderate	Pharmacologic OR SCDs
≥ 5	High	Pharmacologic AND SCDs
>2 and high bleed risk		*SCDs until bleed risk resolves then re-assess for use of pharmacologic prophylaxis*

Table 8- VTE prophylaxis regimens for at-risk *non-orthopedic* surgical patients[2,15), f]

Surgical procedure	Preferred option	Alternative option(s)
Bariatric [a] BMI ≤ 50 kg/m^2[16] BMI > 50 kg/m^2 [17]	 Enoxaparin 40mg SQ q 12h Enoxaparin 60mg SQ q 12h	 Heparin 7500 SQ q 8 hrs
Cardiothoracic or vascular	Enoxaparin 40 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
General (e.g., abdominal)	Enoxaparin 40 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
Gynecologic	Enoxaparin 40 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
Neuro or spinal	SCDs [g]	Enoxaparin 40 mg SQ q 24 hrs or Heparin 5000 units SQ q 8 hrs
Trauma [b]	Enoxaparin 30 mg SQ q 12 hrs	Heparin 5000 units SQ q 8 hrs
Urologic (e.g., TURP, prostatectomy)	SCDs [g]	Enoxaparin 40 mg SQ q 24 hrs
Special populations/situations		
CrCl 15- 30 mL/min (not on dialysis)	Enoxaparin 30 mg SQ q 24 hrs	Heparin 5000 units SQ q 8 hrs
ESRD (CrCl <15 ml/min) or on dialysis	Heparin SQ at appropriate prophylactic dose for weight	
Extreme obesity [c] [18] (BMI > 40 kg/m^2)	Moderate risk: Enoxaparin 0.5 mg/kg SQ q 24 hrs High risk: Enoxaparin 0.5 mg/kg SQ q 12 hrs	Heparin 7500 units SQ q 8 hrs[e]
Low body weight (weight < 50 kg, BMI < 18.5 kg/m^2)	Heparin 5000 units SQ q 8-12 hrs[d]	Enoxaparin 30 mg SQ q 24 hrs
High bleeding risk	SCDs until bleed risk resolves then re-assess for use of pharmacologic prophylaxis	

[a] Check with bariatric surgeon prior to making any independent 'dose adjustments per pharmacy'

[b] See also TSI- specific VTE prevention guideline that may be accessed by clicking here

[c] In non-bariatric surgery patient

[d] May consider BID dosing if weight is very low (i.e., < 40 kg)

[e] For patients with a BMI >60, calculate dose according to the following equation and administer in the subcutaneous fat of the lateral aspect of upper arm every 12 hours:
Unfractionated heparin dose = (71.34 x weight in kg) + (83.75 x height in inches) – 3467.59 [10]

[f] Fondaparinux 2.5 mg SQ daily is an option if needed, but use restricted to patients with CrCl > 50 ml/min in the setting of a documented pork allergy, religious beliefs precluding pork products, and/or active/recent HIT. Provider will need to call pharmacist to obtain

[g] if patient is extremely high risk for VTE and low risk for bleeding, consider use of alternative option of pharmacologic prophylaxis

Table 9- VTE prophylaxis regimens for at-risk *orthopedic* surgical patients[2,19], [f]

Surgical procedure	Standard VTE risk (from the procedure itself)	High VTE risk (risk factors in addition to orthopedic procedure[d])
Total hip or knee arthroplasty[a,b]	Apixaban 2.5 mg PO BID Rivaroxaban 10 mg PO daily Enoxaparin 40 mg SQ daily Enoxaparin 30 mg SQ BID ASA 81-325 mg QD-BID[20,21][c]	Apixaban 2.5 mg PO BID Rivaroxaban 10 mg PO daily Enoxaparin 30 mg SQ BID
Hip fracture surgery[b]	All patients considered high risk Enoxaparin 30 mg SQ BID Enoxaparin 40 mg SQ once daily	
All other orthopedic procedures (e.g., distal fractures, cast immobilization)	• No specific recommendations on VTE prophylaxis • Defer to provider discretion • Pharmacologic prophylaxis may be reasonable in patients with minimal bleeding risk and additional VTE risk factors[d] - Aspirin - Enoxaparin 40 mg SQ daily	
Special populations/situations		
CrCl 15- 30 mL/min (not on dialysis)	Enoxaparin 30 mg SQ q 24 hrs	
ESRD (CrCl <15 ml/min) or on dialysis	Heparin SQ at appropriate prophylactic dose for weight	
Extreme obesity [c][14] BMI > 40 kg/m^2)	Standard risk: Enoxaparin 0.5 mg/kg SQ q 24 hrs High risk: Enoxaparin 0.5 mg/kg SQ q 12 hrs	
Low body weight (weight < 50 kg, BMI < 18.5 kg/m^2)	Enoxaparin 30 mg SQ q 24 hrs	
High bleeding risk	SCDs until bleed risk resolves then re-assess for use of pharmacologic prophylaxis	

[a] Guidelines suggest use of either anticoagulants or aspirin (ASA). If anticoagulants are used, DOACs (apixaban or rivaroxaban) are suggested in preference to enoxaparin. If DOACs are not used, enoxaparin is suggested in preference to heparin

[b] Fondaparinux 2.5 mg SQ daily is an option if needed, but use restricted to patients with CrCl > 50 ml/min in the setting of a documented pork allergy, religious beliefs precluding pork products, and/or active/recent HIT. Provider will need to call pharmacist to obtain

[c] ASA doses are not well-established. When used, evidence-based approaches suggest an initial 10-day period of anticoagulant prophylaxis prior to switching to aspirin[20,21]

[d] History of VTE, active malignancy (excluding skin cancer), systolic heart failure, hormone replacement therapy, known thrombophilic disorder, or bilateral TKA or THA procedure. If bleeding risk factors present (major bleeding event w/in 3 months, active gastroduodenal ulcer, platelet count < 50,000, severe renal failure, hepatic failure, advanced age >85), reasonable to consider using aspirin in patients with additional VTE risk factors.

VTE prophylaxis initiation and duration considerations in surgical patients

A. Surgical patients who warrant DVT prophylaxis should have prophylaxis initiated as soon as they are determined to be at risk and should receive prophylaxis throughout their hospitalization with minimal interruptions in therapy.
B. Optimized VTE prevention should place particular emphasis on any needed discontinuation and timely resumption in the peri-operative period (see peri-operative section).
C. Pre-operatively, there is no clear consensus on need for or timing of interruption of VTE prophylaxis and this is left at the discretion of providers.
    i. North American guidelines generally suggest interruption of pre-operative prophylaxis 12-24 hours prior to the procedure to minimize bleeding complications.[15,19]
    ii. However, outside of the US and in certain surgical procedures (e.g., abdominal surgery for cancer) existing evidence suggests it is reasonable to consider a dose of VTE prophlyaxis closer surgery (e.g., in the peri-op holding area within 2 hours of surgery) to minimize risk of clot formation during the procedure.[22]
D. Post-operatively, pharmacologic prophylaxis should generally not be administered any sooner than 6 hours post-procedure based on evidence that shows a clinically and statistically significant increase in bleeding complications when prophylaxis is started too soon.[23]
E. Overall goal for peri-operative management is < 24 hours (12 hrs pre and 12 hours post) off of prophylaxis to minimize adverse events. Concomitant use of SCDs is encouraged to minimize gaps in VTE prevention around procedures.
F. Surgical patients determined to be at risk for VTE should receive prophylaxis for the duration of the hospital admission or at least until fully ambulatory and VTE risk has diminished.
    i. Guidelines suggest it is reasonable to consider a duration of up to 10 days following surgical intervention in select patients.
    ii. Guidelines further suggest extended prophylaxis beyond hospital discharge for patients that fall into one of the following categories:[15,19]

Hip/knee arthroplasty, hip fracture surgery	Minimum of 10 – 14 days Consider extending up to 35 days
High risk abdominal or pelvic surgery for cancer	Consider 4 weeks of prophylaxis if not at high risk for bleeding

VII. Obstetric patients: pregnancy and the postpartum period[24-27]

A. Pregnant women have a ≥5-fold increased risk for VTE compared to non-pregnant women due to physiologic changes including:
    i. Venous stasis related to venous dilatation, compression and diminished mobility
    ii. Increased production of procoagulants and decreased fibrinolytic activity
    iii. Vascular damage that occurs during placental separation

B. Risk is equally distributed between ante- and post-partum period
    i. Daily risk is much higher in the shorter 6-week post-partum period (≥15-35-fold)

C. VTE risk assessment of obstetric patients should be performed minimally at 4 key time points as shown in Table 10 below

Table 10- Key VTE risk assessment time points for obstetric patients

Time point	Considerations
Antepartum at first prenatal visit	• Patient history, particularly for prior VTE or known personal or family history of thrombophilia, is imperative for informing decisions about antepartum VTE prophylaxis
Hospitalization occurring during antepartum period	• Ensure hydration and maintain full ambulation if possible • Benefits of VTE risk reduction *may be outweighed* by risks of emergent neuraxial or general anesthesia • Recommend shared decision making with patient and discussion/consultation with anesthesia regarding risk of delivery, bleeding and surgery prior to initiating pharmacologic prophylaxis • For women at high risk of imminent delivery or bleeding, mechanical thromboprophylaxis should be utilized • Consider prophylaxis with low dose unfractionated heparin as an alternative to LMWH, which may better facilitate neuraxial anesthesia
Birth hospitalization	• Cesarean section: - Placement of SCDs prior to delivery and continued post-op is recommended for all women undergoing Cesarean section - For women undergoing cesarean with *additional risk factors* for thromboembolism, individual risk assessment may indicate thromboprophylaxis with both SCDs and pharmacologic prophylaxis during the hospital admission • Vaginal delivery - Women with BMI ≥ 40 undergoing vaginal delivery should have SCDs placed before delivery and continued until fully ambulatory at minimum - If patient has additional risk factors, pharmacologic prophylaxis up to hospital discharge should be considered if no contraindications
Postpartum	• Pharmacologic prophylaxis may be indicated if patient at increased risk • Duration will range from 10 day to 6 weeks, depending on VTE risk

Table 11- RCOG VTE risk assessment for obstetric patients[24]

Points			
4	**3**	**2**	**1**
Previous VTE in any pregnancy	Previous VTE outside pregnancy	Cesarean section in labor	1° familial history of VTE
OHSS[b]	High risk thrombophilia	BMI>40	Low risk thrombophilia w/o VTE
	Surgical procedures		BMI 30-40
	Hyperemesis		Parity≥ 3
	Medical comorbidities[c]		Smoker
			Gross varicose veins
			In vitro fertilization
			Immobility
			Acute systemic infection
			Postpartum hemorrhage
			Labor >24hrs
			Preterm birth
			Age > 35 years
			Pre-eclampsia in current pregnancy
			Multiple pregnancy
			Elective Cesarean section
			Stillbirth in current pregnancy
[a]No widely accepted scoring system has been prospectively validated in the obstetric population. [b]Ovarian hyperstimulation syndrome [c]Cancer, heart failure, systemic lupus erythematosus, irritable bowel, active IV drug use, etc.			

Table 12- VTE prophylaxis regimens for obstetric patients[24-27]

Score	1st Trimester	2nd Trimester	3rd Trimester	CrCl<30mL/min	Obesity
0-**2**	Clinical surveillance	Clinical surveillance	Clinical surveillance	Clinical surveillance	Clinical surveillance
3	Clinical surveillance	Clinical surveillance	Enoxaparin 40mg SQ daily or Intermediate dosing 40mg SQ q12h or Heparin 10,000 units SQ q12h	Recommend UFH Refer to gestational dosing	Enoxaparin 0.5mg/kg SQ daily or UFH (refer to gestational dosing)
≥4	Enoxaparin 40mg SQ daily or Intermediate dose 40mg SQ q12h or Heparin 5,000-7,500 units SQ q12h	Enoxaparin 40mg SQ daily or Intermediate dose 40mg SQ q12h or Heparin 7,500-10,000 units SQ q12h	Enoxaparin 40mg SQ daily or Intermediate dose 40mg SQ q12h or Heparin 10,000 units SQ q12h		
Postpartum					
≥2	Refer to 3rd trimester dosing			Recommend UFH	Enoxaparin 0.5mg/kg SQ daily

Table 13- Risk factors for bleeding in obstetric patients[24]

Contraindications/cautions to LMWH use
Known bleeding disorder (e.g., hemophilia, von Willebrand's disease or acquired coagulopathy
Active antenatal or postpartum bleeding
Women considered at increased risk of hemorrhage (e.g., placenta previa)
Thrombocytopenia (platelet count <75 x 10^9/l)
Acute stroke in previous 4 weeks (hemorrhagic or ischemic)
Severe renal disease (glomerular filtration rate < 30 ml/min/1.73m^2)
Severe liver disease (prothrombin time above normal range or known varices)
Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic)

VTE prophylaxis duration considerations in obstetric patients[24]

A. For postpartum women who received **antenatal VTE prophylaxis**, have a **prior history of VTE**, or **known thrombophilia,** postpartum pharmacologic VTE prophylaxis should be continued up to hospital discharge then may be extended **up to 6 weeks** (or longer) following a focused bleed risk assessment and shared-decision making discussion with the patient.
B. Postpartum women who did not receive antenatal VTE prophylaxis and without a known history of VTE or known thrombophilia may benefit from prophylaxis extended beyond discharge for up to 10 days and possibly extended up to 6 weeks following a focused bleed risk assessment and shared-decision making discussion with the patient.

VIII. Neuraxial anesthesia and VTE prophylaxis

A. Epidural anesthesia and analgesia have many proven benefits and are often used in surgical and obstetric patients.
B. Bleeding into the epidural space can cause spinal cord compression, ischemia and subsequent paralysis.
C. Due to the gravity of this potential complication, the American Society of Regional Anesthesiologists (ASRA) [28] and the Society for Obstetric Anesthesia and Perinatology (SOAP)[29] have issued specific recommendations for concomitant neuraxial blockade and anticoagulant therapy**.**
    i. Click here for ASRA guidelines for non-obstetric patients
    ii. Click here for SOAP guidelines for obstetric patients

PRIOR TO INITIATING ANTICOAGULATION IN ANY PATIENT RECEIVING AN EPIDURAL, NOTIFICATION TO ACUTE PAIN/ANESTHESIA SERVICE VIA TIGER CONNECT BY THE PRIMARY TEAM IS SUGGESTED

IX. Peri-operative management of VTE prophylaxis

A. Click here for formal guidelines and recommendation for perioperative management of VTE prophylaxis

X. COVID-19 (highly suspected or confirmed)[30]

A. Click here for formal guidelines and recommendations for VTE prophylaxis during the COVID-19 pandemic

XI. Monitoring of VTE prophylaxis therapy

A. Per authority of the P&T committee, pharmacists may order necessary labs for implementation of safe, effective VTE prophylaxis

Lab	Interpretation
Platelets (for UFH and enoxaparin)	Baseline platelet count and every 2 to 3 days to monitor for HIT If platelets decrease by 50% from baseline, or HIT suspected reach out to Antithrombosis Pharmacist (764-7637 or Tiger Connect)
CBC (UFH)	Baseline hemoglobin, hematocrit and every 2 to 3 days up to at least 14 days and thereafter or at least as clinically necessary
Serum creatinine	Baseline prior to dispensing any doses of anticoagulation *May dispense one dose of anticoagulation in emergent situations prior to knowing the current serum creatinine, but should order a serum creatinine and ensure follow up* Routine creatinine at least every 3-5 days, depending on patient's clinical status
Anti-Factor Xa monitoring in special populations* (enoxaparin)	The utility of Anti-Xa levels in chemoprophylaxis of VTE has not been firmly established. The 2018 ASH guidelines, recommend against using anti-Xa monitoring for enoxaparin monitoring due to the lack of quality evidence for dose titration based upon an anti-Xa level.[31] If suspected need for anti-Xa monitoring of VTE prophylaxis is needed, reach out to the Antithrombosis Pharmacist (764-7638) to discuss.

**If drawing anti-xa level is deemed necessary, draw level 4hrs after 2nd or 3rd dose of enoxaparin, with an anti-xa target of 0.2-0.5 IU/mL*

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