

VTE Prophylaxis: Orthopedic Patients

Given the high-risk of bleeding post-operatively from orthopedic procedures, the American Academy of Orthopaedic Surgeons has the following recommendations (MUST document that patient is at high risk for bleeding if aspirin is used).

Enoxaparin	Post-Hip: 40 mg SQ Q24H, begin 12-24 hrs post-op, for 7-12 days Post-Knee: 30 mg SQ Q12H, begin 12-24 hrs post-op, for 7-12 days
Warfarin	Start either the night before or the night after surgery, for 2-6 weeks with INR goal ≤2
Aspirin	325 mg PO BID, starting evening of surgery x 6 weeks

Rivaroxaban is an oral anticoagulant and should not be used in patients with CrCl < 30 mL/min or concomitantly with phenytoin, rifampin, ketoconazole, protease inhibitors, or erythromycin.

Rivaroxaban	10 mg PO Q24H, begin ≥6 h post-op Post Hip: give up to 35 days Post Knee: give up to 14 days
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DABIGATRAN (Pradaxa®)

- Indicated to reduce the risk of stroke and systemic thromboembolism in patients with non-valvular atrial fibrillation (NVAF) only
- All orders must include the following in the "COMMENTS" field: estimated renal function (CrCl or eGFR), hemoglobin or hematocrit
- Do NOT:
 - use with rifampin
 - open or crush capsules – increases bleeding risk
 - use with current or recent thrombolytic therapy
 - use with indwelling epidural catheter

Dabigatran Dosing

NOTE Renal Dose Adjustment Requirements

CrCl or eGFR	Dabigatran Dose
> 30 mL/min	150 mg PO twice daily
15 – 30 mL/min	75 mg PO twice daily
< 15 mL/min (or on dialysis)	Do not use

Extended Prophylaxis Recommendations

(Chest, 2008)

Higher risk** or major procedure for cancer	LMWH or LDUH Extended treatment for high risk (i.e. 4 wks)
Prior VTE	Consider LMWH for up to 28 days after discharge
Major cancer surgery	
High risk GYN procedures especially for major cancer	
TKR and hip fracture surgery	Recommend extend beyond 10 days and up to 35 days

**Hip or knee arthroplasty, major trauma, spinal cord injury

Treatment of PE/DVT

Start warfarin on day 1*

In addition, start patient on either LMWH (preferred if no contraindication) or UFH

Continue heparin/enoxaparin and warfarin until INR > 2 for 24 hours (at least 5 days)

Enoxaparin

Preferred for PE/DVT patients, except for:

- Massive PE
- Pts receiving or about to receive thrombolysis
- CrCl < 30
- Weight > 150 kg

Dosage: based on ACTUAL weight

- 1.5 mg/kg SQ daily for DVT

-or-

- 1 mg/kg SQ Q12 hours for PE/DVT

- If CrCl < 30: UFH is preferred or consider enoxaparin 1 mg/kg SQ daily

Heparin

See heparin dosing nomograms at right

All heparin continuous infusion orders MUST:

- Be written every 24 hours and with each dose change
- Be written as units/hour
- Contain the most recent aPTT results

*See other side for warfarin dosing recommendations

Heparin Dosing

Indication	Initial Load*	Initial Maintenance Rate*
DVT/PE	80 units/kg (max 10,000 units)	18 units/kg/hr (max 2,100 units)
ACS	60 units/kg (max 5,000 units)	12 units/kg/hr (max 1,000 units/hr)
Atrial Fibrillation	Bolus optional, if given 60 units/kg (max 5,000 units)	12 units/kg/hr (max 1,000 units/hr)

* Use the weight/indication-based heparin order sets in PRISM to determine correct dose

Heparin Adjustment Nomograms

DVT/PE Target Range aPTT: 60-90 seconds

aPTT	Repeat Bolus Dose	Stop Infusion?	Change in Heparin Infusion	Next aPTT
< 45	3,000 units	NO	↑ by 3 units/kg/hr	6 hrs
45-59	2,000 units	NO	↑ by 2 units/kg/hr	6 hrs
60-90	No change – THERAPEUTIC RANGE			*6 hrs
91-109	None	NO	↓ by 2 units/kg/hr	6 hrs
> 109	None	Hold heparin drip for 60 mins	↓ by 3 units/kg/hr	6 hrs (send stat)

ACS/AFib Target Range aPTT: 50-70 seconds

aPTT	Repeat Bolus Dose	Stop Infusion?	Change in Heparin Infusion	Next aPTT
< 41	2,000 units	NO	↑ by 2 units/kg/hr	6 hrs
41-49	None	NO	↑ by 1 unit/kg/hr	6 hrs
50-70	No change – THERAPEUTIC RANGE			*6 hrs
71-90	None	NO	↓ by 1 unit/kg/hr	6 hrs
91-110	None	Hold heparin drip for 30 mins	↓ by 2 units/kg/hr	6 hrs
> 110	None	Hold heparin drip for 60 mins	↓ by 3 units/kg/hr	6 hrs (send stat)

*Once two consecutive aPTTs are therapeutic, order aPTT every 24 hours

Warfarin Dosing

All orders require INR goal, current INR, and indication
Order must be written every 24 hours

Please formally consult neurology/neurosurgery on their patients

1) Start 5 mg PO HS (renew daily)

Consider a lower dose in those with hepatic disease, CHF, a high risk of bleeding, the elderly, malnourished, Asian ethnicity, clinical hyperthyroidism, concomitant medications that increase bleeding risk (see next page), and those with a known lower dosing regimen.

2) Check INR daily (changes will usually not be seen for 2-3 days) and adjust dose according to nomogram

Warfarin Dosing Nomogram

(For warfarin naïve patients, goal INR 2-3)

Day	INR	Dosage
1		5 mg
2	< 1.5	5 mg
	1.5-1.9	2.5 mg
	2-2.5	1-2.5 mg
3	> 2.5	Hold Dose
	< 1.5	5-10 mg
	1.5-1.9	2.5-5 mg
	2-2.5	0-2.5 mg
4	2.5-3	0-2.5 mg
	> 3	Hold Dose
	< 1.5	10 mg
	1.5-1.9	5-7.5 mg
5	2-3	0-5 mg
	> 3	Hold Dose
	< 1.5	10 mg
	1.5-1.9	7.5-10 mg
6	2-3	0-5 mg
	> 3	Hold Dose
	< 1.5	7.5-12.5 mg
	1.5-1.9	5-10 mg
6	2-3	0-7.5 mg
	> 3	Hold Dose
	< 1.5	7.5-12.5 mg

Tablets are available in 1, 2, 2.5, 3, 5, 6, 7.5, and 10 mg strengths

INR Goals

Condition	INR Goal
Treatment for PE/DVT, atrial fibrillation (AF), aortic mechanical valve, bioprosthetic mitral valve (short term)	2-3
Mechanical mitral valve	2.5-3.5

Medications that Increase INR

Amiodarone	Simvastatin	metroNIDAZOLE
Quinolones	ceFAZolin	Ginkgo biloba
TMP/SMX	Ibuprofen	traZODone
Erythromycin	Fluconazole	

Supratherapeutic INR: How do I treat?

INR < 5 without bleeding	Lower or hold next dose, then resume at lower dose when INR is therapeutic
INR between 5-9 and no bleeding	<ul style="list-style-type: none"> If no need for reversal: hold warfarin until INR in therapeutic range, then resume at a lower dose If need to reverse for surgery: give PO Vitamin K 2.5-5 mg, which will lower INR in 24 hours
INR ≥ 9 and no bleeding	Hold warfarin and give PO Vitamin K 2.5-5 mg, expect INR reversal in 24-48 hours
Bleeding	Hold warfarin. Administer IV Vitamin K 10 mg ± FFP depending on clinical need

Upon Discharge

Ensure all patients are educated about drug interactions, drug safety, administration methods, and diet.

Continuum
Health Partners

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Anticoagulation Guide for Inpatient Administration

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Venous Thromboembolism (VTE) Prophylaxis: Pharmacologic Options

Risk	Recommendation [†]
Low Expected LOS < 48 hours, minor/ambulatory surgery, age < 50 yrs & NO other risk factors, already on therapeutic anticoagulation	Early ambulation
Intermediate Most medical/surgical patients; CHF, pneumonia, active inflammation, advanced age, varicose veins, less than fully and independently ambulatory, dehydration, active malignancy	Choose One Pharmacologic Option <input type="checkbox"/> Heparin (UFH) preferred: 5,000 units SQ Q8H Consider 5,000 units Q12H if elderly, <55kg, renally impaired, or concerned about bleeding risk <input type="checkbox"/> Enoxaparin (LMWH): 40 mg SQ Q24H (if CrCl < 30, use 30 mg SQ Q24H or use UFH) Also (OPTIONAL) <input type="checkbox"/> Sequential compression device
High Acute spinal cord injury with paresis; multiple major trauma; abdominal or pelvic surg for cancer For Knee/Hip: see Ortho Section	<input type="checkbox"/> Enoxaparin (LMWH) preferred: 40 mg SQ Q24H (if CrCl < 30, use 30 mg SQ Q24H or use UFH) And <input type="checkbox"/> Sequential compression device

[†]LMWH is the preferred injectable agent post-CABG