

Adult Heparin Drip Protocol

This protocol reflects current evidence based clinical practice. It is not a substitute for appropriate clinical evaluation and does not supersede clinical judgment.

Initiating Heparin therapy:

→**Extreme Caution: Do not start in patients who have had tPA, for ischemic stroke, within 24 hours.**

1. Obtain baseline PT, PTT, CBC and Serum Creatinine if not done within 24 hours prior to initiation of therapy.
2. Discontinue all Intramuscular injections and prophylactic anticoagulation.
3. Discontinue Aspirin > 162mg
4. Use approved Heparin PowerPlan or in the event of CPOE downtime, use VCMC 345-066 order form.

Exclusion Criteria:

1. Do not initiate on patient with epidural catheter.
2. Do not initiate on patient with platelets <50,000 or PTT>79 seconds.
3. Do not initiate on patients with suspected or proven DIC, TTP or HIT.

Dosing:

1. Heparin will *not* be held in the event there are no baseline labs. Pharmacist may order baseline labs if physician has not already done so.
2. Dosing is based on Actual Body Weight.

INDICATION	WEIGHT	LOADING DOSE	INITIAL INFUSION RATE	NOTES
Deep Venous Thrombosis (DVT) Pulmonary Embolism (PE) Arterial Embolism	≤ 125kg	80 units/kg IV (rounded to nearest 1000 units)	18 units/kg/hour	
<i>Deep Venous Thrombosis (DVT)</i> <i>Pulmonary Embolism (PE)</i> <i>Arterial Embolism</i>	> 125kg	<i>10,000 units IV</i>	<i>2250 units/hr divided by weight (kg) = units/kg/hr</i>	<i>1. Maximum Loading Dose = 10,000 units 2. Maximum initial rate = 2250 units/hr</i>
Acute Coronary Syndrome (ACS) Atrial Fibrillation	≤ 83kg	60 units/kg IV (rounded to nearest 1000 units)	12 units/kg/hr	
<i>Acute Coronary Syndrome (ACS)</i> <i>Atrial Fibrillation</i>	> 83kg	<i>5,000 units IV</i>	<i>1000 units/hr divided by weight (kg) = units/kg/hr</i>	<i>1. Maximum Loading Dose = 5,000 units 2. Maximum initial rate = 1000 units/hr</i>
Acute Coronary Syndrome (ACS) Atrial Fibrillation AFTER Thrombolytics	≤ 66kg	60 units/kg IV (rounded to nearest 1000 units)	12 units/kg/hr	
<i>Acute Coronary Syndrome (ACS)</i> <i>Atrial Fibrillation</i> <i>AFTER Thrombolytics</i>	67-83 kg	<i>4,000 units IV</i>	<i>12 units/kg/hr</i>	<i>Maximum Loading Dose = 4,000 units</i>
Acute Coronary Syndrome (ACS) Atrial Fibrillation AFTER Thrombolytics	>83 kg	4,000 units IV	1000 units/hr divided by weight (kg) = units/kg/hr	1. Maximum Loading Dose = 4,000 units. 2. Maximum initial rate = 1000 units/hr
<i>Hypothermia</i> <i>Cerebrovascular Accident (CVA)</i>	≤ 83kg	<i>NONE</i>	<i>12 units/kg/hr</i>	
Hypothermia Cerebrovascular Accident (CVA)	> 83kg	NONE	1000 units/hr divided by weight (kg) = units/kg/hr	1. Maximum initial rate = 1000 units/hr

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Monitoring:

1. Obtain CBC daily and PTT daily following dose changes.
2. Obtain PTT 6 hours after initiation of Heparin and after any subsequent changes until therapeutic X 2, then every AM.
3. Monitor platelets. Consider discontinuing if platelets decrease by $\geq 30\%$ from baseline and evaluate for HIT. Discontinue heparin if platelets decrease by 50% from baseline and proceed with HIT protocol.
4. Monitor for bleeding.
5. Use the following Nomograms for adjusting Heparin Drip Rates:

A) STANDARD BLEEDING RISK PATIENTS: Goal PTT 79-118 seconds

PTT	Rebolus or Hold	Rate Adjustment	Recheck PTT
≤ 60	Bolus: 40 units/kg	$\uparrow 2$ units/kg/hr	6hrs
61-78	Bolus: 20 units/kg	$\uparrow 1$ units/kg/hr	6hrs
GOAL 79-118	NONE	NONE	Continue Q6hr until Therapeutic x2, then QAM
119-135	NONE	$\downarrow 1$ units/kg/hr	6hrs
≥ 136	HOLD 60 minutes	$\downarrow 3$ units/kg/hr	6hrs

B) HIGHER BLEEDING RISK PATIENTS: Goal PTT 70-103 seconds

PTT	Rebolus or Hold	Rate Adjustment	Recheck PTT
≤ 59	Bolus: 2000 units	$\uparrow 2$ units/kg/hr	6hrs
60-69	NONE	$\uparrow 1$ units/kg/hr	6hrs
GOAL 70-103	NONE	NONE	Continue Q6hr until Therapeutic x2, then QAM
104-116	NONE	$\downarrow 1$ units/kg/hr	6hrs
≥ 117	HOLD 60 minutes	$\downarrow 3$ units/kg/hr	6hrs

C) POST-OP AND TRAUMA PATIENTS: Goal PTT 60-79 seconds

PTT	Rebolus or Hold	Rate Adjustment	Recheck PTT
≤ 59	NONE	$\uparrow 1$ units/kg/hr	6hrs
GOAL 60-79	NONE	NONE	Continue Q6hr until Therapeutic x2, then QAM
80-90	NONE	$\downarrow 0.5$ units/kg/hr	6hrs
91-100	NONE	$\downarrow 1$ units/kg/hr	6hrs
101-109	HOLD 60 minutes	$\downarrow 2$ units/kg/hr	6hrs
≥ 110	HOLD 60 minutes	$\downarrow 3$ units/kg/hr	6hrs

6. In the event that the infusion has been turned off for a procedure (for >60 minutes), the nurse is to **suspend** orders in the electronic medical record (EMR) and the nurse is to document the time when the drip was turned off. After the procedure, the provider needs to **resume** the order in the EMR. The nurse shall not resume heparin without a provider order. The provider shall consult with pharmacy to determine the new heparin infusion rate and bolus (if necessary). The nurse is to document when the drip was restarted.

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Guidelines for Restarting Heparin Infusions (For reference only):

Time off drip (hours)	Actions
< 2 hrs	<ul style="list-style-type: none">Review previous drip rates and aPTT values.Restart drip at the previous rate when the patient's aPTT was at goal (or near goal) prior to discontinuation.Recheck aPTT in 6 hours and adjust as necessary.
2-4 hrs	<ul style="list-style-type: none">Get STAT aPTT prior to re-starting of the drip.Review previous drip rates and aPTT values in CERNER.Do NOT bolus.Choose the most appropriate rate based on patient response before the drip was turned off.Do NOT automatically start at the initial drip rate for the indication.Recheck PTT in 6 hours and adjust as necessary.
> 4 hrs	<ul style="list-style-type: none">Get STAT aPTT prior to re-starting of the drip.Review previous drip rates and aPTT values in CERNER.Give bolus dose based on protocol.Choose the most appropriate rate based on patient response before the drip was turned off.Do NOT automatically start at the initial drip rate for the indication.Recheck PTT in 6 hours and adjust as necessary.
KEY POINTS <ul style="list-style-type: none">When the aPTT value is below goal (blood drawn from when patient off drip) at the time of restart, do NOT add extra unit/kg/hr based on the protocol to the previous rate. This will lead to supra-therapeutic levels.Consider even smaller adjustments or not giving bolus dose when the aPTT is near goal.	

Bridge Therapy: Concurrent use of Heparin and Warfarin.

- For those with active clot or high risk for clotting, there must be a five day overlap of both drugs.
- Achieve therapeutic INR ≥ 2 days prior to stopping the Heparin.

Reversal of Heparin Anticoagulation:

- Slow intravenous injection of Protamine 1% solution.
- Dose: 1mg Protamine for every 100 units of heparin administered over the last 4 hours.

Perioperative Management of Heparin:

- Discontinue Heparin 6 hours prior to surgery.
- Reorder Heparin 12 hours after surgery (if there is no evidence of bleeding).

References:

Garcia, DA, Baglin TP, et al. (2012). Parenteral Anticoagulants. *American College of Chest Physicians Evidence Based Clinical Practice Guidelines*, 9th Edition, 24S-43S.

Nutescu, E. (2007). Heparin, Low Molecular Weight Heparin, and Fondaparinux. In *Managing Anticoagulation Patients in the Hospital: The Inpatient Anticoagulation Service* (pp. 177-196). Bethesda: American Society of Health-System Pharmacists.