attach patient label here

Methodist Le Bonheur Healthcare

Physician Orders - Adult
Heparin Induced Thrombocytopenia (HIT) Protocol Orders

[X or R] = will be ordered unless marked out.
T= Today; N = Now (date and time ordered)
Height:_____cm Weight:_____kg

Allergies:	[ ] No known allergies
[ ]Medication allergy(s):	
[ ] Latex allergy	[ ]Other:

	Medications
	NOTE: Select either Bivalirudin, Argatroban, or Fondaparinux Orders below:
	NOTE: Argatroban preferred when CrCl is less than 15 mL/min or on dialysis.
	NOTE: Fondaparinux is contraindicated when CrCl is less than 30 mL/min
[ ]	**Bivalirudin Orders**
[ ]	**Argatroban Orders**
[ ]	**Fondaparinux Orders**

	CareSets/Protocols/PowerPlans	
[R]	**Heparin Induced Thrombocytopenia (HIT)**	T;N

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Physician Orders: Adult

Heparin Induced Thrombocytopenia (HIT) Protocol: Bivalirudin Orders

[X or R] = will be ordered unless marked out.

T= Today; N = Now (date and time ordered)

Height: _____cm Weight: _____kg

Allergies:		[ ] No known allergies
[X] Medication allergy(s): Heparin Low Molecular Weight Heparins_____		
[ ] Latex allergy [ ]Other:_____		
Patient Care		
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Bivalirudin: Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Adjust rate of bivalirudin based upon Bivalirudin Dose Adjustment Instructions (Ref Text)(pg. 3 for paper)
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Document the initiation, the rate, rate changes, and discontinuation on the HIT Protocol Flow Record.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Document the time of aPTT lab draw and result on the HIT Protocol Flow Record.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Discontinue daily CBC and aPTT when bivalirudin is discontinued.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Bivalirudin-Validate that heparin is documented as an allergy
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Discontinue orders for any heparin or LMWH, including heparin flushes or locks.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: If heparin or LMWH is ordered, contact prescriber to inform of Heparin allergy/HIT so that alternative anticoagulation can be ordered.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Label all IV sites/catheters "NO HEPARIN".
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: No Heparin coated needles for ABGs.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Place order for Partial Thromboplastin Time (PTT) to be collected 2 hours after the start of Bivalirudin
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: Place order for and Draw PTT 2 hours after any rate change on Bivalirudin infusion
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Bivalirudin: If any two sequential aPTT results exceed 75 seconds while on bivalirudin protocol, notify Pharmacist.

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Methodist Le Bonheur Healthcare

Physician Orders: Adult
Heparin Induced Thrombocytopenia (HIT) Protocol: Bivalirudin Orders

[X or R] = will be ordered unless marked out.
T= Today; N = Now (date and time ordered)

Medications		
Bivalirudin Maintenance		
[ ]	.Bivalirudin (HIT) Protocol Reference Text	See Ref. Text, N/A, N/A, Routine
	NOTE: If CrCl less than 10 mL/min or conv HD, place Bivalirudin order below:	
[ ]	bivalirudin (additive) 250 mg + Sodium Chloride 0.9% 250 mL	250 mL, IV, Routine,T;N, Titrate, Comment: Start rate at 0.02 mg/kg/hr, titrate per protocol. BIVALIRUDIN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL) aPTT (seconds) Dose Adjustment /Monitoring
	NOTE: If CrCl between 10-29 mL/min or CRRT, place Bivalirudin order below:	
[ ]	bivalirudin (additive) 250 mg + Sodium Chloride 0.9% 250 mL	250 mL, IV, Routine,T;N, Titrate, Comment: Start rate at 0.05mg/kg/hr, titrate per protocol. BIVALIRUDIN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL) aPTT (seconds) Dose Adjustment /Monitoring
	NOTE: If CrCl between 30-59 mL/min, place Bivalirudin order below:	
[ ]	bivalirudin (additive) 250 mg + Sodium Chloride 0.9% 250 mL	250 mL, IV, Routine,T;N, Titrate, Comment: Start rate at 0.08 mg/kg/hr, titrate per protocol BIVALIRUDIN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL) aPTT (seconds) Dose Adjustment /Monitoring
	NOTE: If CrCl greater than 60mL/min, place Bivalirudin order below:	
[ ]	bivalirudin (additive) 250 mg + Sodium Chloride 0.9% 250 mL	250 mL, IV, Routine,T;N, Titrate, Comment: Start rate at 0.15 mg/kg/hr, titrate per protocol BIVALIRUDIN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL) aPTT (seconds) Dose Adjustment /Monitoring
Laboratory		
[ ]	Partial Thromboplastin Time (PTT)	T;N, STAT, once, Type: Blood, Order Comment: draw prior to start of Bivalirudin infusion
[ ]	CBC	Routine, T+1;0400, qam, Type: Blood
Diagnostic Tests		
	NOTE: If not already performed, order bilateral ultrasound venous doppler below:	
[ ]	US Ext Lower Ven Doppler W Compress Bil	T;N, Reason for Exam: DVT (Deep Vein Thrombosis), Routine, Stretcher, Comment: Heparin Allergy
Consults/Notifications		
[ ]	Pharmacy Consult-HIT Bivalirudin dosing	T;N, Notify Clinical Pharmacy Specialist for initiation and daily follow-up of bivalirudin
[ ]	Pharmacy Consult-Warfarin Dosing	T;N, qam
CareSets/Protocols/PowerPlans		
[R]	Bivalirudin (HIT) Protocol Orders.	

Date **Time** **Physician's Signature** **MD Number**

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Methodist Le Bonheur Healthcare

Physician Orders-Adult

Heparin Induced Thrombocytopenia (HIT) Protocol: Argatroban Orders

[X or R] = will be ordered unless marked out.
T= Today; N = Now (date and time ordered)

Height: cm Weight: kg

Allergies: [ ] No known allergies
[ ]Medication allergy(s):
[ ] Latex allergy [ ]Other:

	Nursing Communication	
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: Validate that heparin is documented as an allergy
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: Discontinue orders for any heparin or LMWH, including heparin flushes or locks
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: If heparin or LMWH is ordered, contact prescriber to inform of Heparin allergy/HIT so that alternative anticoagulation can be ordered
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: Label all IV sites/catheters "NO HEPARIN"
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: No heparin coated needles for ABG's
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: Place order for Partial Thromboplastin Time (PTT) to be collected 2 hours after the start of argatroban continuous infusion.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: Draw PTT 2 hours after any rate change on Argatroban infusion
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Argatroban: If any two sequential PTT results exceed 90seconds while on Argatroban protocol, notify Pharmacist
	Argatroban Maintenance Medications	
	NOTE: Argatroban preferred when CrCl is less than 15 mL/min or on dialysis.	
	NOTE: If total bilirubin is equal to or less than 1.5mg/dL, place argatroban order below:	
[ ]	argatroban (Argatroban 50 mg/50mL Injectable Solution)	50 mg / 50 mL, IV, per protocol, Titrate, Comment: initial infusion is 1 mcg/kg/min. Titrate per protocol below: Comment: PTT(sec) Rate Adjustment Draw PTT
	NOTE: If total bilirubin is greater than 1.5mg/dL, place argatroban order below:	
[ ]	argatroban (Argatroban 50 mg/50mL Injectable Solution)	50 mg / 50 mL, IV, per protocol, Titrate, Comment: initial infusion is 0.5.mcg/kg/min Titrate per protocol below: PTT(sec) Rate Adjustment Draw PTT >90 Stop infusion. 2 hours post rate change
[R]	Sodium Chloride 0.9%	1,000 mL, IV, Routine, 20 mL/hr (infuse over 50 hr), Comment: To be run to keep line open when argatroban rate falls below 10 mL/hr.
	Laboratory	
[ ]	CBC	Routine, T+1;0400, qam, Type: Blood
[ ]	Partial Thromboplastin Time (PTT)	T;N, STAT, once, Type: Blood
[ ]	Partial Thromboplastin Time (PTT)	Routine, T+1;0400, qam, Type: Blood
	Diagnostic Tests	
[ ]	US Ext Lower Ven Doppler W Compress Bil	T;N, Reason for Exam: DVT (Deep Vein Thrombosis), Routine, Stretcher, Comment: Heparin Allergy
	Consults/Notifications	
[ ]	Pharmacy Consult-Warfarin Dosing	Routine, qam
[ ]	Pharmacy Consult-DTI Dosing-argatroban	Routine, qam, DTI - Argatroban dosing
	CareSets/Protocols/PowerPlans	
[R]	Argatroban (HIT) Protocol Orders.	

Date **Time** **Physician's Signature** **MD Number**

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Methodist Le Bonheur Healthcare

Physician Orders - Adult
Heparin Induced Thrombocytopenia (HIT) Protocol: Fondaparinux Orders

[X or R] = will be ordered unless marked out.
T= Today; N = Now (date and time ordered)

Height: _____cm Weight: _____kg

Allergies: [ ] No known allergies
[ ]Medication allergy(s):_____
[ ] Latex allergy [ ]Other:_____

	Nursing Communication	
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Validate that heparin is documented as an allergy
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Discontinue orders for any heparin or LMWH, including heparin flushes or locks
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: If heparin or LMWH is ordered, contact prescriber to inform of Heparin allergy/HIT so that alternative anticoagulation can be ordered
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Fondaparinux Label all IV sites/catheters "NO HEPARIN"
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Fondaparinux No heparin coated needles for ABG's
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Discontinue any active orders for Bivalirudin, Argatroban or Heparin. If patient was previously on Bivalirudin/Argatroban, obtain PTT every 4 hours. Do not start Fondaparinux until PTT less than 45 seconds.
[ ]	Nursing Communication	Heparin Induced Thrombocytopenia (HIT) Protocol Fondaparinux: Page Clinical Pharmacist for Fondaparinux initiation and daily follow-up.
Fondaparinux for NON Acute HIT and weight greater than 50kg		
[ ]	fondaparinux	2.5 mg,Injection,Subcutaneous,QDay,Routine,T;N, Comment: Do not start until PTT is less than 45 seconds if patient was previously on Bivalirudin, Argatroban or heparin.
Fondaparinux for Acute HIT or thrombosis present		
	NOTE: If weight less than 50kg place order below:	
[ ]	fondaparinux	5 mg,Injection,Subcutaneous,QDay,Routine,T;N, Comment: Do not start until PTT is less than 45 seconds if patient was previously on Bivalirudin, Argatroban or Heparin.
	NOTE: If weight is 50-100kg place order below:	
[ ]	fondaparinux	7.5 mg,Injection,Subcutaneous,QDay,Routine,T;N, Comment: Do not start until PTT is less than 45 seconds if patient was previously on Bivalirudin, Argatroban or Heparin.
	NOTE: If weight is greater than 100kg place order below:	
[ ]	fondaparinux	10 mg,Injection,Subcutaneous,QDay,Routine,T;N, Comment: Do not start until PTT is less than 45 seconds if patient was previously on Bivalirudin, Argatroban or Heparin.
	Laboratory	
[ ]	CBC w/o Diff	Routine, T+1;0400, qam, Type: Blood

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Methodist Le Bonheur Healthcare

Physician Orders - Adult

Title: Direct Thrombin Inhibitor (DTI) Protocol Fondaparinux Orders

[X or R] = will be ordered unless marked out.
T= Today; N = Now (date and time ordered)

	Diagnostic Tests	
	NOTE: If not already performed, order bilateral ultrasound venous doppler below:	
[ ]	US Ext Lower Ven Doppler W Compress Bil	T;N, Reason for Exam: DVT (Deep Vein Thrombosis), Routine, Stretcher, Comment: Heparin Allergy
	Consults/Notifications	
[ ]	Consult Clinical Pharmacist	Start at: T;N, Special Instructions: Discontinue Bivalirudin, Argatroban or Heparin if patient is currently receiving.
[ ]	Pharmacy Consult-DTI Fondaparinux dosing	Routine, once, DTI - Fondaparinux dosing
[ ]	Pharmacy Consult-Warfarin Dosing	Routine qam

_____ _____ _____ _____

Date **Time** **Physician's Signature** **MD Number**

(Place Patient Sticker Here)

Methodist Healthcare

PHYSICIAN'S ORDERS

DATE: _____

HT:_____cm

WT:_____kg

Allergies: **Heparin** TIME:_____

HEPARIN-INDUCED THROMBOCYTOPENIA (HIT) PROTOCOL-ARGATROBAN

Orders completed by Nursing

1. Page Clinical Pharmacy Specialist / Coordinator for initiation and daily follow-up.
2. Order CBC without differential DAILY.
3. Draw baseline aPTT prior to infusion.
4. STAT aPTT 2 hours after the start of the continuous infusion and 2 hours after any rate change.
5. Stop all heparin or low-molecular weight heparin, including flushes or locks
6. Label all IV sites or catheters as "NO HEPARIN"
7. Adjust rate of infusion based upon *Argatroban Dose Adjustment Instructions.*

ARGATROBAN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL)	
APTT (seconds)	Dose Adjustment /Monitoring ***(Maximum rate NOT TO EXCEED 10 mcg/kg /min or ml / hour)***
Greater than 90	Stop infusion for **1 hour** and then restart at **50%** slower rate. ***(Reminder - Draw aPTT 2 (two) hours after each rate change)***
45-90	Continue at current rate. ***Draw aPTT in AM***
Less than 45	Increase infusion rate by **20%. *(Reminder - Draw aPTT 2 (two) hours after each rate change)***

8. Document the initiation, the rate, rate changes, and discontinuation on the *HIT Protocol Flow Record.*
9. Document time of drawing and results of each aPTT value on the *HIT Protocol Flow Record.*
10. Discontinue daily CBC and aPTT when Argatroban is discontinued.
11. If any two sequential aPTTs exceed 90 seconds, page the Clinical Pharmacist.

Orders for Pharmacist

1. Order bilateral lower extremity ultrasound for DVT if not done
2. Discontinue active orders for any heparin or LMWH and add to allergy list

Initial Maintenance Infusion:	
Total Bilirubin	**Dose**
Equal to or less than 1.5 mg / dL	1 mcg / kg / min
Exceeds 1.5 mg / dL	0.5 mcg / kg / min
Critically Ill	0.2 mcg/kg/min

3. Enter initial infusion rate_____mL/hr

Warfarin Management Recommendations (Not Orders)

1. Do not start warfarin until platelets greater than 150/mm^3
2. Use doses no greater than 5 mg to initiate warfarin therapy
3. Minimum of 5 days overlap with argatroban and warfarin.
4. NOTE: Argatroban prolongs the INR, therefore it must overlap with warfarin until INR **greater than 4**
5. **If rate is less than 2 mcg/kg/min stop infusion**
   a. Obtain INR 4-6 hours after stopping argatroban infusion
   b. If INR 2-3 (therapeutic), continue with warfarin monotherapy
   c. If INR less than 2 (sub-therapeutic) resume argatroban at previous rate & repeat procedure the following day
6. **If rate is greater than 2 mcg/kg/min reduce to 2 mcg/kg/min**
   a. Obtain INR in 4-6 hours, if INR greater than 4, stop argatroban
   b. Obtain INR 4-6 hours after stopping argatroban infusion
   c. If INR 2-3 (therapeutic), continue with warfarin monotherapy
   d. If INR less than 2 (sub-therapeutic) resume argatroban at previous rate & repeat procedure the following day

_____ _____ _____

Physician Signature: Physician Number: Date/time:

Methodist Healthcare – Memphis Hospitals
Heparin-Induced Thrombocytopenia Fact Sheet

Protocol Name	Heparin-Induced Thrombocytopenia (HIT) Protocol. There are three different HIT protocols but only one protocol will be used at a time. The drugs that are available for use per HIT protocol include argatroban, bivalirudin (Argatroban) and fondaparinux (Arixtra).
HIT Background	HIT is an immune-mediated response to heparin or low-molecular-weight heparins that results in the development of thrombocytopenia and increased risk for arterial and/or venous thrombosis. It is typically identified by a 50% drop in platelet count during or after heparin exposure and carries a high risk of morbidity and mortality. A heparin antibody test is usually positive.
Pharmacist's Role	The clinical pharmacy specialist or pharmacy coordinator (or designee) will review each case and determine the initial dose per the protocol based on each patient's renal or hepatic function. The pharmacist will leave a pharmacy consult note daily.
Nursing Assessment	Assess for signs and symptoms of deep vein thrombosis and pulmonary embolism. Patients with central or femoral lines are at high risk for upper or lower extremity DVT. All extremities should be examined regularly for color changes or decreased pulses indicating impaired perfusion. No heparin of any kind may be administered to the patient, including heparin flushes.
Direct Thrombin Inhibitors (DTI)	Direct Thrombin Inhibitors (DTI) are anticoagulants that work via a different mechanism than heparin and don't cross-react with heparin. These agents are high risk drugs and must be administered as a continuous infusion with frequent aPTT monitoring. Bleeding complication rates are high, and there is no known antidote. It is strongly recommended that a second nurse double-check the pump settings when programming the infusion rate.
Argatroban	Argatroban is a DTI that is approved for the treatment of patients with documented HIT. It must be dose adjusted for patients with liver disease. Monitor aPTT closely.
Bivalirudin	Bivalirudin (Argatroban) is a DTI that is used for the treatment of patients with documented HIT. It must be adjusted for patients with renal impairment. Monitor aPTT closely, that there is some risk for anaphylaxis.
Fondaparinux	Fondaparinux (Arixtra) is a once-daily subcutaneous injection that can be used for the treatment and prevention of DVT or PE. Similar to enoxaparin, it requires no aPTT monitoring.
Monitoring Parameters	The DTIs have a very narrow therapeutic index and require careful monitoring of aPTT and for bleeding complications. It is very important that the aPTT be adjusted promptly if it is too low or too high in patients with HIT.
Warfarin	Warfarin must not be initiated until platelet counts have recovered to at least 150,000. Patients with HIT require concomitant use of a DTI or fondaparinux when initiating warfarin, usually for at least 5 days. It is OK for the INR to exceed 3-4 in patients who are on argatroban.
Nurse	Please read this sheet and sign below to indicate that you understand the information presented.

(Place Patient Sticker Here)

PHYSICIAN'S ORDERS

HT: _____cm

WT: _____kg

DATE: _____

Allergies: **Heparin Low-Molecular Weight Heparins** TIME: _____

HEPARIN-INDUCED THROMBOCYTOPENIA (DTI) PROTOCOL –BIVALIRUDIN

Orders completed by Nursing

1. Page Clinical Pharmacy Specialist / Coordinator for initiation and daily follow-up.
2. Order CBC without differential DAILY.
3. Draw baseline aPTT prior to infusion.
4. STAT aPTT 2 hours after the start of the continuous infusion and 2 hours after any rate change.
5. Stop all heparin or low-molecular weight heparin, including flushes or locks.
6. Label all IV sites or catheters as "NO HEPARIN"
7. Adjust rate of infusion based upon *Bivalirudin Dose Adjustment Instructions.*

BIVALIRUDIN DOSE ADJUSTMENT INSTRUCTIONS (Use Standard Concentration 1 mg / mL)	
aPTT (seconds)	Dose Adjustment /Monitoring
Greater than 75	Stop infusion for **1 hour** and then restart at **50%** slower rate. **(new rate=current rate/2)** ***(Reminder - Draw aPTT 2 (two) hours after each rate change)***
45-75	Continue at current rate. ***Draw aPTT in AM***
Less than 45	Increase infusion rate by **20%. (new rate=current rate x 1.2)** ***(Reminder - Draw aPTT 2 (two) hours after each rate change)***

8. Document the initiation, the rate, rate changes, and discontinuation on the *HIT Protocol Flow Record*
9. Document the time of aPTT lab draw and result on the *HIT Protocol Flow Record*
10. Discontinue daily CBC and aPTT when bivalirudin is discontinued
11. If any two sequential aPTTs exceed 75 seconds, page the Clinical Pharmacy Specialist On-Call/Coordinator at _____.

Orders for Pharmacist

1. Order bilateral lower extremity ultrasound for DVT if not already done
2. Discontinue active orders for any heparin or LMWH and add to allergy list
3. Calculate CrCl using Cockcroft-Gault equation

Initial Maintenance Infusion (250mg / 250ml NS or D5W)	
CrCl (ml/min)	**Dose (based on actual body weight)**
> 60	0.15 mg/kg/hr
30-59	0.08 mg/kg/hr
10-29 *or* CRRT	0.05 mg/kg/hr
< 10 *or* conv HD	0.02 mg/kg/hr

4. Enter initial infusion rate _____mL/hr

Orders for Physician

- ❑ Warfarin Dosing Service to follow & begin anticoagulation with warfarin after platelet count recovery & when physician specifies.
- ❑ Do not consult Warfarin Dosing Service. MD to manage warfarin.

Warfarin Management Recommendations (NOT ORDERS)

1. Do not start warfarin until platelets > 150,000 / mm^3
2. Use doses no greater than 5 mg to initiate warfarin therapy
3. Minimum of 5 days of overlap with bivalirudin and warfarin
4. **NOTE:** Bivalirudin slightly elevates the INR *in vitro*; therefore, overlap with warfarin until INR **greater than 3**
5. Once INR greater than 3 for 2 consecutive days, stop bivalirudin

_____ _____ _____

Physician Signature: Physician Number: Date/time: