National Patient Safety Goal 3E:
Implications on Anticoagulation Practices at WHC

Quality, Safety and Education
Department of Nursing
2011
Objectives

• Discuss the importance of National Safety Goal 3E
• Describe the practice at Washington Hospital Center in relation to National Patient Safety Goal 3E
• Review revised heparin and therapeutic anticoagulation initiation protocols
NPSG-3E:
“Reduce the likelihood of patient harm associated with the use of anticoagulant therapy (TJC, 2010)”
1. Assess baseline coagulation status prior to starting warfarin
2. Educate patients on f/u, compliance, interaction, & reactions
Anticoagulation Protocols & Clinical Practice Guidelines

- Heparin
- Enoxaparin
- Fondaparinux
- Warfarin
- Argatroban
Clinical Practice Guidelines

- Starport>Pharmacy>Clinical Document Repository>Clinical Guidelines

- Standard Heparin Protocol
- Acute Coronary Syndrome (ACS) Protocol
- Low Target Range Protocol (incorporates stroke and vascular)
- Therapeutic Anticoagulation Protocol: Warfarin, Enoxaparin, and Fondaparinux
Heparin (Therapeutic) - Administration

- Premixed Bag (25,000 units/500 mL)
- Must use volumetric pump to infuse
- Doses based on weight in kg
  - Round to nearest 5 kg
  - Max dosing is 85 kg
- Use charts on order to determine rate changes
  - Units/hour are referenced for total amount of heparin administration
  - Pump titrated in units/kg/hour

Never titrate in ml/hour!
Heparin Monitoring (Anti-factor Xa)

- Better marker for anticoagulation
- Unaffected by diurnal rhythm, obesity, technique
- Goal PTT of 77-117 = anti-Xa level of 0.3-0.7
- Pump titration in units/kg/hour
Heparin Monitoring: Standard Protocol

<table>
<thead>
<tr>
<th>Heparin Level anti-Xa</th>
<th>BOLUS UNITS</th>
<th>STOP INFUSION</th>
<th>Rate Change</th>
<th>Repeat Heparin Level anti-Xa</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.19</td>
<td>80 units/kg IV (_______ units)</td>
<td>0</td>
<td>Increase rate by 4 units/hr (_______ units/hr)</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>0.19–0.70</td>
<td>40 units/kg IV (_______ units)</td>
<td>0</td>
<td>Increase rate by 2 units/hr (_______ units/hr)</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>0.30–0.70</td>
<td>0</td>
<td>0</td>
<td>Goal rate change in infusion rate</td>
<td>Repeat in 6 hours until anti-Xa is therapeutic x 2 consecutively, then anti-Xa every AM.</td>
</tr>
<tr>
<td>0.71–1.00</td>
<td>0</td>
<td>0</td>
<td>Decrease rate by 2 units/hr (_______ units/hr)</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>1.00–1.40</td>
<td>for 60 minutes</td>
<td>0</td>
<td>Hold infusion x 1 hour, then restart and decrease rate by 3 units/hr (_______ units/hr)</td>
<td>Repeat anti-Xa 60 minutes after infusion resumed.</td>
</tr>
<tr>
<td>&gt; 1.49</td>
<td>0</td>
<td>HOLD</td>
<td>Increase anti-Xa every 2 hours until &lt; 1.00. Resume infusion after decreasing the dose by 3 units/hr (_______ units/hr) and notify prescribing physician.</td>
<td>Repeat anti-Xa 6 hours after infusion resumed.</td>
</tr>
</tbody>
</table>

Repeat anti-Xa 60 minutes after drip held. Value should drop. Repeat anti-Xa 6 hrs after restarted and treat per protocol.

Document pt. education.

Lab Value to order in Invision for Standard Heparin Protocol.

HEPARIN MONITORING FLOWsheet: STANDARD PROTOCOL

<table>
<thead>
<tr>
<th>DATE/TIME of Adjustment</th>
<th>anti-Xa Result</th>
<th>TIME HELD (minutes)</th>
<th>NEW INFUSION RATE (units/kg/h)</th>
<th>anti-Xa DUE</th>
<th>RN SIGNATURE / PRINT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

HEPARIN LEVEL (LMWH) anti-Xa

Order Stat anti-Xa in 6 hours. The goal is to obtain a anti-Xa value in the 0.30–0.70 range.
Heparin Monitoring: Acute Coronary Syndrome Protocol

<table>
<thead>
<tr>
<th>Heparin Level anti-Xa</th>
<th>BOLUS UNITS</th>
<th>STOP INFUSION</th>
<th>Rate Change</th>
<th>Repeat Heparin Level anti-Xa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin Deep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 0.10</td>
<td>60 units/kg IV</td>
<td>0</td>
<td>Start IV drip at 12 units/kg/hr</td>
<td>Order STAT anti-Xa in 6 hrs. The goal is to obtain an anti-Xa value in the 0.30-0.70 range.</td>
</tr>
<tr>
<td>0.10 - 0.29</td>
<td>30 units/kg IV</td>
<td>0</td>
<td>Increase rate by 6 units/kg/hr Add this amount to the previous rate.</td>
<td>Repeat anti-Xa in 6 hrs.</td>
</tr>
<tr>
<td>0.20 - 0.70</td>
<td>0</td>
<td>0</td>
<td>Increase rate by 2 units/kg/hr Add this amount to the previous rate.</td>
<td>Repeat anti-Xa in 6 hrs.</td>
</tr>
<tr>
<td>0.71 - 1.00</td>
<td>0</td>
<td>0</td>
<td>Goal: No change in infusion rate</td>
<td>Repeat anti-Xa in 6 hrs.</td>
</tr>
<tr>
<td>1.01 - 1.40</td>
<td>0</td>
<td>0</td>
<td>Decrease rate by 2 units/kg/hr Subtract this amount from the previous rate.</td>
<td>Repeat anti-Xa in 6 hrs.</td>
</tr>
<tr>
<td>&gt; 1.40</td>
<td>HOLD</td>
<td></td>
<td></td>
<td>Repeat anti-Xa in 6 hrs. after Infusion resumed.</td>
</tr>
</tbody>
</table>

**Bolus from vial only**
**Titrates pump in units/kg/hr only**
**Repeat anti-Xa 60 minutes after drip held. Value should drop**
**Repeat anti-Xa in 6 hrs after Infusion resumed.**
**Repeat anti-Xa in 6 hrs and treat per protocol**

Lab test in Invasion to order for Acute Coronary Syndrome Protocol

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**Date/Time of Adjustment**
**Anti-Xa Result**
**TIME OF INFUSION (minutes)**
**TIME HELD (minutes)**
**NEW INFUSION RATE (units/kg/hr)**
**NEXT anti-Xa DUE**
**ORDER INTER #**
**SIGNATURE**

**HEPARIN MONITORING FLOW SHEET: ACUTE CORONARY SYNDROME PROTOCOL**
(Heparin Level [UNF] anti-Xa)
**Heparin Monitoring: Low Target Range Protocol (Stroke & Vascular)**

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### Stroke and Vascular Heparin Protocols have merged to become Low Target Range Protocol

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**NO BOLUS. Titrate in units/kg/h.**

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**Document patient education**

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**Lab Value to order in Invision for Low Target Range Heparin Protocol**
GUIDELINES FOR IV HEPARINIZATION PROTOCOL
ORDERS AND USE OF THE HEPARIN MONITORING FLOWSHEET

1. Transcribe IV heparinization protocol orders on the heparin monitoring flowsheet.

2. Units using the medication kardex will transcribe the following statement: “Heparin infusion, see heparin monitoring flowsheet.” The licensed nurse will place her/his initials by the order on the medication kardex per procedure.

3. The licensed nurse will put the date, time, and his/her name on the flowsheet to indicate the orders have been correctly transcribed from the order sheet.

4. Note all rates on heparin flowsheet in units/kg/hr.

5. The heparin monitoring flowsheet will be kept on a clipboard at the patient’s bedside along with the nursing flowsheet.

6. Anti-Xa should be adjusted per protocol AFTER THERAPY IS CHANGED.

7. When the heparin infusion has been discontinued, write: “Discontinue heparin infusion on the medication kardex per procedure.” The licensed nurse will place her/his initials, date and time the infusion was stopped in the appropriate column on the medication kardex and on the heparin monitoring flowsheet.

8. The nurse will remove the heparin monitoring flowsheet from the clipboard and place it in the patient’s chart.

## Ordering Lab Value for Anti-Xa in Invision

<table>
<thead>
<tr>
<th>Protocol / Order Set and Indication</th>
<th>Goal Anti-Xa</th>
<th>Lab Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Protocol</strong> - DVT, PE, Afib, Mechanical Heart Valves</td>
<td>0.3-0.7</td>
<td>Heparin (UNF) Anti-Xa</td>
</tr>
<tr>
<td><strong>Acute Coronary Protocol</strong> – ACS patients who have not received thrombolytic or GPIIb/IIIa inhibitors in past 24 hrs.</td>
<td></td>
<td>Heparin (UNF) Anti-Xa</td>
</tr>
<tr>
<td><strong>Low Target Range Protocol</strong> - Stroke, Arterial Thrombus</td>
<td>0.1-0.3</td>
<td>Heparin (Low Target Range) Anti-Xa</td>
</tr>
<tr>
<td>STEMI with thrombolytics*</td>
<td>0.2-0.5</td>
<td>Heparin (Mid Target Range) Anti-Xa</td>
</tr>
<tr>
<td><strong>Therapeutic Anticoagulation Initiation Order Set</strong> - Therapeutic Enoxaparin</td>
<td>0.6-1</td>
<td>Heparin (LMW) Anti-Xa</td>
</tr>
<tr>
<td>BID schedule</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>DAILY schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutic Fondaparinux (Back up slip)</td>
<td>0.5-1.5</td>
<td>Fondaparinux Level (anti-Xa)</td>
</tr>
</tbody>
</table>
Ordering Heparin Labs in Invision

- Baseline and routine INRs need to be done for warfarin. A baseline INR must be drawn prior to initiation and daily until the level has been therapeutic for 2 consecutive levels. At that time, INRs may be drawn every 3rd day.
Therapeutic Anticoagulation Initiation: Warfarin, Enoxaparin, or Fondaparinux

Orders with a □ must be checked to be carried out. Orders without a □ will be carried out unless crossed out and initialed.

When an option in orders designated by an "( )" is completed the default value will not be followed. Information in brackets [ ] is informational only and not an order.

1. Indication
   □ Atrial Fibrillation
   □ Pulmonary Embolism (PE) treatment
   □ Ischemic Stroke/CVA
   □ Peripheral Vascular Disease (PVD)
   □ Mechanical Valve replacement
   □ Deep Vein Thrombosis (DVT) treatment
   □ Other ____________

MEDICATIONS

Warfarin

Orders 2-9 pertain only if warfarin is checked. [Do not use this form if converting from argatroban to warfarin. Instead use Argatroban-Warfarin Conversion Orders (P&T 271B)]

2. □ Warfarin __ mg po every pm at 1800 [Note: Loading dose (>5 mg) is NOT recommended. Please refer to Warfarin Clinical Practice Guidelines (CPG0013) for recommendations on initiation of therapy or initiate with patient home dose]

3. Goal INR
   □ INR 2-3
   □ INR 2.5-3.5
   □ Other ____________

   Baseline INR must be drawn before warfarin therapy is initiated

4. Draw a baseline CBC, PTT, and PT/INR before initiation of therapy

5. Daily PT/INR. May be reduced to every 3rd day when 2 consecutive labs are in the therapeutic range with no dosage adjustments.

6. Hold Warfarin for INR greater than or equal to 5 or active bleeding and notify physician

7. CBC every other day, unless otherwise ordered.

8. Nurse will provide "Understanding your COUMADIN therapy" booklet and "Dietary Recommendations for Warfarin Therapy" pamphlet and document education in the Interdisciplinary Patient Education Record.

9. □ Dietary consult if additional patient education needed

Signature _____________________________
Date _____________________________

Patient education must be documented in IPER or Medconnect. Additional educational materials can be obtained via "Drug Information 7-6646"

Washington Hospital Center
MedStar Health

Place LABEL precisely in this space
Enoxaparin

Orders 10-14 apply only if enoxaparin is checked.

10. Current Actual Weight
   Est. CrCl [Using Cockcroft-Gault and Ideal body weight]
   [Cockcroft Gault est. CrCl: (140-age) x SCr / (72 x Wt)]
   [If female multiply x 0.85]

11. □ Enoxaparin (Dose should be based on actual body weight. Round to the nearest 10 mg. Maximum weight 150 kg. See LMWH Clinical Practice Guidelines (CPG0014) for dosing for various indications. Use CAUTION if calculated CrCl less than 15 mL/min. Enoxaparin should not be used in patients with a history of heparin induced thrombocytopenia.)
   - 1.5 mg/kg once daily subcut = ______ mg once daily subcut
   - 1 mg/kg every 12 hours subcut = ______ mg every 12 hours subcut
   - 1 mg/kg once daily subcut = ______ mg once daily subcut [If CrCl of 15-30 mL/min]
   - Other ______ mg/kg once daily subcut = ______ mg once daily subcut

Unfractionated heparin recommended in patients with severe renal insufficiency, extremes in body weight, or extremes in age and especially in patients with multiple risk factors for bleeding.

12. Draw baseline CBC, PT, and PTT before initiation of therapy.

13. CBC every other day, unless otherwise ordered.
14. Nurse will provide patient education and document education in the Interdisciplinary Patient Education Record.

Fondaparinux

Orders 15-19 apply only if fondaparinux is checked.

15. Current Actual Weight
   Est. CrCl [Using Cockcroft-Gault and Ideal body weight]
   [Cockcroft Gault est. CrCl: (140-age) x SCr / (72 x Wt)]
   [If female multiply x 0.85]

16. □ Fondaparinux (CAUTION if calculated CrCl less than 30 mL/min. Refer to the LMWH Clinical Practice Guidelines (CPG0014) for dosing recommendations for fondaparinux.)
   - 5 mg subcut once daily for a patient who weighs less than 50 kg
   - 7.5 mg subcut once daily for a patient who weighs 50-100 kg
   - 10 mg subcut once daily for a patient who weighs greater than 100 kg

17. Draw baseline CBC, PT, and PTT before initiation of therapy.

18. CBC every other day, unless otherwise ordered.
19. Nurse will provide patient education and document education in the Interdisciplinary Patient Education Record.

Occasionally a Heparin (LMWH) Anti-Xa may be ordered for monitoring purposes.

Remember: Patient Education

Routine Fondaparinux levels are not in Invision and must be requested on a backup slip.

Remember: Patient Education

Place LABEL precisely in this space
Enoxaparin (Lovenox)

- Dosing for ACS indications
- Caution with multiple risk factors (extremes in size, age, and renal function)
- Use discouraged for CrCl <15 mL/min
- Doses rounded to nearest 10 mg & based on actual body weight
- Lab monitoring (anti-Xa level) available
  - Ordered as “LMWH Level (anti-Xa)
  - Should be drawn 4 hours after the second dose
  - Anti-Xa level is 0.6 – 1 if on twice daily therapeutic dosing
Fondaparinux (Arixtra)

- Included in LMWH guideline
- Dosing for therapeutic anticoagulation weight-based
- Extreme caution in patients with CrCl <30 mL/min
- Long half-life - D/C at least 48 hours prior to surgery
Warfarin (Coumadin) Guidelines

- Recommended starting doses, titration, goal INRs, & duration of therapy
- Use of loading dose (>5 mg) is still discouraged
- Duration no longer required to be written
  - Still encouraged since ensures regular prescriber monitoring

NPSG3E requires a **baseline INR** and **routine** monitoring!
TJC Requirements for Education

• Patient & family education on anticoagulation
  – Importance of follow-up & compliance
  – Dietary restrictions (or lack of)
  – Adverse drug reactions
  – Drug interactions

• Specific anti-coagulant documentation
Education Specific to Anticoagulant

- Coumadin Booklet
- Warfarin dietary information
- Lovenox teaching kits
- Drug Information – Ext. 7-6646
  - Standardized counseling
  - Patient education channel & website
  - Written education materials
**Counseling Talking Points**

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**Warfarin Counseling Points**  
(Coumadin=warfarin)

Instruct the patient on the following:
- Warfarin is a blood thinner. The patient’s condition makes them more prone to forming clots.
- Warfarin may be taken any time of day, with or without food so long as it is consistent.
- Tell the patient Coumadin = warfarin.
- Because warfarin is a blood thinner, they may find that they bruise easier and it may take longer for a cut to stop bleeding.
  - Not concerning unless it doesn’t stop or if they have bleeding when they go to the bathroom.
- “Do not start or stop any medication, including herbal and OTC meds, without first speaking to your doctor or pharmacist.”
- The patient does not need to avoid Vitamin K containing foods (spinach, collard greens). The patient simply needs to maintain a consistent amount of Vitamin K.
- The patient will need to have routine blood monitoring.
- When to contact their doctor.
  - Bleeding that doesn’t stop or bruising that gets worse
  - Blood when the patient goes to the bathroom
- RN: Don’t forget to
  - Give the patient the Coumadin book and the Washington Hospital Center “Warfarin Therapy: Dietary Recommendations Guide (see below)
  - Obtain written materials from “Drug Information” 7-6646
  - Document in Medconnect under the patient education section or in the IPER!
  - Remember to document specific anticoagulant (i.e., Coumadin, enoxaparin, or heparin)
  - Contact the pharmacy if your patient needs more information.

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**Enoxaparin Counseling Points**  
(Lovenox=Enoxaparin)

Instruct the patient on the following:
- Enoxaparin is a blood thinner. The patient’s condition makes them more prone to forming clots.
- Typically only on until INR is therapeutic on warfarin.
- If given daily, give as close to 24 hours apart as possible. If q12h, give as close to 12 hours apart as possible.
- Tell the patient that Lovenox = Enoxaparin.
- Because enoxaparin is a blood thinner, they may find that they bruise easier and it may take longer for a cut to stop bleeding.
  - Not concerning unless it doesn’t stop or if they have bleeding when they go to the bathroom.
- “Do not start or stop any medication, including herbal and OTC meds, without first speaking to your doctor or pharmacist.”
- When to contact their doctor.
  - Bleeding that doesn’t stop or bruising that gets worse
  - Blood when the patient goes to the bathroom
  - Teach the patient how to self-administer enoxaparin.
  - If possible, watch them give themselves the injection.
- Don’t forget to
  - Give the patient the Lovenox kit
  - Obtain Lovenox teaching kits from “Drug Information” 7-6646
  - Document in Medconnect under Patient Education or on the IPER!
  - Remember to document specific anticoagulant (i.e., enoxaparin, warfarin, or heparin)

Contact the pharmacy if your patient needs more information.
Educational Materials Available from Drug Information 7-6646

- Understanding your COUMADIN therapy
- Patient Starter Kit
- At Home with LOVENOX®
- How to Continue Your LOVENOX® Treatment at Home
Example of Patient Education Documentation in Medconnect
<table>
<thead>
<tr>
<th>EP</th>
<th>Description</th>
<th>Standard</th>
<th>Jan-10</th>
<th>Feb-10</th>
<th>Mar-10</th>
<th>Apr-10</th>
<th>May-10</th>
<th>Jun-10</th>
<th>Jul-10</th>
<th>Aug-10</th>
<th>Sep-10</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use only unit-dose products, prefilled syringes, or premixed infusion bags when these types of products are available.</td>
<td>A - 3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Use approved protocols for the initiation and maintenance of anticoagulant therapy.</td>
<td>C - 3, M</td>
<td></td>
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<tr>
<td></td>
<td>Heparin</td>
<td></td>
<td>100.0</td>
<td>100.0</td>
<td>96.9</td>
<td>100</td>
<td>96.6</td>
<td>100</td>
<td>96.3</td>
<td>100</td>
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<tr>
<td></td>
<td>Warfarin</td>
<td></td>
<td>98.4</td>
<td>100.0</td>
<td>95.7</td>
<td>98.2</td>
<td>95.3</td>
<td>98.4</td>
<td>94.3</td>
<td>93.9</td>
<td>92.9</td>
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<tr>
<td></td>
<td>Enoxaparin</td>
<td></td>
<td>100.0</td>
<td>90.1</td>
<td>95.6</td>
<td>93.2</td>
<td>98.5</td>
<td>94.3</td>
<td>97.6</td>
<td>95.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Before starting a patient on warfarin, assess the patient’s baseline coagulation status for all patients receiving warfarin therapy. Use a current INR to adjust therapy. The baseline status and current INR are documented in the medical record.</td>
<td>A - 3</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Baseline INR</td>
<td></td>
<td>66.2</td>
<td>81.0</td>
<td>75.7</td>
<td>83.6</td>
<td>70.3</td>
<td>76.2</td>
<td>84.5</td>
<td>71.4</td>
<td>80</td>
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<tr>
<td></td>
<td>Maintenance INR</td>
<td></td>
<td>100.0</td>
<td>91.9</td>
<td>88.6</td>
<td>89.1</td>
<td>90.6</td>
<td>93.7</td>
<td>94.8</td>
<td>87.8</td>
<td>93.4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Use authoritative resources to manage potential food and drug interactions for patients receiving warfarin.</td>
<td>A - 3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>When heparin is administered intravenously and continuously, use programmable pumps in order to provide consistent and accurate dosing.</td>
<td>A - 3</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>A written policy addresses baseline and ongoing laboratory tests that are required for heparin and low molecular weight heparin therapies.</td>
<td>A - 3, D</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Provide education regarding anticoagulant therapy to staff, patients, and families.</td>
<td>C - 3, M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heparin</td>
<td></td>
<td>51.0</td>
<td>62.7</td>
<td>62.9</td>
<td>69.2</td>
<td>68.4</td>
<td>73.5</td>
<td>81.9</td>
<td>81.5</td>
<td></td>
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<tr>
<td></td>
<td>Warfarin</td>
<td></td>
<td>12.5</td>
<td>39.4</td>
<td>48.4</td>
<td>57.1</td>
<td>55.2</td>
<td>63.3</td>
<td>67.7</td>
<td>65.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enoxaparin</td>
<td></td>
<td>87.9</td>
<td>83.3</td>
<td>85.3</td>
<td>90.9</td>
<td>88.9</td>
<td>87.3</td>
<td>87.9</td>
<td>95.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Evaluate anticoagulation safety practices, take action to improve practices and measure the effectiveness of those actions in a time frame determined by the organization.</td>
<td>A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Remember do not exceed 85 kg for dosing calculations.

<table>
<thead>
<tr>
<th>Indication: Pulmonary Embolus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTENTION UNIT CLERK: Enter the following statement on the Kardex: &quot;Heparin infusion see, heparin monitoring flow sheet.&quot;</td>
</tr>
<tr>
<td>Discontinue all previous heparin, enoxaparin, fondaparinux, and argatroban orders</td>
</tr>
<tr>
<td>Draw a stat baseline PT/INR and CBC prior to initiation of heparin</td>
</tr>
<tr>
<td>Draw a CBC every other day while on heparin unless otherwise ordered</td>
</tr>
<tr>
<td>Make all subsequent dosing adjustments based on the charts below</td>
</tr>
</tbody>
</table>

**NOTE: DO NOT EXCEED 85 KG FOR DOSING CALCULATIONS**

**Initial Heparin Infusion:**

- WBC standard concentration 50 units/ml (25,000 units/500 ml of 0.45% NaCl)
- Make all subsequent dosing adjustments based on the charts below

<table>
<thead>
<tr>
<th>DOSING SCHEDULE</th>
<th>INITIAL BOLUS</th>
<th>INITIAL HEPARIN INFUSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARD THERAPEUTIC DOZING</td>
<td>80 units/kg = 5600 units IV</td>
<td>18 units/kg/hr = 1260 units/hr</td>
</tr>
</tbody>
</table>

**STANDARD THERAPEUTIC DOZING ADJUSTMENTS:**
The **GOAL** is to obtain an anti-Xa 0.30–0.70 international units/ml.

Draw initial Heparin Level (anti-Xa) in 6 hours.
Repeat Heparin Level (anti-Xa) every 6 hours (starting 6 hours after the last intervention) until in GOAL range x 2 consecutively: then Heparin Level (anti-Xa) qAM while on IV heparin.
Heparin drip adjustments to be made as per the dose adjustment chart below.

***NOTE: DO NOT EXCEED 85 KG FOR DOSING CALCULATIONS***

<table>
<thead>
<tr>
<th>anti-Xa</th>
<th>BOLUS DOSE</th>
<th>STOP INFUSION</th>
<th>DOSE CHANGE (units/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 0.10</td>
<td>80 units/kg = 5600 Units</td>
<td>0 min.</td>
<td>INCREASE by 4 units/kg/hr = 280 units/hr</td>
</tr>
<tr>
<td>0.10–0.29</td>
<td>40 units/kg = 2800 units</td>
<td>0 min.</td>
<td>INCREASE by 2 units/kg/hr = 140 units/hr</td>
</tr>
<tr>
<td>GOAL</td>
<td>0.30–0.70</td>
<td>0</td>
<td>0 min.</td>
</tr>
<tr>
<td>0.71–1.00</td>
<td>0</td>
<td>0</td>
<td>0 min.</td>
</tr>
<tr>
<td>1.01–1.40</td>
<td>0</td>
<td>60 min.</td>
<td>DECREASE by 3 units/kg/hr = 210 units/hr</td>
</tr>
<tr>
<td>Greater than 1.40</td>
<td>0</td>
<td>HOLD</td>
<td></td>
</tr>
</tbody>
</table>

**PREPRINTED PRESCRIBER'S ORDER**

P&T 069 (Page 1 of 2) 1/3/2009
(revised 9/2009)

[Handwritten note]

Place LABEL precisely in this space

DOB: 01/02/1960
MRN: 123456789
This flowsheet MUST match appropriate Order Set: P&T 0069, IV Heparinization Standard Protocol

Make calculations based on a total body weight of 70 kg (1 Kg = 2.2 lbs) Round off to the nearest 5 kg. DO NOT EXCEED 85 KG FOR DOSE CALCULATIONS.

Washington Hospital Center standard concentration 50 units/ml (25,000 units/500 ml 0.45% NaCl)

Note all rates on heparin infusion sheets in units/kg/hour. Draw initial PTT prior to initiating protocol.

MD orders checked by: signature: Christina Hawthorne 10/10/10 10AM

<table>
<thead>
<tr>
<th>Heparin Level anti-Xa</th>
<th>BOLUS UNITS</th>
<th>STOP INFUSION</th>
<th>Rate Change</th>
<th>Repeat Heparin Level anti-Xa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin Drip</td>
<td>80 units/kg IV 5000 units</td>
<td>0</td>
<td>Start IV drip at 18 units/kg/hr (160 units/hr).</td>
<td>Order Stat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>&lt; 0.10</td>
<td>80 units/kg IV 5000 units</td>
<td>0</td>
<td>Increase rate by 2 units/kg/hr (200 units/hr). Add this amount to the previous rate.</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>0.10-0.29</td>
<td>40 units/kg IV 2500 units</td>
<td>0</td>
<td>Increase rate by 2 units/kg/hr (140 units/hr). Add this amount to the previous rate.</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>0.30-0.70</td>
<td>0</td>
<td>0</td>
<td>Goal: No change in infusion rate</td>
<td>Repeat in 6 hours until anti-Xa is therapeutic x 2 consecutively, then anti-Xa every AM.</td>
</tr>
<tr>
<td>0.71-1.00</td>
<td>0</td>
<td>0</td>
<td>Decrease rate by 2 units/kg/hr (140 units/hr). Subtract this amount from the previous rate.</td>
<td>Repeat anti-Xa in 6 hours.</td>
</tr>
<tr>
<td>1.01-1.40</td>
<td>0</td>
<td>for 60 minutes</td>
<td>Hold infusion x 1 hour, then restart and decrease rate by 3 units/kg/hr (210 units/hr). Subtract this amount from the previous rate.</td>
<td>Repeat anti-Xa in 60 minutes and notify MD/PA/NP.</td>
</tr>
<tr>
<td>&gt; 1.40</td>
<td>0</td>
<td>HOLD</td>
<td>Obtain anti-Xa every 2 hours until &lt; 1.00</td>
<td>Repeat anti-Xa in 6 hours after infusion resumed.</td>
</tr>
</tbody>
</table>

Check anti-Xa 6 hours AFTER ANY CHANGE in heparin dosing. Document patient education.

<table>
<thead>
<tr>
<th>DATE / TIME of Adjustment</th>
<th>anti-Xa Result</th>
<th>TIME / BOLUS AMOUNT (units)</th>
<th>TIME HELD (minutes)</th>
<th>NEW INFUSION RATE (units/kg/hr)</th>
<th>NEXT anti-Xa DUE</th>
<th>ORDER ENTRY Number</th>
<th>RN SIGNATURE / PRINT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/10/10</td>
<td>1100</td>
<td>9000</td>
<td>18</td>
<td>1700</td>
<td># 22</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>1750</td>
<td>0.58</td>
<td>1750</td>
<td>1750</td>
<td># 22</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>2900</td>
<td>0.50</td>
<td>2900</td>
<td>2200</td>
<td># 22</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>6300</td>
<td>0.80</td>
<td>6300</td>
<td>2000</td>
<td># 22</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>1500</td>
<td>0.80</td>
<td>1500</td>
<td>1230</td>
<td># 27</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>1400</td>
<td>1.20</td>
<td>1400</td>
<td>1400</td>
<td># 30</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>2630</td>
<td>1.50</td>
<td>2630</td>
<td>2630</td>
<td># 31</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>2300</td>
<td>0.90</td>
<td>2300</td>
<td>2300</td>
<td># 33</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>300</td>
<td>0.60</td>
<td>300</td>
<td>300</td>
<td># 36</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
<tr>
<td>1/10/10</td>
<td>1200</td>
<td>0.50</td>
<td>1200</td>
<td>1200</td>
<td># 37</td>
<td>C. Hawthorne</td>
<td>CHRISTINA HAWTHORNE</td>
</tr>
</tbody>
</table>

HEPARIN MONITORING FLOW SHEET: STANDARD PROTOCOL
(Heparin Level [UNF] anti-Xa)

APENA, GEORGE A
DOB: 01/02/1960
MRN: 123456789
High Risk Medication Label

• High Risk Medications
  – narrow therapeutic range
  – significant consequences when administered incorrectly or at incorrect dose

• Library Function on pump must be used

• Second LIP verifies correct order, patient, medications, dosage, setting and both will then sign the red “high risk double check” sticker

• Red “double check” applies to:
  – Change of shift
  – Change of caregiver (OR → PACU)
  – Change of dose/rate (non titrating)

Referenced WHC SP 260.09 3.30.10
Heparin Protocols