

# Developing Patient Safety Evidence-Based Care Recommendations to Improve Child Outcomes

Cynthia Barclay, Pharm, D

\*Karen Vonderhaar, MS, RN

Eloise Clark, MPH, MBA





# Conflict of Interest Disclosure

No conflict of interest to  
disclose.

# Objectives

- ◆ Discuss development of anticoagulation recommendations which meet the Joint Commission on Accreditation's National Patient Safety Goals
- ◆ Understand how to implement Best Evidence Statements (BESTs) into practice to improve patient outcomes

# Improving the Safe Use of Medications: Anticoagulant Therapy

- ◆ 2008 Joint Commission on Accreditation National Patient Safety Goal
  - Defined anticoagulant management program
- ◆ American College of Chest Physicians guidelines
  - Antithrombotic and Thrombolytic Therapy: Evidence-based Guidelines
- ◆ Locally-relevant evidence-based pediatric focused set of care recommendations

# Interprofessional Team

- ◆ Physician
- ◆ Pharmacist
- ◆ Nurse
- ◆ Evidence Methodologist
- ◆ Guideline Developer



# Evidence-Based Recommendations:

- ◆ Based upon systematic search of evidence
- ◆ Improve outcomes

*(Bahtsevani, 2004 & Perlstein, 1999)*



- ◆ Reduce the likelihood of patient harm unsafe practice because standardize approach
- ◆ Increase level of reliability that care will be provided correctly and consistently *(Nolan, 2004)*

# CHEST Guidelines

- ◆ AGREE'd
- ◆ Rated >50% in all domains except applicability
- ◆ Not change validity
- ◆ High quality guidelines

# Best Evidence Statements (BESt)

- ◆ Presentation format of recommendations, discussion and methods of synthesized evidence at the bedside (*McGee 2010*)
- ◆ Share dosing and monitoring information
- ◆ Evidence-based vs consensus-based
- ◆ Specific, unambiguous and behaviorally actionable (*Michie, 2004*)
- ◆ Written in accessible and understandable format for effective implementation



# BESTs



Safety/Anticoagulation Therapy/Low M

## Best Evidence Statement (BEST)

Date published/posted: August 7, 2009

### Management of Low Molecular Weight Heparin Therapy (LMWH)

#### Clinical Question

- P (population/problem): In patients at a pediatric institution requiring molecular weight heparin (LMWH) for treatment of thromboembolic events, what are the appropriate medication doses and laboratory monitoring parameters to prevent under-coagulation and over-anticoagulation complications?
- I (intervention):
- O (outcome):

#### Target Population

Patients receiving low molecular weight heparin therapy (LMWH) at a pediatric institution

Recommendations (See Table of Recommendation Strength following references)

#### Laboratory Monitoring

*Laboratory studies required for LMWH therapy*

1. It is recommended to use the anti-factor Xa level as a measurement of effect.  
**Note:** Cincinnati Children's Hospital Medical Center (CCHMC) identifies "Level 1" in the clinical laboratory system.



Safety / Anticoagulation / Warfarin / BEST 048

## Best Evidence Statement (BEST)

Date published/posted: August 7, 2009

### Management of Warfarin Therapy

#### Clinical Question

- P (population/problem): In patients at a pediatric institution requiring long-term systemic anticoagulation with warfarin.
- I (intervention): what are the appropriate medication doses and laboratory monitoring parameters to prevent under-coagulation and over-anticoagulation complications?
- O (outcome):

#### Target Population

- Inclusion:** Patients receiving warfarin therapy at a pediatric institution
- Exclusion:** Children less than 3 months of age  
Patients receiving hemodialysis for renal failure

Recommendations (See Table of Recommendation Strength following references)



Safety / Anticoagulation / Unfractionated Heparin / BEST 050

## Best Evidence Statement (BEST)

Date published/posted: August 7, 2009

### Management of Therapeutic Unfractionated Heparin (UFH)

#### Clinical Question

- P (population/problem): In patients at a pediatric institution requiring systemic anticoagulation with unfractionated heparin (UFH) for the prevention or treatment of thromboembolic events.
- I (intervention): what are the appropriate medication doses and laboratory monitoring parameters to prevent under-coagulation and over-anticoagulation complications?
- O (outcome):

#### Target Population

- Inclusion:** Patients receiving systemic unfractionated heparin therapy at a pediatric institution
- Exclusion:** Patients on extracorporeal membrane oxygenation (ECMO)  
Patients receiving heparin flushes/infusions for central catheter patency

Recommendation(s)

#### Laboratory Monitoring

1. It is recommended that activated partial thromboplastin time (aPTT) be used as the standard laboratory measurement for the management of UFH therapy as discussed in Table 1 (*Local Consensus [S1, Hirsch 2008a, [5a]*)

# Implementation and Education

- ◆ Physicians
- ◆ Residents
- ◆ Pharmacists
- ◆ Nurses

# Electronic Medical Record

- ◆ Physician's Orders
  - Order Sets
  - Order Entry
- ◆ Medication Administration Record
- ◆ Internal Home Pages
  - House staff
  - Pharmacy
  - Clinical Effectiveness

# Order Set Instruction

## ▼ Heparin Cont. Infusion Orders

Add Order

### ▼ Medications

#### ▶ Bolus

1 of 1 selected

- heparin (HEPARIN) 1,875 Units in D5W 18.75 mL  
75 Units/kg × 25 kg = 1,875 Units, 100 units per mL, Intravenous, for 10 Minutes, ONCE, Today at 2318, For 1 dose

#### ▼ Continuous infusion

**Baseline PTT must be checked prior to starting heparin infusion**  
**Please order a post PTT lab for 4-6 hours after heparin infusion is started or changed**

\*\*\*\* Subsequent dosing based upon a PTT response \*\*\*\*

\*\*\*\* Please refer to heparin therapy Best Statements \*\*\*\*

- heparin 100 units/mL IV infusion - Infants < 1 yr = 28 units/kg/hr. Please order a post PTT lab for 4-6 hours after heparin infusion is started or changed  
28 Units/kg/hr, Intravenous, CONTINUOUS
- heparin 100 units/mL IV infusion - Children 1 - 16 yrs of age = 20 units/kg/hr. Please order a post PTT lab for 4-6 hours after heparin infusion is started or changed  
20 Units/kg/hr, Intravenous, CONTINUOUS
- heparin 100 units/mL IV infusion - Age > 16 yrs and adults = 18 units/kg/hr. Please order a post PTT lab for 4-6 hours after heparin infusion is started or changed  
18 Units/kg/hr, Intravenous, CONTINUOUS
- heparin 100 units/mL IV infusion - Special consideration: Neonates post heart surgery  
20 Units/kg/hr, Intravenous, CONTINUOUS

### ▼ Labs

#### ▶ Labs

5 of 8 selected

- CBC with Differential  
P Routine, ONCE First occurrence Today at 2318, Unit Collect, Blood
- Hepatic Panel (no GGT)  
P Routine, ONCE First occurrence Today at 2318, Unit Collect, Blood
- GGT  
P Routine, ONCE First occurrence Today at 2318, Unit Collect, Blood
- Protime & INR  
Routine, ONCE First occurrence Today at 2318, Unit Collect, Blood
- PTT (Act. Partial Thromb Time)  
Routine, ONCE First occurrence Today at 2318, Unit Collect, Blood

# BEST links are available that take you to the BESts.

**enoxaparin (LOVENOX) 30 mg in sodium chloride (NS) 0.9 % 1.5 mL injection** Accept Cancel Link Order Remove

30 mg, Subcutaneous, EVERY 12 HOURS, First Dose Today at 2310

Order Inst.: [Use concentration 20mg/ml NS for doses less than < 10 mg. Use concentration 100mg/ml for doses equal to or greater than =>10 mg.](#)

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Dose:  mg

**Administer Dose: 30 mg** 30 mg ordered of 20 mg/mL  
= 1.5 mL of 20 mg/mL  
= 30 mg

**Administer Amount: 1.5 mL**

Route:

Priority:

Frequency:

For:   Doses  Hours  Days

Starting:     At:

First Dose: **Today 2310** **Until Discontinued**

**Scheduled Times:** [Hide Schedule](#)

7/28/10	2310
7/29/10	1110, 2310


(Order has no end date or number of doses, so more times will be scheduled at a later date)

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Volume:  mL

Admin. Inst.: [For Subcutaneous use](#)

Comments (F6): [Click to add text](#)

Reference Links: 1. [High Alert Policy II-118](#) 2. [Lexi-Comp](#) 3. [BESt LMWH](#) 

Self Administered  Patient supplied for  Doses

Accept Cancel Link Order Remove

# Medication Administration Record

MAR

Refresh Report MAR Note Legend Show Details Show All Admins Doc Flowsheet Link Lines

Current Time Thu 1000 – Thu 2200 Start Date: 7/29/2010

Due/Overdue Meds Scheduled PRN Continuous Chemo Intra-Op To Be Linked (TBL) ALL(e)

Linked: Discontinued: Completed: Future:

Sort by: Medication Name

	1000	1100	1200	1300
<b>heparin (HEPARIN) injection 1,000 Units</b> Freq: AS DIRECTED Route: Intravenous Order Dose: 1,000 Units Admin Amount: 1,000 Units = 1 mL of 1,000 Units/mL Order Start Time: 11/18/09 1235 Last Admin Given: 11/18/09 1236 PRN Reasons: Other PRN Comment: Each access Admin Instruction: **Aspirate catheter prior to each use** References: <a href="#">High Alert Policy II-118</a> <a href="#">Lexi-Comp</a> <a href="#">BEST Heparin</a> Current Line: <a href="#">Currently Unlinked</a>				

Rx

Real time access

# Challenges

- ◆ Share the load
- ◆ Senior level physicians
- ◆ Skeptics

# Final Thoughts

- ◆ Summary product – action focused
- ◆ Practice affected more completely than just monitoring
- ◆ Skeptics became cheerleaders
- ◆ [www.cincinnatichildrens.org/evidence](http://www.cincinnatichildrens.org/evidence)





Questions?

Thank you!