

Computerized WBH Clinical Pathway

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BID-Plymouth

Introduction/Problem

- ❖ **Weight-Based Heparin (WBH) IV infusion is a high-alert medication which requires close monitoring and disease specific therapeutic aPTT ranges. The original BID-Plymouth WBH Protocol was customized from the *Raschke et al* article published in the 1993 *Annals of Internal Medicine*.**
- ❖ **One formula was utilized for all indications requiring anticoagulation with WBH. This formula utilized 50 units/kg bolus followed by 15 units/kg/hr continuous infusion with manual calculations performed by the nurse utilizing actual body weight. Therapeutic aPTT range for all indications was 68-112 sec.**
- ❖ **A paper dosing nomogram was referred to by the nurse to make dosing adjustments with aPTT results with no direct oversight by the Clinical Pharmacy Service. In some instances it would take 2-3 hours for RN to change rate once aPTT resulted. This practice had significant potential for adverse events, unidentified errors, and delays in therapy.**
- ❖ **Current literature supports specific target aPTT ranges per diagnosis therefore with the shortcomings of the current program the decision was made to revise the entire protocol.**

Aim/Goal

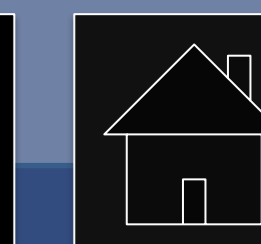
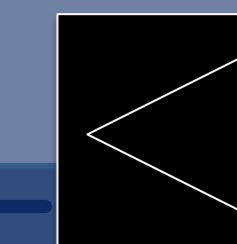
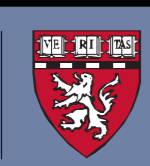
- ❖ The Clinical Pharmacy Service focused on implementation of a MEC Approved Computerized WBH Protocol with specific therapeutic ranges by indication to be ordered by the physician.
- ❖ Documentation of every aPTT result would be completed by the nurse electronically and overseen by the clinical staff pharmacist.
- ❖ Establish turnaround times: Clinical Lab has 45 minutes from collection to result of aPTT
RN has 30 minutes to make adjustment to rate.
- ❖ Create computerized protocols for VTE WBH treatment **Therapeutic Range 68-112 sec.**
 - BMI <40 80 units/kg bolus followed by 18 units/kg/hr continuous infusion.
 - BMI ≥40 80 units/kg uncapped bolus followed by 15 units/kg/hr continuous infusion.
- ❖ Create computerized protocol for Cardiac/Neurologic **Therapeutic Range 50-70 sec**
60 units/kg bolus followed by 12 units/kg/hr. continuous infusion
- ❖ Maximum bolus of 5000 units and 1000 units/hr for initiation of therapy

The Interventions

- Computerized WBH Protocol was recommended and created at the Clinical Pathway Committee which has representation from all clinical and quality departments, including physicians.
- The proposed revision to the protocol was reviewed by Clinical Pharmacy Leadership at the Cardiology, Intensivist, Hospitalist, Emergency Department and Hematology Service Meetings and approved. This revision is a MEC Protocol which was designed to meet CMS guidelines and ultimately the protocol was approved by P&T and Medical Executive Committees.
- Clinical Pharmacists worked closely with our Clinical IT specialists to incorporate all of the specific nomogram logic into a computerized program. Multiple meetings with RNs, Lab Leadership, Clinical Pharmacy Leadership, and IT Specialists were held in the computer lab to test the program.
- The result of this collaboration created a WBH Computerized Module which would be selected by the physician. All that was required was selection of appropriate formula. Bolus and infusion rates were calculated by computer, verified by pharmacist, and administered by RN.
- Results of aPTTs are input by RN into the electronic program and new changes automatically calculated. The pharmacist and RN collaborate to identify when the next aPTT is resulted and this collaboration assisted in the goal of changes to the protocol being implemented within 30 minutes of result
- **Implementation Date Hospital-Wide December 12, 2016**

The Team

- Richard Regnante, MD, Chief Medical Informatics Officer
- Diane R. Lancaster, Ph.D., RN, Director, Professional Practice
- Barbara Kilroy, MBA, RN-BC, Chief Nursing Informatics Officer, Director, Clinical Informatics
- Gregory Kirschner, IT Physician Analyst
- Kristina L. McGill, R.Ph., MS, BID-Plymouth Director, Pharmacy Services
- Judy VanTilburg, RN,BSN,MHM,CPHQ, BIDP Senior Director, Quality and Safety
- James A. Berghelli, RPh, MS,BID-Plymouth Director, Clinical Integration/Clinical Pathways



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Progress to Date

	November 2017 N-20	December 2017 N-19	Nov/Dec 2017 Total N-39
aPTT Resulted within 45 minutes	81% (111/137)	82% (104/127)	81% (215/264)
aPTT Resulted Average Time Collect to Result Target <45 minutes	34 minutes (4593/137)	34 minutes (4345/127)	34 minutes (8938/264)
WBH Rate Adjusted Within 30 minutes of aPTT Result	74% (79/106)	61% (67/107)	69% (146/213)
WBH Rate Adjusted Average Time from aPTT Result Target <30 minutes	23 minutes (2422/106)	34 minutes (3644/107)	28 minutes (6076/213)
Time to VTE Target 68-112 Sec**	~17 hr N-3	~10 hr N-4	~13 hr N-7
Time to Cardiac/Neuro Target 50-70 Sec**	~18 hr N-16	~17 hr N-11	~17.5 hr N-27

Lessons Learned

- The outdated concept of utilizing one paper WBH formula and the same therapeutic aPTT range for all indications has been adjusted to current evidence-based recommendations for VTE and Cardiac/Neurologic diagnosis.
- **Manual calculations by the RN with no direct Clinical Pharmacy oversight has been eliminated for this High-Alert Anticoagulant. The computerized logic automatically displays dosing, guardrails have been added to Smart Pumps for new formulas, RN Documentation is electronic in Meditech, and Clinical Pharmacists monitoring every aPTT level has created an extremely safer program**
- *The revised Computerized WBH Protocol is a MEC Approved Protocol. Every dosage change calculated for implementation by RN and verified by the pharmacist is automatically reflexed to the physician's electronic status board to be e-signed. The Clinical Staff Pharmacist changes the provider as needed to assure the attending physician covering the patient receives the reflexed order. This procedure meets all elements of CMS Guidelines for MEC Approved Protocols.*
- **Clinical pharmacist's documentation for WBH is now part of the patient's medical record in the Notes section. Prescribers have welcomed the oversight by the Clinical Staff Pharmacists.**
- The established targets for resulting aPTTs in 45 minutes and changing rates within 30 minutes are the ultimate goal to facilitate time to therapeutic range.
- The Computerized WBH Protocol is a 68-page document which is hyperlinked to the BID-Plymouth High-Alert Medication Policy. This protocol is available on the Pharmacy Intranet and Hospital-Wide Intranet. A step-by-step procedure is available for providers, nurses, and pharmacists. New staff members are in-serviced on availability of this document to assure ongoing compliance of program.

Next Steps

- Nursing Practice Council and Clinical Pharmacy Leadership team will continue to monitor goals for turnaround time for aPTT levels, time to change infusion rates, and time to therapeutic range
- Data will be reviewed with physicians and clinical staff to highlight efficacy of revised protocols

**5 Pts omitted prior to therapeutic range due to change to enoxaparin or sent to Cardiac Cath Lab

For more information, contact:

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