Venous Thromboembolism
Safety Tool Kit

Brenda K. Zierler, PhD, RN, RVT
University of Washington

Medication Safety: Tools for Diverse Settings
September 10, 2008
8:00 AM - 9:30 AM
VTE Safety Toolkit

- Partnership in Patient Safety Grant
- AHRQ (Agency for Healthcare Research and Policy)
- 2-year grant to improve care for patients at risk for or diagnosed with VTE
  - PI: Brenda Zierler, PhD
  - Co-PI: Gene Peterson, MD
VTE Safety Toolkit- What is It?

- Evidence-based algorithms, guidelines, recommendations, and order sets for preventing, diagnosing, treating and educating patients and providers about VTE
- Educational intervention and compliance training
- Medications – heparin, warfarin
<table>
<thead>
<tr>
<th>Name</th>
<th>Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Ann Wittkowsky, PharmD</td>
<td>Toolkit/Cases/anticoagulation</td>
</tr>
<tr>
<td>Robb Glenny, MD</td>
<td>Toolkit/Cases/Pulmonary ICU</td>
</tr>
<tr>
<td>Paul Hendrie, MD</td>
<td>Toolkit/Hematologist</td>
</tr>
<tr>
<td>Karen McDonough, MD</td>
<td>Toolkit/Medicine Consult</td>
</tr>
<tr>
<td>Kim Cantwell-Gab, BSN</td>
<td>Toolkit/Patient Education</td>
</tr>
<tr>
<td>Gene Peterson, MD</td>
<td>Co-PI/Cases/Administration</td>
</tr>
<tr>
<td>Brenda Zierler, PhD</td>
<td>Toolkit/Cases/Research Design</td>
</tr>
<tr>
<td>David Flum, MD</td>
<td>Consult/Prevention/Surgeon</td>
</tr>
<tr>
<td>*Mark Meissner, MD</td>
<td>Consult/DVT Diagnosis/Surgeon</td>
</tr>
<tr>
<td>Sylvia McKenzie, RN</td>
<td>QI/Mechanical Prophylaxis</td>
</tr>
<tr>
<td>Seth Wolpin, PhD</td>
<td>Dashboard/Web Team</td>
</tr>
</tbody>
</table>

VTE Safety Toolkit; AHRQ Patient Safety Grant
Why Study VTE? Epidemicology of VTE

- VTE encompasses deep vein thrombosis (DVT) and pulmonary embolism (PE)
- *Most common preventable cause of hospital death*
- 900,000 Americans suffer VTE each year
  - 400,000 DVT
  - 500,000 PE
Epidemiology of VTE

- In 300,000 patients, PE proves fatal
  - 3rd most common cause of hospital-related deaths in the United States
  - Post-thrombotic syndrome will be seen in 800,000 pts.
    - 7% of these individuals will have a severe form of the problem and will become disabled
  - Survivors are at risk for recurrence of PE
    - Pulmonary hypertension develops in approximately 30,000 patients who survive their PE
Epidemiology of VTE

- 1 of 20 hospitalized medical patients will suffer a fatal PE if they have not received appropriate thrombosis prophylaxis.
- 50% of the 2 million cases of DVT yearly are “silent.”
Risk Factors for VTE

- Determine who should receive prophylaxis
- Every patient at UWMC should be assessed for risk of developing VTE
- Understand contraindications to pharmacologic prophylaxis (heparin, warfarin)
- Offer mechanical prophylaxis when pharmacologic prophylaxis is not safe
VTE Safety Toolkit- Components

- **VTE Prophylaxis** (focus of today’s talk)
- Risk Assessment Tool
- DVT Diagnostic Algorithm
- PE Diagnostic Algorithm
- HIT Assessment
- Heparin nomograms (dosing)
- VTE Treatment Pathway
- DVT Treatment Order Set
- Vascular Lab Requisition
- Neural-axial anesthesia guidelines
- Patient Education (prevention & treatment)
VTE as a Clinical and System Problem

- System Barriers
  - Providers are not employees of a 450-bed academic medical center
  - No standards of practice
  - Multiple disciplines treating small numbers of patients (without experience or expertise)
  - Prophylaxis is underutilized
PAST EXPERIENCE

• Implementation of DVT pathways

• Reasons for failure
  • Trying to change individual physician behavior
  • No culture of safety
  • Lack of systems supports
  • No integrated information system
  • Ownership/turf issues
VTE Prophylaxis

- Every patient should be assessed for risk of developing VTE
- Determine who should receive prophylaxis
- Understand dosing and contraindications to pharmacologic prophylaxis (heparin, warfarin)
- Offer mechanical prophylaxis when pharmacologic prophylaxis is not safe
- Document assessment and prophylaxis plan
Steps in Implementation

- Dedicated Web Site
- Training Modules – pilot in winter 2007
- Test interactive cases as educational intervention
- Gather feedback about training (effectiveness, clarity, timeliness, relevance)
This Website contains multiple evidence-based tools called the VTE Safety Toolkit for the prevention, diagnosis, and treatment of venous thromboembolism (VTE).

The development and implementation of the toolkit was funded by the Agency for Healthcare Research and Quality (AHRQ) for the purpose of increasing the implementation of safe practice interventions for patients at risk for or who are diagnosed with VTE, through use of an evidenced-based and system-supported interactive VTE Safety Toolkit.

DEDICATION

This project is dedicated to the late Dr. D. Eugene Strandness, Jr., MD, who was a Professor of Medicine at the University of Washington School of Medicine. Dr. Strandness had consecutive NIH funding for 15 years studying the natural history of venous thromboembolism. He was an outstanding clinical researcher, mentor, friend and colleague.
DVT AND PE PREVENTION GUIDELINES FOR ADULTS

This toolkit component was created by providers at the University of Washington Medical Center and Harborview Medical Center and is the prophylaxis guidelines for the prevention of VTE. The levels of evidence for recommendations are included in the guideline.

Click here to download   (Updated November 2006)

TERMS OF USE
Purpose: This website serves to connect people with knowledge to support the patient care, education, and research missions of the University of Washington.

Disclaimer: This website is designed for educational purposes only. Medical decisions should be made in consultation with your health care provider. The University of Washington will not be liable for any complication, injuries, or other medical accidents arising from or in connection with the use of or reliance upon any information on the web or specific to this site.

Copyright: This website is copyrighted. By using this website you agree to abide by copyright laws and the terms of use. Users are granted a limited license to use the site. No part of the site may be reproduced or sold in any form, or by any means, without written permission from the copyright owner. However, information contained in the website can be printed and used by University of Washington faculty, staff and students, clinical and academic faculty from outside universities or healthcare systems, patients or caregivers of patients, and for educational purposes.

Terms of Use: Information on this website is provided "as is" and "as available" basis without any warranty of any kind, either expressed or implied. The University of Washington, the Department of Pharmacy Services, and the University of Washington Medical Center Anticagulation Services, the School of Nursing EXPRESSLY DISCLAIMS ALL WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. The University of Washington SHALL NOT IN ANY WAY BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, OR OTHER DAMAGES ARISING OUT OF USE OF OR INABILITY TO USE THIS WEB SITE OR THE INFORMATION IT CONTAINS.

Questions & Comments
<table>
<thead>
<tr>
<th></th>
<th>UW VTE risk assessment and prophylaxis order set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UWMC vascular diagnostic service (Vascular Lab Requisition)</td>
</tr>
</tbody>
</table>
Diagnostic Algorithms

- Diagnostic Workup for Patients Presenting with Signs and Symptoms of DVT
- Diagnostic Workup for Patients Presenting with Signs and Symptoms of PE
Treatment of acute VTE
<table>
<thead>
<tr>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal Therapeutic Range and Duration of Anticoagulation</td>
</tr>
<tr>
<td>Flexible Initiation Methods for Warfarin</td>
</tr>
<tr>
<td>Dosing Adjustment Nomogram for Warfarin</td>
</tr>
<tr>
<td>Recommendations for the Frequency of Monitoring Warfarin</td>
</tr>
<tr>
<td>Clinical Management of Suspected HIT</td>
</tr>
</tbody>
</table>
Signs and Symptoms and Prevention Measures
Outpatient Treatment Protocol
Patient Testimonials
AHRQ Patient Safety Network
http://psnet.ahrq.gov/

University of Washington Anticoagulation Clinic
http://uwmcacc.org/

University of Washington Laboratory Medicine Guidelines for Hypercoagulable Workup (go to page 14 for Venous thromboembolism)
http://depts.washington.edu/labweb/PatientCare/Clinical/Guides/hemostasis.pdf

Coalition to Prevent Deep Vein Thrombosis
http://www.preventdvt.org/

National Consensus Standards for the Prevention and Care of Venous Thromboembolism (including Deep Vein Thrombosis and Pulmonary Embolism)
1. DVT AND PE PREVENTION GUIDELINES FOR ADULTS


2. ANTICOAGULATION GUIDELINES FOR NEURAXIAL PROCEDURES


3. UW VTE Risk Assessment and Prophylaxis Order Set

Caprini JA. Thrombosis risk assessment as a guide to quality patient care. Dis Mon 2005; 51:70-78


4. UWMC Vascular Diagnostic Service (Vascular Lab Requisition)


5. Diagnostic Workup for Patients Presenting with Signs and Symptoms of DVT


The work for this website is the culmination of ongoing venous research at the UWMC. The team members for the current AHRQ study include:

**University of Washington Clinical and Research Faculty**

Brenda K. Zierler, PhD, RN, RVT, Principle Investigator  
Associate Dean, Technology Innovations in Education and Research  
brndazju.washington.edu

Gene Peterson, MD, PhD, MHA, Co-Principal Investigator  
Assistant Professor  
Associate Medical Director for Quality  
gpeterso@u.washington.edu

Ann K. Wittkowsky, PharmD, CACP, FASHP, FCCP  
Associate Professor  
akw@u.washington.edu

Robb Glenny, MD  
Professor of Medicine and of Physiology and Biophysics  
glenny@u.washington.edu

Paul Hendrie, MD, PhD  
Hematology Division, Acting Instructor  
phendrie@u.washington.edu

Pamela Mitchell, PhD, CNRN, FAAN  
Professor Elizabeth S. Soule Professor, Associate Dean for Research, School of Nursing  
pmitch@u.washington.edu

Frederick Wolf, MD  
Professor & Chair, Medical Education & Biomedical Informatics  
wolf@u.washington.edu

Lynne Robins, PhD  
Associate Professor, Medical Education and Biomedical Informatics  
lynner@u.washington.edu

Karen A. McDonough M.D.  
Division of General Internal Medicine  
kmcdonou@u.washington.edu

Mark Messner, MD  
Associate Professor, Department of Surgery, Vascular Division
Randomized Controlled Trial

- Test knowledge acquisition about VTE prevention using interactive case studies
- Control Group (passive didactic)
- Experimental Group (interactive case studies with feedback)
- Mandatory training (similar to HIPAA)
- Tracking outcomes by provider (currently tracking pre-intervention data)
Provider will be randomized when they log-in
Both groups will be pre-tested on current VTE prophylaxis knowledge
Patients Who Do Not Need Prophylaxis

Almost every hospitalized patient should receive VTE prophylaxis.

Those who do NOT need VTE prophylaxis include patients who are fully anticoagulated with:
- Warfarin (INR > 2.0)
- Heparin (aPTT > 60)
- Low molecular weight heparin (full dose)
- Direct thrombin inhibitors (bivalirudin, lepirudin, argatroban)
- Factor Xa inhibitors (fondaparinux)

As long as patients remain fully anticoagulated with these medications during hospital admission, additional VTE prophylaxis is not required.
Control Group will take Post test after passive training
59 year old male who presents to the Emergency Department with new atrial fibrillation. The patient is admitted to the hospital and started on an intravenous heparin drip (70 U/kg bolus, 15 U/kg/hr initial infusion). What is the most appropriate VTE prevention strategy?

Hct: 38       Platelets: 112       INR: 2.2       Creatinine: 2.3

- No need for prophylaxis
- Pharmacologic prophylaxis indicated
- Mechanical prophylaxis indicated
CASE 1

59 year old male who presents to the Emergency Department with new atrial fibrillation. The patient is admitted to the hospital and started on an intravenous heparin drip (70 U/kg bolus, 15 U/kg/hr initial infusion).

What is the most appropriate VTE prevention strategy?

| Hct: 38 | Platelets: 112 | INR: 2.2 | Creatinine: 2.3 |

- No need for prophylaxis
- Pharmacologic prophylaxis indicated
- Mechanical prophylaxis indicated

This is not the correct answer. This patient will be fully anticoagulated with heparin as a bridge to transition to therapeutic oral anticoagulation for stroke prevention. This therapy is adequate prophylaxis for VTE.
59 year old male who presents to the Emergency Department with new atrial fibrillation. The patient is admitted to the hospital and started on an intravenous heparin drip (70 U/kg bolus, 15 U/kg/hr initial infusion).
What is the most appropriate VTE prevention strategy?

- Hct: 38  Platelets: 112  INR: 2.2  Creatinine: 2.3

- No need for prophylaxis
- Pharmacologic prophylaxis indicated
- Mechanical prophylaxis indicated

This is the correct answer. This patient will be fully anticoagulated with heparin as a bridge to transition to therapeutic oral anticoagulation for stroke prevention. This therapy is adequate prophylaxis for VTE.
100% pass rate expected; certification will be granted and linked to Quality Improvement (compliance)
IMPLEMENTATION of VTE TOOLKIT

- Systems approach
- Buy-in from Administration
- Focus on patient safety
- Mandatory training to meet core competencies on VTE prophylaxis
- Joint Commission and the National Quality Forum
Conclusion

- Improve patient safety by adopting practice standards based on evidence from the literature
- Improve utilization of diagnostic services
- Improve safety of medications (heparin nomograms/guidelines)
- http://vte.son.washington.edu
Thank You