DIAGNOSIS AND MANAGEMENT OF DVT's IN THE ELDERLY

Marjorie Bessel, MD
Banner Desert Medical Center

Objectives:

- Describe risk factors for DVT in the elderly
- Identify diagnostic workup for DVT
- Delineate DVT management concerns in the elderly.

DISCLOSURE OF COMMERCIAL SUPPORT
Marjorie Bessel, MD does not have a significant financial interest or other relationship with manufacturer(s) of commercial product(s) and/or provider(s) of commercial services discussed in this presentation.
Diagnosis and Management of DVT’s in the Elderly

Marjorie Bessel, MD

Venous Thromboembolic Disease (VTED)

- Reasons to prophylax
- Risk factors for VTED
- Options for prophylaxis
- HIT
- Treatment of DVT/PE
- Outpatient DVT treatment
- Distal clots
- Special considerations: Renal, Neuraxial, Obese, Cancer
- Medication overview

Reasons to Rx prophylaxis

- Prevalent disease
- Malpractice risk
- Media coverage → Patient awareness
- Morbidity
- Mortality
- Good consensus recommendations & agency recommendations/guidelines
- Public reporting
Venous Thrombosis
Magnitude of the Problem

- DVT
  - 2 Million
- PE
  - 600,000
- Silent PE
  - 1 Million
- Death
  - 60,000***
- Post-thrombotic Syndrome
  - 800,000
- Pulmonary Hypertension
  - 30,000

Estimated Cost of VTE Care $1.5 Billion/year


Deep Vein Thrombosis Information

Deep vein thrombosis is a potentially deadly condition that may occur during long periods of physical inactivity. In deep vein thrombosis, blood tends to pool in the legs, a condition that may cause a thrombus, a blood clot that forms in a blood vessel. If such a clot breaks loose and travels to a vital organ such as the lungs or brain, blood flow may become obstructed and the result is often deadly.

Remembering David Bloom

NBC News Mourns the death of our colleague

NBC family is mourning the death of correspondent David Bloom, who died in Iraq Sunday of a pulmonary embolism.

NBC News Mourns the death of our colleague

Remembering David Bloom

NBC News Mourns the death of our colleague

Remembering David Bloom

NBC News Mourns the death of our colleague

Remembering David Bloom

NBC News Mourns the death of our colleague

The information in this document may not be reproduced or disclosed to unauthorized parties without the prior consent of the Arizona Geriatrics Society.

2011 Arizona Geriatrics Society  All Rights Reserved
3 passengers claiming blood clots can sue airlines

Arizona Republic
October 18, 2007
DVT May Have Significant Long-Term Health Consequences

- 355 patients with first episode of DVT (mostly proximal) followed for up to 8 years in prospective cohort study
  - Cumulative incidence of subsequent DVT/PE was 30%
  - 23% of DVT survivors developed postthrombotic syndrome (PTS) within 2 years
  - Cumulative incidence of PTS was 20% over 8 years

---

The information in this document may not be reproduced or disclosed to unauthorized parties without the prior consent of the Arizona Geriatrics Society.

2011 Arizona Geriatrics Society  All Rights Reserved
PE: “Most commonly missed fatal diagnosis in a hospitalized patient.”

Reasons to Rx prophylaxis

- Prevalent disease
- Malpractice risk
- Media coverage → Patient awareness
- Morbidity
- Mortality
- Good consensus recommendations & agency recommendations/guidelines
- Public reporting
ACCP

• “A vast number of randomized clinical trials over the past 30 years provide irrefutable evidence that primary thromboprophylaxis reduces DVT, PE and fatal PE.”
• “Thromboprophylaxis, therefore, provides an opportunity both to improve patient outcomes and also to reduce hospital costs.”

ACCP

• In acutely ill medical patients who are admitted to the hospital with congestive heart failure or severe respiratory disease, or who are confined to bed and have one or more additional risk factors, including active cancer, previous VTE, sepsis, acute neurologic disease, or inflammatory bowel disease, we recommend prophylaxis with LDUH (Grade 1A) or LMWH (Grade 1A) or fondaparinux (Grade 1A)

Agency for Healthcare Research and Quality

• 79 patient safety practices
• Highest ranked was appropriate use of prophylaxis to prevent VTE in patients at risk
• Overwhelming evidence that prophylaxis reduces adverse outcomes and decreases overall costs
The National Quality Forum

- Safe Practices for Better Healthcare Consensus Report
  - 30 Health care safe practices that should be universally utilized in applicable clinical care settings to reduce the risk of harm to patients
- Safe Practice 17 states the following:
  - Evaluate each patient upon admission, and regularly thereafter, for the risk of developing deep vein thrombosis/venous thromboembolism
  - Utilize clinically appropriate methods to prevent DVT/VTE

JCAHO (now The Joint Commission)

- Collaboration with NQF to develop standardized performance measures for DVT prevention
- “DVT is one of the most common preventable causes of deaths in hospitals”
- “The use of proven and effective DVT prevention ... methods could save the lives of many patients.”

Public Reporting

- CMS
- SCIP VTE-1, VTE-2
- ARRA
Risk Factors:

Risk factors for DVT: multiple, additive and sometimes synergistic.

AGE

6/100,000

620/100,000
### Risk Factors

- **Age**
- Obesity
- Varicose veins
- Immobility
- Pregnancy
- Puerperium

- High dose estrogen Rx
- *** PREVIOUS VTE
- Thrombophilia
  - Acquired: Antiphospholipid Ab or lupus anticoagulant, hyperhomocysteinemia
  - Inherited: Protein C, Protein S, AT deficiency, F V Leiden, Prothrombin gene mutation 20210A, hyperhomocysteinemia

### Risk Factors

- Trauma
- Malignancy, especially adenocarcinoma
- Major medical illnesses
  - Heart failure
  - Sepsis
  - Respiratory disease
  - Kidney disease
  - Spinal cord injury
  - Stroke
  - Myocardial infarct
  - Polycythemia

### Options for VTED Prophylaxis

- Pharmaceuticals
  - Heparin
  - Low molecular weight heparin (Lovenox)
  - Warfarin (Coumadin)
  - fondaparinux (Arixtra)
  - rivaroxaban (Xarelto)

- Mechanical
  - Early ambulation
  - Elastic stockings
  - Intermittent pneumatic compression devices
  - IVC filter placement
Mechanical Compression Devices

- CMS counts only those that are knee-high or thigh-high
- Literature recommends: “vast majority of the day” or “23 hours/day”
- Imperative to be applied correctly

Pharmacological Agents for Medically Ill

- ACCP 2008 1A recommendation: LDUH or LMWH or fondaparinux
- Heparin 5000 units tid*
- Lovenox 40 mg SQ q day (30 mg SQ q day for renal)
- Xarelto

SCIP (CMS recommended prophylaxis)

- Multiple choices based on surgery type
Treatment

Choices

- Heparin
- LMWH
- fondaparinux
HIT

- HIT -1
  - Non-immune mediated thrombocytopenia

- HIT -2 - Immune mediated thrombocytopenia (IgG antibodies)
  - Latent: IgG +, no thrombocytopenia
  - HIT: IgG +, thrombocytopenia
  - HIT/T: IgG +, thrombocytopenia, with thrombosis

Pathogenesis of HIT

**LMWH vs. Unfractionated Heparin**

*Heparin-induced Thrombocytopenia (HIT) Incidence*

A prospective study comparing enoxaparin with UFH for DVT prevention in patients undergoing elective joint replacement surgery.

<table>
<thead>
<tr>
<th></th>
<th>UFH</th>
<th>Lovenox</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIT seroconversion</td>
<td>7.8%</td>
<td>2.2%</td>
<td>0.02</td>
</tr>
<tr>
<td>Clinical HIT</td>
<td>9/332 (2.7%)</td>
<td>0/333 (0%)</td>
<td>0.0018</td>
</tr>
<tr>
<td>HIT plus thrombosis</td>
<td>8/9</td>
<td>0/9</td>
<td></td>
</tr>
</tbody>
</table>


**FDA-approved LMWH’s**

enoxaparin (Lovenox):
- * Treatment of DVT with or without PE in the inpatient setting (1mg/kg SQ q 12 hrs or 1.5 mg/kg SQ q 24 hrs)
- * Treatment of DVT without PE in the outpatient setting (1 mg/kg SQ q 12 hrs)
- * Prophylaxis for
  - Hip replacement surgery
  - Knee replacement surgery
  - General abdominal surgery
  - Medically ill (40 mg SQ q day)
- * Treatment of acute coronary syndrome

**Treatment of DVT and Non-massive PE**

- 1A recommendation to use LMWH over UFH for treatment of inpatient DVT or non-massive PE
- Dosing: Lovenox 1 mg/kg SQ q 12 hours or 1.5 mg/kg SQ q 24 hours
Unfractionated Heparin: Unpredictable Therapeutic Response

% Patients

<table>
<thead>
<tr>
<th>Time from start of treatment</th>
<th>&lt;55</th>
<th>55-85</th>
<th>&gt;85</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-24 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-48 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-72 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72-96 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**fondaparinux (Arixtra)**

- Selective, synthetic factor Xa inhibitor
- Approved for treatment of DVT and PE (CMS compliant for ortho/ gen surg prophylaxis - added as of 10/1/07 discharges)
- Less “HIT” *
- Not reversible (some studies show possible human reversal with recombinant Factor VIIa)
- Longer half-life (18 hours)
- Once daily injection: Dosing for treatment
  - 10 mg SQ q day for > 100 kg
  - 7.5 mg SQ q day
  - 5 mg SQ q day for < 50 kg

---

**Randomized Trials Comparing SC Enoxaparin with IV UFH for the Initial Treatment of DVT**

**Objective**

- To compare the efficacy and safety of enoxaparin administered subcutaneously twice daily, primarily at home, to continuous intravenous infusion of unfractionated heparin in the treatment of patients with DVT


---

**Randomized Trials Comparing SC Enoxaparin with IV UFH for the Initial Treatment of DVT**

**Conclusions**

- Many patients with acute, proximal deep vein thrombosis can be safely and effectively treated in the outpatient setting with weight-based dosing of subcutaneous enoxaparin 1 mg/ kg twice daily
- Outpatient deep vein thrombosis therapy is well-tolerated and convenient
- Outpatient deep vein thrombosis therapy may substantially reduce healthcare system costs

What about distal clots?

- Review of the literature (Throm Haemost 2006;95:56-64)
- ACCP recommends treatment for 3 months for those who are symptomatic
- Australasian Society of Thrombosis and Haemostasis
- “Obviously there is no definitive answer”

Special Considerations

- LMWH are renally cleared
- Creatinine clearance < 30 ml/min
- Dose adjust (for enoxaparin 1 mg/kg SQ q 24 hours if creatinine clearance < 30 ml/min)
- fondaparinux contraindicated in severe renal impairment
- Heparin/warfarin unchanged

Special Considerations

- Neuraxial blockade
  - Timing of LMWH (and fondaparinux?) essential to prevent significant neurological complications

The information in this document may not be reproduced or disclosed to unauthorized parties without the prior consent of the Arizona Geriatrics Society.

2011 Arizona Geriatrics Society  All Rights Reserved
Neuraxial Anesthesia and Anticoagulation
Consensus Statements
American Society of Regional Anesthesia (ASRA)

- Timing essential
- Pre-procedure
  - 12 hrs (prophylaxis)
  - 24 hrs (treatment)
- Indwelling
  - controversial
- Post-procedure
  - 2 hrs

----

Special Consideration: Obesity

- Patients of extreme weight have rarely been included in clinical trials
- Highest weight of patient in LMWH trial is 190 kg
- Orthopedic study showed enoxaparin 40 mg qd probably not sufficient for patients >100kg
- Bariatric study showed enoxaparin 40 mg q 12 hrs better than 30 mg q 12 hrs
- Obese patients may benefit from anti-Xa level monitoring but this is not a consensus recommendation
- Dosing should always be on actual body weight

----

Special Consideration: Cancer Patient

- 20% of VTE patients have cancer
- VTE is 2nd most common cause of death in cancer patient
- Cortes study showed greater improvement venographically and decreased recurrence rate when LMWH used
- There appears to be a survival advantage when LMWH used
- Animal models show LMWH decreased metastasis and decreased angiogenesis
LMWH and cancer

- LMWH preferred for cancer patients for initial therapy and long-term prophylaxis*
- Lower recurrence rate
- Possible improvement in survival (not conclusively proven)

*Rondina et al. Thrombosis Research 2006

Oral Anticoagulation

- Warfarin (coumadin) recommendations

Recommended anticoagulation for PE or proximal VTE

- 5 days
- Heparin/LMWH/fondaparinux
- 3 months - Indefinite
- Warfarin

The information in this document may not be reproduced or disclosed to unauthorized parties without the prior consent of the Arizona Geriatrics Society.
2011 Arizona Geriatrics Society  All Rights Reserved
**Warfarin (coumadin) pearls**

- For treatment, 1st dose can be given after 1st dose of parenteral agent
- 5 days (minimum) overlap therapy is the standard for treatment
- Excessive use of Vitamin K can make patient coumadin resistant for weeks
- Follow up in dedicated coumadin clinic setting shown to have benefit

---

**ACCP Guidelines: Duration of Therapy**

- Three to Six Months:
  - First event with reversible or time-limited risk factor
- Greater Than Six Months:
  - Idiopathic VTE, first event
- Twelve months to Lifetime:
  - First event with
    - Cancer until resolved
    - Anticardiolipin antibody
    - Antithrombin deficiency
    - Recurrent event, idiopathic or with thrombophilia

---

**Protamine**

- Can cause cardiovascular collapse
- Can reverse heparin or 60% of LMWH effect
- Dosing is 1 mg protamine for 100 anti-Xa units given (1mg protamine for every 1 mg of enoxaparin/Lovenox)
- Rarely clinically necessary
# Venous Thromboembolic Disease (VTED)

- Reasons to prophylax
- Risk factors for VTED
- Options for prophylaxis
- Treatment of DVT/PE
- HIT
- Outpatient DVT treatment
- Distal clots
- Special considerations: Neuraxial, Obese, Cancer

## Summary
Reasons to Rx prophylaxis

- Prevalent disease
- Malpractice risk
- Media coverage → Patient awareness
- Morbidity
- Mortality
- Good consensus recommendations & agency recommendations/guidelines
- Public reporting

Thanks