Venous Thromboembolism (VTE): Prophylaxis and the Incidence of Hospital Acquired VTE(HAQ-VTE)

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Outline

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Rationale

• Hospitalization for acute medical illness is associated with increased risk of venous thromboembolism (VTE). (1)

• Efforts designed to increase use of pharmacologic VTE prophylaxis are intended to reduce hospital-associated VTE

• In general it is unclear whether higher rates of prophylaxis lead to a reduction in VTE events(3, 7, 8)
Background

• VTE refers to the combined entities; deep venous thrombosis (DVT) and Pulmonary embolism (PE)

• The landmark MEDENOX trial published in 1999 in NEJM demonstrated that enoxaparin was superior to placebo in reducing the risk of VTE in acutely ill medical patients.

• Pursuant to this finding and similar outcomes in other trials, such as ARTEMIS and PREVENT, VTE prophylaxis became the standard of care.
Background

• True incidence of clinically significant hospital acquired VTE is unclear

• From the MEDENOX trial, they reported 1.0% PE, 0.7% symptomatic DVT and 13.9% asymptomatic DVT among placebo recipients vs 0.0%, 0.3%, and 5.5% respectively among heparin recipients
Background

- A great body of the literature has been devoted to assessing rates of prophylaxis among acutely ill medical patients.

- One such study, ENDORSE, a large multinational cross-sectional survey, found that as much as 60% of high risk medical patients were not receiving recommended VTE prophylaxis.
Background

• As a result of the data from ENDORSE and other similar studies, a number of initiatives aimed at advocating for increased use of VTE prophylaxis in hospitalized patients came into use.

• Very few studies are actually available looking at whether increased prophylaxis correlates with decreased incidence of HAQ-VTE.
Objectives

Primary
• Assess burden of hospital acquired VTE at Sisters Hospital Main Campus pre and post initiation of hospital protocols
• Determine if increased rates of prophylaxis led to concurrent decrease incidence of HAQ-VTE

Secondary
• Describe population of patients who develop HAQ-VTE
Methods

• Observational study/retrospective chart review

• Two time periods were specified as pre and post observation

• 2002-2004 (A) before any formal prophylaxis order sheet/protocol was in place

• 2010-2012 (B) after introduction of formal VTE prophylaxis protocols
Methods

• Catholic Health System electronic database was used to search for all cases of VTE using appropriate ICD-9 codes

• Individual cases were then assessed to determine timing of onset

• Cases of VTE present on admission (POA) were excluded

• VTE was deemed hospital acquired if it occurred at least 48 hours after admission
Methods

• Data was collected on several variables
  • Age
  • Admitting diagnosis
  • Date of VTE diagnosis
  • Type of prophylaxis
  • Length of stay
  • Identifiable risk factors

• VTE diagnosis was confirmed in all cases by reviewing results of Venous Doppler, V/Q Scan or CTA
Results

Group A (2002-2004); 191 cases were reviewed. Surgical and OB/GYN cases excluded via principal diagnosis

184 cases of medical admissions with VTE

40 cases were found to have HAQ-VTE

Group B (2010-2012); 531 cases were reviewed. Surgical and OB/GYN cases excluded via principal diagnosis

484 cases of medical admissions with VTE

45 cases were found to have HAQ-VTE
### Results

- **Incidence**

<table>
<thead>
<tr>
<th>Observation Years</th>
<th>2002-2003 (A) (pre-protocol)</th>
<th>2010-2012 (B) (post-protocol)</th>
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<tbody>
<tr>
<td>Total HAQ-VTE</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Total Admissions</td>
<td>21,056</td>
<td>20,037</td>
</tr>
<tr>
<td>% HAQ-VTE</td>
<td>0.19%</td>
<td>0.22%</td>
</tr>
</tbody>
</table>
Results

Epidemiology of HAQ-VTE Population in Group B (2010-2012)
VTE By Type

- DVT: 29
- PE: 10
- Overlap: 6
VTE Distribution By Age

Number of Cases

Age

<50 50-59 60-69 70-79 >80

VTE
Sex Distribution

![Bar chart showing the number of cases by sex. Male has a significantly higher number of cases than Female.]

- Male: 25 cases
- Female: 20 cases

Legend: VTE
### HAQ-VTE Occurrences In Patients With Prophylaxis Versus No Prophylaxis

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
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<tr>
<td>Prophylaxis</td>
<td>33</td>
<td>73.3</td>
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<tr>
<td>None</td>
<td>3</td>
<td>6.7</td>
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<tr>
<td>Unknown</td>
<td>9</td>
<td>20.0</td>
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</table>
## Type Of Prophylaxis

<table>
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<tr>
<th>Type</th>
<th>N</th>
<th>Number</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Standard Heparin</td>
<td>33</td>
<td>22</td>
<td>66.7</td>
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<tr>
<td>Enoxaparin</td>
<td></td>
<td>2</td>
<td>6.0</td>
</tr>
<tr>
<td>SCDs</td>
<td></td>
<td>5</td>
<td>15.2</td>
</tr>
<tr>
<td>Other*</td>
<td></td>
<td>4</td>
<td>12.1</td>
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</table>
Most Prevalent Admitting Diagnoses

![Bar Chart]

- Pneumonia
- SBO
- Respiratory failure
- ARF
- Sepsis
- NSTEMI
- Fall

Percentage of Cases

Diagnosis
VTE Diagnosis By Hospital Day

![Bar chart showing the percentage of VTE diagnoses by hospital day and length of stay categories (1-5 days, 6-10 days, >10 days, and Total). The chart compares PE and DVT cases.]
VTE Risk Factors

![Bar chart showing the percentage of cases for different risk factors. The risk factors include Cancer, Surgery, Age, Prior VTE, PICC, Trauma, Lupus Anticoagulant, and None. The bar for None is the highest, followed by Cancer and Surgery. The y-axis represents the percentage of cases ranging from 0 to 35.](image-url)
Mortality Distribution

Outcome

Percentage of Cases

alive
deceased
Total
Discussion

• A large percentage of patients developed VTE in spite of prophylaxis

• Unfractionated heparin appeared to be the most common agent employed

• This suggests that heparin might be ineffective in these specific patient groups

• The most prevalent risk factors, as expected, were Malignancy, Surgery and Prior VTE

• Age was also an important independent risk factor
Discussion

• Our findings are quite similar to published data on the issue

• A recent study published in JAMA by Flanders et al compared hospitals with varying performance on prophylaxis and found no difference in incidence of VTE among those with high rates of prophylaxis compared with those with more modest rates. (8)

• Samuel Z. Gold Haber, MD and colleagues at Brigham and Women’s Hospital also found that hospital VTE was caused more often by prophylaxis failure than withholding treatment. (3)
Conclusion

• HAQ-VTE may not always be preventable especially in the highest risk patients

• While efforts have been directed at global order sheets/protocols our study and emerging data suggests that targeting specific high risk groups would be more effective

• Though not directly shown in this study, enoxaparin is likely superior to unfractionated heparin

• Future studies should look at prophylaxis regimens that may be more effective in these high risk populations
References


3. Goldhaber SZ, Dunn K, Mac Dougall RC. New onset of venous thromboembolism among hospitalized patients at Brigham and Women’s Hospital is caused more often by prophylaxis failure than by withholding treatment. Chest 2000;118:1680


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