DVT and PE Reduction Strategy in AWR: Can We Win?

Luciano Tastaldi, MD
Objectives

• Summary of the Project

• Present Numbers Evolution

• Challenges of Implementation

• Discuss Future Directions
-Problem at CCF-

CCF – 366 cases - 4 year Period*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N=366</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>59 (±11)</td>
</tr>
<tr>
<td>BMI</td>
<td>33 (±5)</td>
</tr>
<tr>
<td>H. Width</td>
<td>20 (±5)</td>
</tr>
<tr>
<td>CDC 1</td>
<td>255 (70%)</td>
</tr>
<tr>
<td>CDC 2-4</td>
<td>111 (30%)</td>
</tr>
<tr>
<td>Parastomal</td>
<td>43 (12%)</td>
</tr>
<tr>
<td>TAR</td>
<td>366 (100)</td>
</tr>
</tbody>
</table>

VTE = 5%

*Open, Elective, Incisional Hernias, ≥ 15cm, all wound classes, Myofascial Release
-Problem at CCF-

CCF – 366 cases - 4 year Period*

• All in Hernias ≥ 15cm

• 85% In-Hospital

• 2-14% between Surgeons

• Variation in prophylaxis protocols

• Is it just us?

*Open, Elective, Incisional Hernias, ≥ 15cm, all wound classes, Myofascial Release
-AHSQC – Surgeons >20 cases -

*Open, Elective, Incisional Hernias, ≥ 15cm, all wound classes, Myofascial Release
Using Collaboration for QI improvement

- Surgeons responded to a survey
- Detailed VTE prophylaxis protocols
- Circumstances when the protocol is not followed or modified
- Eventual problems with compliance
Highest Performing Surgeons

- SCD’s 100%
- **Routine** use of Pre-operative Dose of Heparin
- Routine use Post-operative Heparin
- Less Problems With Compliance
Lowest Performing Surgeons

- SCD’s 100%
- **Selective** Pre-operative Heparin Dose
- Routine use of Post-operative Heparin

More Problems With Compliance
Hypothesis: Can We Decrease VTE rates by standardizing prophylaxis?

<table>
<thead>
<tr>
<th>- Suggested Protocol -</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000UI Heparin SC in Pre-op</td>
</tr>
<tr>
<td>Orders and Administration verified during safety huddle</td>
</tr>
<tr>
<td>No Epidurals - Transition to TAP Blocks</td>
</tr>
<tr>
<td>Enoxaparin 40mg QD – weight adjust if needed</td>
</tr>
<tr>
<td>Starting in night of surgery</td>
</tr>
<tr>
<td>SCD Intra-op and Post-op (at least 18h/day)</td>
</tr>
<tr>
<td>Early Mobilization, Constant Encourage for Ambulation</td>
</tr>
</tbody>
</table>
Timeline

May 2017
Project Development

June 2017
Implementation at CCF

October 2017
1st Presentation
AHSQC Session on ACS
Clinical Congress

March 2018
2nd Presentation
AHSQC Session on
International Hernia Meeting
May 2017 - Baseline
Evolution of VTE rates at CCF
Evolution of VTE rates at CCF
Evolution of VTE rates at CCF

<table>
<thead>
<tr>
<th>115 Cases</th>
<th>176 cases</th>
<th>226 cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEGIN - MAY 2017</td>
<td>OCT-17</td>
<td>MAR-18</td>
</tr>
<tr>
<td>1.7</td>
<td>2.8</td>
<td>4</td>
</tr>
</tbody>
</table>
Have We Come Full Circle?

![Graph showing the number of cases from May 2017 to May 2018. The number of cases decreases from 5 to 4, then increases to 226 cases.](image)
Have We Come Full Circle?

• Critical Analysis of the Prophylaxis Protocol with cooperation of Vascular Medicine

• Literature Review – Current Guidelines

No Changes to Current Protocol

Timing of Pre-op dose stressed Ideal: 2 hours prior incision

Compliance Monitoring with Constant Feedback
Have We Come Full Circle?

- Compliance Checking
- 50 Randomly selected Charts for Review

<table>
<thead>
<tr>
<th>N=50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed Pre-op Doses – 2 (4%)</td>
</tr>
<tr>
<td>Pre-op dose giving after induction or after incision – 17 (34%)</td>
</tr>
<tr>
<td>Missing Doses Post-op – 12 (24%)</td>
</tr>
<tr>
<td>Patient Refusal – 1 (2%)</td>
</tr>
</tbody>
</table>
Challenges of Implementing a Change

Protocol
Anesthesia
Floor
Patients

Pre-op
Resident / Fellow
Pharmacy
Lack of standardized orders on EMR
Caregivers not aware of protocol
Difficult to monitor compliance

Patients

Floor

Anesthesia

Resident / Fellow

Pre-op

Protocol
Patients

Anesthesia

Floor

Protocol

Resident / Fellow

Pharmacy

Lack of Standardized orders on EMR

Caregivers not aware of protocol

Difficult to monitor compliance

Pre-op dose held due to transfer

No administration of pre-op dose

Pre-op
Patients

Floor

Anesthesia

Protocol

Lack of Standardized orders on EMR

Caregivers not aware of protocol

Difficult to monitor compliance

Pre-op dose held due to transfer

No administration of pre-op dose

Not confirming administration in Pre-op

Administration after Surgery started

Heparin discontinued upon transfer to different unit

Wrong Orders/Doses

Resident does not order pre-op Heparin

No administration of pre-op dose

Resident / Fellow

Pharmacy

Patients
Patients

**Protocol**
- Lack of Standardized orders on EMR
- Caregivers not aware of protocol
- Difficult to monitor compliance

**Anesthesia**
- Not confirming administration in Pre-op
- Administration after Surgery started

**Floor**
- Missing Doses
- Incomplete Documentation of Held Doses
- Not informing Surgeon when a dose is held

**Pharmacy**
- Heparin discontinued upon transfer to different unit
- Wrong Orders/Doses
- Resident does not order pre-op Heparin
- No administration of pre-op dose

**Pre-op**
- Preop-op dose held due to transfer

**Resident / Fellow**
- Resident does not order pre-op Heparin

**Patients**
Patients

Anesthesia

Protocol

Lack of Standardized orders on EMR
Caregivers not aware of protocol
Difficult to monitor compliance
Pre-op dose held due to transfer
No administration of pre-op dose

Not confirming administration in Pre-op
Administration after Surgery started
Heparin discontinued upon transfer to different unit
Wrong Orders/Doses
Resident does not order pre-op Heparin

Not informing Surgeon when a dose is held
Incomplete Documentation of Held Doses
Orders not verified before PM labs

Missing Doses

Floor

Incomplete Documentation of Held Doses
Not informing Surgeon when a dose is held
Orders not verified before PM labs

Refusal

Inadequate Ambulation

Insufficient or Inadequate SCD Use

Residents/Fellows

Pharmacy

Orders not verified before PM labs

Refusal

Inadequate Ambulation

Insufficient or Inadequate SCD Use

Residents/Fellows

Pharmacy

Orders not verified before PM labs
Patients
Floor
Anesthesia
Protocol

Lack of Standardized orders on EMR
Caregivers not aware of protocol
Difficult to monitor compliance
Pre-op dose held due to transfer for not known reason
No administration of pre-op dose

Not confirming administration in Pre-op
Administration after Surgery started
Heparin discontinued upon transfer to different unit
Wrong Orders/Doses
Resident does not order pre-op Heparin

Missing Doses
Incomplete Documentation of Held Doses
Not informing Surgeon when a dose is held
Orders not verified before PM labs

Refusal
Insufficient or Inadequate SCD Use
Inadequate Ambulation
Not Educating Other Caregivers regarding protocol

Non-Compliance

Pre-op
Resident / Fellow
Pharmacy
Clinicians
-Remediation-

• Awareness and Education of All Caregivers involved in Care

• Standardization of Orders

• Compliance Monitoring with Continuous Feedback
• Pace of 20/cases month
• Rare Event
• It takes very few cases to be back where we were in the beginning
-Are we in the Right Direction?

1. Is 5% that high?

- Major Abdominal Operation
- Large Hernias
- High-Risk Comorbid Patients
Are we in the Right Direction?

1. Is 5% that high?

<table>
<thead>
<tr>
<th>Risk Score</th>
<th>Prophylaxis</th>
<th>Duration</th>
<th>VTE rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4 [moderate]</td>
<td>Mechanical and Pharmacological Prophylaxis</td>
<td>During Hospitalization</td>
<td>3.0%</td>
</tr>
<tr>
<td>5-8 [high]</td>
<td>Mechanical and Pharmacological Prophylaxis</td>
<td>7-10 days total</td>
<td>6.0%</td>
</tr>
<tr>
<td>&gt;8 [highest]</td>
<td>Mechanical and Pharmacological Prophylaxis</td>
<td>30-days total</td>
<td>6-18%</td>
</tr>
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</table>

Estimates in Absence of Prophylaxis

Based on Observational Studies

Wide range of procedures

NSQIP Data – No Info about Prophylaxis
- Overall Rate 0.92%
- Only 3.7% w/ Component Separation
- No Hernia Width Available

Creation and validation of a condition-specific venous thromboembolism risk assessment tool for ventral hernia repair
Pannucci C, et al.
-Are we in the Right Direction?

1. Is 5% that high? **Maybe...**

- Kim K. et al. (2015) [1]: NSQIP Data – 501 pts. w/ Component Separation – VTE = 0.6%

- Basta M et. Al (2016): Single Institution Data – 142 pts. (70% w/ Component Separation) – VTE = 8.5%

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-Are we in the Right Direction?

2. Is the prophylaxis protocol the problem? Maybe not...

- Other factors other than suboptimal prophylaxis might be involved
- Fascial Closure, Transient Intra-Abdominal Hypertension, Increase in Venous Stasis

Adequate Compliance and Continuous Monitoring of Rates might answer this question
-Are we in the Right Direction?

3. If yes, Can the protocol be improved?

• American College of Chest Physicians (ACP) – 2012
• Asian venous thromboembolism guidelines: updated recommendations for the prevention of venous thromboembolism – 2017
• European Guidelines on perioperative venous thromboembolism prophylaxis: Executive summary - 2018
- Are we in the Right Direction?

3. Can the protocol be improved?

Moderate to High-Risk for VTE, Low-Risk for Bleeding

<table>
<thead>
<tr>
<th>SCD's</th>
<th>Use</th>
</tr>
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<tbody>
<tr>
<td>Limited Data; Small RCT's w/ mixed Populations</td>
<td>- Initiate during surgery and continue throughout LOS</td>
</tr>
<tr>
<td>Superior to No Prophylaxis (DVT 7.3% vs. 16.7%; PE 2.8 vs. 1.2%)</td>
<td>- Proper fit</td>
</tr>
<tr>
<td>Inferior to Pharmacologic Prophylaxis (RR 1.8, 95%CI 1.16-2.8)</td>
<td>- Remove only for ambulation</td>
</tr>
<tr>
<td>Combination w/ Pharmacologic Prophylaxis is recommended, but high-quality data is lacking</td>
<td></td>
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3. Can the protocol be improved?

Moderate to High-Risk for VTE, Low-Risk for Bleeding

<table>
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<th>Pharmacological Prophylaxis</th>
<th>Use</th>
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<tr>
<td>- Superior to Mechanical methods or No Prophylaxis</td>
<td>LMW: Enoxaparin 40mg started 2-12 hours before surgery and 40mg QD</td>
</tr>
<tr>
<td>- LMW Heparin (Enoxaparin) seems to be superior to UFH - 30% rate reduction when compared to UFH w/ no difference in bleeding or death</td>
<td>UFH: 5000UI SC at least 2 hours before surgery and 5000UI BID or TID</td>
</tr>
<tr>
<td>- UFH: Alternative when CLcr &lt;30ml/min) or Cost is a Issue</td>
<td>Plt. Count Monitoring</td>
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- Are we in the Right Direction?

3. Can the protocol be improved?

Moderate to High-Risk for VTE, Low-Risk for Bleeding

<table>
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<th>Obese Patient</th>
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<tr>
<td>- Clcr&gt;30ml/min: No adjustment (LMW)</td>
<td>LMW:</td>
</tr>
<tr>
<td>- Clcr 20-29ml/min: Reduce to 30mg QD (LMW)</td>
<td>BMI 30-39: 30mg BID</td>
</tr>
<tr>
<td>- Clcr&lt;20ml/min: UFH</td>
<td>BMI&gt;40: 40mg BID</td>
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Moderate to High-Risk for VTE, Low-Risk for Bleeding

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</tr>
<tr>
<td>(LMW)</td>
<td>30mg BID</td>
</tr>
<tr>
<td>- Clcr &lt; 20ml/min: UFH</td>
<td>BMI &gt; 40:</td>
</tr>
<tr>
<td></td>
<td>40mg BID</td>
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</table>
- Are we in the Right Direction?

3. Can the protocol be improved?

Moderate to High-Risk for VTE, Low-Risk for Bleeding

<table>
<thead>
<tr>
<th>Not Recommended Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Screening Doppler US</td>
</tr>
<tr>
<td>- IVC Filters</td>
</tr>
</tbody>
</table>
Conclusion

- Monitoring your outcomes is necessary
- Complex Problems do not Always Have Simple Solutions…
- Implementing Changes Can Be Challenging, and you cannot do it alone – Involve all Caregivers from the beginning
- This meeting is a huge opportunity for brainstorm and think outside the box – we want to know your opinion