Implementation and evaluation of a pharmacy driven stress ulcer discontinuation protocol

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Implementation and Evaluation of a Pharmacy Driven Stress Ulcer Discontinuation Protocol

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Parkview Health

The speaker has no actual or potential conflict of interest in relation to this presentation.
Stress Ulceration

Definition

• Ulceration of the upper GI tract related to hospital stay

Prophylaxis

• Acid suppressants
  • Proton-pump Inhibitors (PPI)
  • Histamin-2 Receptor Blockers (H2RA)

Pathophysiology

Critical Illness $\rightarrow$ Hypovolemia $\rightarrow$ ↓ Cardiac Output

Splanchnic Vasoconstriction $\rightarrow$ Acute Stress Ulcer

Proton Pump Inhibitors

Mechanism
- **Irreversibly** block H,K-ATPase pump in gastric parietal cells
- Decrease acid production
  - More than H2RA’s

Formulary:
- Pantoprazole IV and PO
- Omeprazole PO suspension
- Lansoprazole PO

Histamine-2 Receptor Blockers

Mechanism

• Competitively and reversibly binding to histamine-2 receptors on gastric parietal cells
• Decrease acid production
  • Less than PPI’s

Formulary:

• Famotidine IV and PO
• Ranitidine PO
1999 ASHP Guidelines

Major Criteria (1 of the following):

- Mechanical ventilation > 48 hours
- Coagulopathy (Platelet<50, INR>1.5, PTT 2x Baseline)
- TBI (GCS<10)
- Major Trauma
- Spinal Cord Injury
- Use of 2 antiplatelet agents
- Burns
- Partial hepatectomy
- Perioperative solid organ transplant

Minor Criteria (2 of the following):

- Sepsis
- ICU stay > 7 days
- High dose steroids (>250 mg HCT eq.)
2008 EAST Guidelines

- Level 1-3 recommendations
  - Similar to ASHP

- Continuation until able to tolerate enteral nutrition
  - Level 3 recommendation

- State no difference between H2RA and PPI
El-Kersh et al (2017)
- RCT
- SUP vs Placebo with EN in mechanically ventilated subjects
- 124 subjects
- GI Bleed: No difference
  - 1.82 vs 2.13; p=0.99
- No difference in:
  - C. Diff

Huang et al (2018)
- Meta Analysis
- SUP vs Placebo with EN
- 7 Studies; 889 Subjects
- GI Bleed: No difference
  - (RR 0.80; 95% CI, 0.49 to 1.31, p = 0.37)
- No difference in:
  - Mortality
  - C. Diff
- Increased risk of hospital pneumonia:
  - (RR 1.53; 95% CI, 1.04 to 2.27; p = 0.03)
Test Your Knowledge

• Which of the following is the most likely adverse drug reaction related to the use of acid suppression therapy?
  a) Hypotension
  b) Aspiration Pneumonia
  c) Leukocytosis
  d) Venous Thromboembolism
Test Your Knowledge

Which of the following is the most likely adverse drug reaction related to the use of acid suppression therapy?

a) Hypotension
b) Aspiration Pneumonia
c) Leukocytosis
d) Venous Thromboembolism
Test Your Knowledge

- Which of the following is a guideline directed indication for stress ulcer prophylaxis?
  a) Mechanical ventilation > 48 hours
  b) Cardiogenic Shock
  c) Adrenal insufficiency
  d) Status epilepticus
Test Your Knowledge

• Which of the following is a guideline directed indication for stress ulcer prophylaxis?
  a) Mechanical ventilation > 48 hours
  b) Cardiogenic Shock
  c) Adrenal insufficiency
  d) Status epilepticus
Parkview Health

- Fort Wayne, Indiana
  - 8 hospital health system
  - Study takes place at Parkview Regional Medical Center (PRMC) and Parkview Hospital Randallia (PVR)

- PRMC: 460 beds
  - Medical ICU: 36 Beds

- PVR: 174 beds
  - Medical ICU: 12 Beds
Purpose

To measure the effect a pharmacist driven stress ulcer prophylaxis discontinuation protocol has on acid suppression discontinuation rates in a community hospital.
Protocol Timeline

Dec 2018 – Feb 2019
Pre-Implementation

Dec 1, 2019
Implementation of SUP Protocol

Dec 2019 – Feb 2020
Post-Implementation
The Protocol

ON Enteral Nutrition (EN)

• **May be discontinued IF:**
  • Tolerating EN for 48 hours
    • At least 1 stool, no vomiting
  • Age > 18
  • Not being managed by GI
  • Not on PTA list
  • No other indication
The Protocol

No Active Nutrition

• May be discontinued if no longer indicated
  • ASHP/EAST Guideline directed indications
Protocol Process

Identification

Identify SUP that can be stopped
Protocol Process

Identification

Identify SUP that can be stopped

Stop the acid suppressant

Discontinuation
Protocol Process

Identification
Identify SUP that can be stopped

Discontinuation
Stop the acid suppressant

Documentation
Progress Note i-Vent

PARKVIEW
Objectives

Primary
- Median percent time on SUP in ICU

Secondary
- Cost savings from pre to post protocol (3 month)
- Median percent time on SUP in hospital
- Difference in pharmacy SUP interventions made
Study Design and Statistical Analysis

**Study Design**
- Institution Review Board Approved
- Pre-Post Intervention
- Cohort Study

**Statistical Analysis**
- Primary Outcome
  - T-Test
- Secondary Outcome
  - T-Test
Inclusion Criteria

- Subjects ≥ 18 years old
- Admitted to Parkview Regional Medical Center or Parkview Randallia Medical ICU
- Receiving ≥ 1 dose of a PPI or H2RA
Exclusion Criteria

• Taking an acid suppressant prior to admission (PTA)
• Other indication(s)
  • GI Bleed
  • Esophagitis
  • H. Pylori
  • Ulceration
  • GERD
  • Varices
RESULTS
Study Population

Pre-Protocol Implementation

535 Subjects Screened

197 Subjects Excluded
167 PTA Medication
30 Other Indications

338 Subjects Analyzed

Post-Protocol Implementation

612 Subjects Screened

233 Subjects Excluded
192 PTA Medications
41 Other Indications

379 Subjects Analyzed
## Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation (n = 338)</th>
<th>Post-Implementation (n = 379)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender, male [n (%)]</td>
<td>172 (53)</td>
<td>205 (54)</td>
</tr>
<tr>
<td>Age, years [median (IQR)]</td>
<td>63 [52 – 73]</td>
<td>63 [50 – 72]</td>
</tr>
<tr>
<td>Weight, kilograms [median (IQR)]</td>
<td>84 [71 – 103]</td>
<td>96 [82 – 112]</td>
</tr>
<tr>
<td>ICU Length of Stay [median (IQR)]</td>
<td>2.9 [1.7 – 5.8]</td>
<td>4.5 [2.8 – 7.3]</td>
</tr>
<tr>
<td>Hospital Length of Stay [median (IQR)]</td>
<td>7.4 [4.0 – 12.9]</td>
<td>6.2 [3.4 – 10.3]</td>
</tr>
</tbody>
</table>
Acid Suppression Rates

Pre-Implementation
(n = 383)

- PPI: 60%
- H2RA: 29%
- PPI + H2RA: 11%

Post-Implementation
(n = 379)

- PPI: 52%
- H2RA: 36%
- PPI + H2RA: 12%
## Results – Primary Outcome

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation</th>
<th>Post-Implementation</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent Time on SUP in the ICU</strong></td>
<td>67.4</td>
<td>56.1</td>
<td>0.001</td>
</tr>
</tbody>
</table>

SUP = Stress Ulcer Prophylaxis  
ICU = Intensive Care Unit
## Results – Secondary Outcome

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation</th>
<th>Post-Implementation</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Time on SUP in the Hospital</td>
<td>79.7 (n = 383)</td>
<td>79.4 (n = 379)</td>
<td>0.41</td>
</tr>
<tr>
<td>Total Number Total Pharmacist Interventions on SUP</td>
<td>129</td>
<td>183</td>
<td>Δ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>
# Results – Financial Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation (n = 383)</th>
<th>Post-Implementation (n = 379)</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Acid Suppression ($)</td>
<td>8,610.49</td>
<td>4,981.38</td>
<td>3,629.11</td>
</tr>
<tr>
<td>Projected Annual Cost Savings ($)</td>
<td></td>
<td>14,615.44</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

• The addition of a pharmacy driven stress ulcer prophylaxis discontinuation protocol significantly improved discontinuation rates and cost savings.
• Pharmacist presence significantly impacts discontinuation rates.
Limitations

• Small sample size
• Restrictive timeline
• High prevalence of transfers to floors with reduced pharmacy presence
Future Direction

- Expanding into other units (STICU, CVICU)
  - Protocol
  - Pharmacist presence
- Long term protocol assessment
  - 1 year +
Acknowledgements

- Tim Johnston, PharmD, BCPS, BCCCP
- Luke Keller, PharmD, BCPS, BCCCP
- Will Armstrong, PharmD, BCPS
- Sarah Ferrell, PharmD
References


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