Introduction

- Our Continuous Quality Improvement (CQI) project was focused on modifiable risk factors associated with Clostridium difficile infection (CDI) with ultimate goal to reduce CDI on the inpatient rehabilitation unit (IMR).
- The incidence of C. Diff on the rehabilitation unit was 7 case per year leading up to the start of the project in 2014.
- Our project included three major interventions: education, appropriate antibiotic prescription and minimizing proton pump inhibitor use.

Background

- Health care-associated Clostridium difficile infection is the most common cause of infectious diarrhea in acute care settings and may lead to pseudomembranous colitis and toxic megacolon.
- CDI is associated with significant morbidity/mortality, increased length of stay and cost.

Literature Review

- Gastric acid suppression has been associated with an increased risk for CDI in multiple studies throughout the past 2 decades.
- PubMed search for c. difficile and PPI yields over 50 studies Publications ranging from 2003 to 2017.
- Most studies are retrospective case reports.
- Meta-analyses available (3 studies).
- Multiple settings including outpatient, acute inpatient, and ICU.
- Studies vary in reviewing PPI duration, PPI dose, PPI with antibiotics, complications such as mortality, comparison to H2 blockers, etc.

Figure 1: IMR Urinary Antibiogram (2011-2014). Number of isolates per UCx

Antibiotics and their association with C. Difficile infection*

<table>
<thead>
<tr>
<th>Very common association</th>
<th>Somewhat common</th>
<th>Uncommon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoroquinolones</td>
<td>Other penicillins</td>
<td>Aminoglycosides</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>Macrolides</td>
<td>Tetacyclines</td>
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<tr>
<td>Ampicillin</td>
<td>Trimethoprim</td>
<td>Bacitracin</td>
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<tr>
<td>Amoxicillin</td>
<td>Sulfa-trimethoprim</td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Cephalosporins (broad spectrum)</td>
<td>Trimethoprim-sulfamethoxazole</td>
<td>Rifampin</td>
</tr>
</tbody>
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Fluoroquinolones were most commonly prescribed antibiotics for UTI in IMR prior to our intervention.

E. coli is the predominant urinary organism isolated from patients in IMR and antibiotic revealed 100% susceptibility of E. coli to Nitrofurantoin but only 75% to Fluoroquinolones.

Figure 2: Antibiotic utilization for UTI treatment in IMR before and after intervention

Figure 3: PPI utilization in patients with CDI diagnosed on IMR

Current C. diff Precautions on IMR

- Staff entering the room: Gown and gloves for hands on therapy or contact with anything in the room. Wash hands with soap and water upon entry and exit of the room (No sanitizer). Remove gown and gloves before exiting the room.
- Patient’s leaving the room: Patient needs to be in clean clothes or gown. Patient washes hands with soap and water (No sanitizer) Wipe down equipment that leaves the room with ORANGE top PDI wipes (4-minute wet contact time required). All gym equipment that the patient contacts must be wiped down with ORANGE top PDI wipes (4-minute wet contact time required).

Interventions

- Continue current hand washing protocol on IMR.
- Continue current precautions for C. Diff for therapies.
- Utilization of PPI H&P template phase for appropriate PPI use while on IMR.

Conclusion

- Development of IMR UTI guideline resulted in a significant reduction of utilization of Fluoroquinolones on the IMR (high-risk antibiotics for CDI) and promoted use of more appropriate empiric antibiotics based on IMR Antibiogram.
- Preliminary data is suggestive of a trend in discontinuation of PPI on IMR, which is likely attributed to our educational intervention as well as implementation of Thera-Doc alerts system. Development of PPI guideline for IMR is pending.

References