Assessing duration of therapy recommendations based on Clostridium difficile guidelines within the Parkview health system

Curtis Stump PharmD
Trent Towne PharmD, BCPS
Aubrey Mills PharmD

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The objective of this study was to evaluate the appropriateness of first-episode CDI treatment (non-severe and severe cases) within the Parkview health system.

**OBJECTIVE**

**BACKGROUND**

- As the most commonly diagnosed diarrheal illness acquired in the hospital, *Clostridium difficile* infections (CDIs) affect an estimated 453,000 individuals in the United States yearly.\(^1\) Previous studies have established that CDI represents a significant economic burden on the United States healthcare system, with a total CDI-attributable cost of around $6.3 billion.\(^1\)
- Prior to the 2017 update, clinical practice guidelines recommended a 14-day treatment course for initial episodes of CDI; whereas, current guidelines recommend a 10-day course for initial, non-fulminant episodes.\(^3,4\)
- Long durations of therapy and higher doses (250 mg or 500 mg) of oral vancomycin for initial, non-fulminant episodes lead to increased healthcare costs and unnecessary exposure to antibiotics.\(^5\)
- Previously published data does not support the use of higher doses of oral vancomycin for treating non-severe or severe CDI; however, these higher doses are sometimes utilized when treating this population.\(^5,6\) In one retrospective study, there was no difference found in duration of symptoms, relapse, or 30-day all-cause mortality when comparing those who received 125 mg doses to those who received 250 mg doses.
- Using the dose and duration recommended by CDI guidelines, there is potential to reduce patient exposure while also providing cost-savings to the health system.

**METHODS**

- **Study design:** a retrospective chart review of patients admitted to any Parkview hospital from March 1, 2019 to March 1, 2020 diagnosed with a first episode of either non-severe or severe CDI.
- **Inclusion criteria:** patients age 18 years or older hospitalized with a first episode of non-severe or severe CDI.
- **Exclusion criteria:** patients who did not meet lab or clinical criteria for CDI; patients who did not receive inpatient antibiotics; patients with subsequent visits during the time period; patients who passed away during hospitalization or shortly after and were therefore unable to complete treatment;
- **Primary outcome:** the percent of patients that received an appropriate total duration of treatment, including both inpatient and outpatient therapy, defined as a duration equal to or within 95% confidence interval of what clinical practice guidelines recommend. While the excess cost of higher doses of oral vancomycin may seem small, these costs may add up while also unnecessarily increasing the risk of adverse events patients may experience.
- **Secondary outcomes:** evaluation of the primary endpoint (using the overall population) based on different patient characteristics, and a cost analysis with oral vancomycin

**RESULTS**

- **Table 1. Patient characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Non-severe (n=227)</th>
<th>Severe (n=147)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>61.2 ± 17.6</td>
<td>63.3 ± 17.0</td>
</tr>
<tr>
<td>Males (n, %)</td>
<td>75 (33.0)</td>
<td>76 (53.6)</td>
</tr>
<tr>
<td>Mean length of stay (days)</td>
<td>9.1</td>
<td>7.8</td>
</tr>
</tbody>
</table>

- **Table 2. Excess cost associated with using higher dose oral vancomycin regimens**

<table>
<thead>
<tr>
<th>Oral vancomycin dose (mg/8h)</th>
<th>Number of doses administered</th>
<th>Cost of treatment, in $</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 mg</td>
<td>5,042</td>
<td>52,406</td>
</tr>
<tr>
<td>250 mg</td>
<td>515</td>
<td>107,151</td>
</tr>
</tbody>
</table>

**DISCUSSION & CONCLUSIONS**

- Regardless of CDI severity, it was found that most therapies were considered inappropriate in length. Upon further analysis, it was determined that 230/374 (61.5%) of cases were too long in duration and 33/374 (11.7%) were too short.
- When evaluating specific subgroups of patients, it was found that those age 65 years or older were more likely than younger patients to have appropriate durations of therapy. It was found that 151/228 (66.2%) of patients receiving broad-spectrum antibiotics received longer durations of therapy, compared to only 79/146 (54.1%) in the group that had not received broad-spectrum antibiotics. This finding may reflect the difficulty that providers face when determining treatment durations in this population, as clinical practice guidelines lack evidence to make a strong recommendation.\(^4\)
- It was found that almost one-third of the population received multiple strengths of vancomycin during hospitalization, leading to excess cost.
- This study has several key limitations, including its retrospective nature, small population examined, and reliance on previous laboratory data or documentation to determine CDI episodes.
- In this retrospective study, it was found that a majority of first episodes of CDI were treated for an inappropriate duration, with most of those being longer than what clinical practice guidelines recommend. While the excess cost of higher doses of oral vancomycin may seem small, these costs may add up while also unnecessarily increasing the risk of adverse events patients may experience.

**REFERENCES**