2020

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

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

Curt Stump, PharmD; Trent Towne, PharmD, BCPS; Aubrey Mills, PharmD

OBJECTIVE

- 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

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.[2]
- 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]
- Longer 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.[4]
- 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] 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, confirmed by the presence of laboratory and clinical criteria
- **Exclusion criteria:** patients who did not meet lab or clinical criteria for CDI diagnosis; 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 total duration greater than or equal to nine, but not including or exceeding eleven days
- **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

Characteristic	Non-severe (n=227)	Severe (n=147)
Demographics		
Age (mean ± SD)	61.2 ± 17.6	63.3 ± 17.0
Male (n, %)	75(33.0)	76 (51)
Mean length of stay (days)	6.1	7.8
Laboratory Values Before CDI Confirmation (mean)		
White blood cells	8.4	15.16
Serum creatinine (mg/dL)	0.9	2.3
CDI Medications Administered During Hospitalization (n, %)		
PO vancomycin	220 (96.9)	145 (98.6)
PO fidaxomicin	0	1 (0.7)
PO metronidazole	14 (6.2)	10 (6.8)
IV metronidazole	55 (24.2)	37 (25.2)
Other Clinical Information (n, %)		
Infectious Diseases consultation	38 (16.4)	50 (34.0)
Received broad-spectrum antibiotics during stay	125 (55.1)	103 (68.7)
Duration of CDI treatment (mean ± SD)	13.2 ± 7.1	13.4 ± 10.2

Figure 1. Overall duration of therapy for CDI treatment

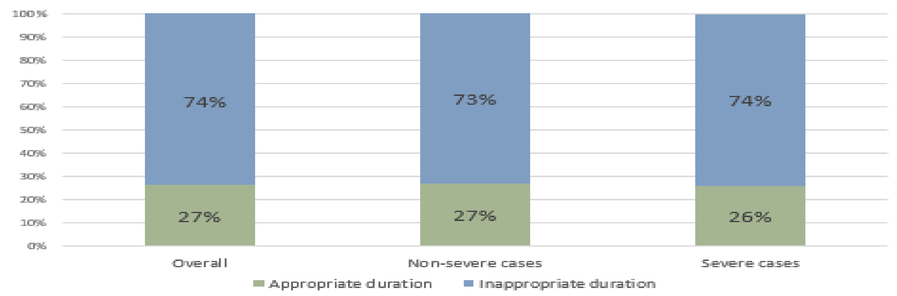
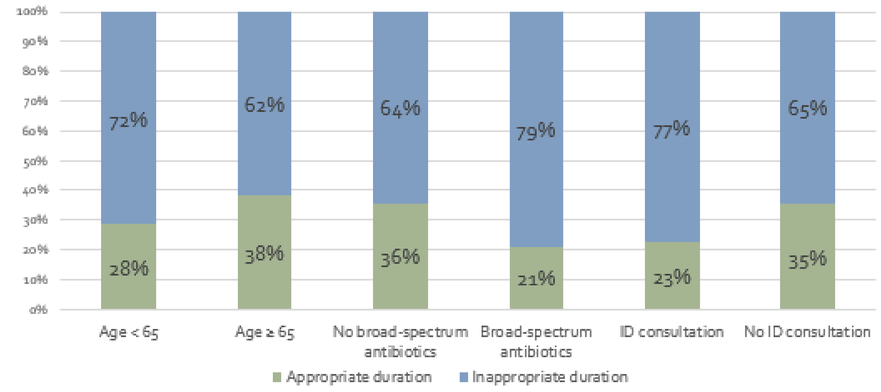


Figure 2. Overall duration of therapy based on various characteristics



RESULTS

Figure 3. Inpatient oral vancomycin regimens

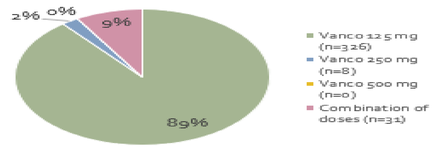


Table 2. Excess cost associated with using higher dose oral vancomycin regimens

	Vancomycin 125 mg	Vancomycin 250 mg	Vancomycin 500 mg
Total number of doses administered	5,242	381	224
Overall estimated cost	$52,420	$7,620	$8,960
Excess cost	---	$3,810	$6,720

*Cost based on a wholesale acquisition cost (WAC) of $10 per one vancomycin 125 mg oral capsule

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 episode.
- 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

1. Gerding DN, Stuart Johnson. Chapter 129: *Clostridium difficile* infection, including pseudomembranous colitis. In: Jameson J, Fauci AS, Kasper DL, Hauser SL, Longo DL. Eds. *Harrison's principles of internal medicine,* 20e. McGraw-Hill, 2018.
2. Zhang S, Palazuelos-Munz S, Balsells EM, Nair H, Chit A, Kyaw MH. Cost of hospital management of *Clostridium difficile* infection in the United States - a meta-analysis and modelling study. *BMC Infect Dis* 2016; 16(1) 447.
3. Cohen SH, Gerding DN, Johnson S, et al. Clinical practice guidelines for Clostridium difficile infection in adults: 2010 update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). *Infect Control Hosp Epidemiol* 2010; 31(5): 431-455.
4. McDonald LC, Gerding DN, Johnson S, et al. Clinical practice guidelines for Clostridium difficile infection in adults and children: 2017 update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). *Clin Infect Dis*2018; 66(7): 1-48.
5. Chiu CY, Sarwal A, Feinstein A, Hennessey K. Effective dosage of oral vancomycin in treatment for initial episode of *Clostridoides difficile* infection: a systematic review and meta-analysis. *Antibiotics* 2019; 8(4).

Special thanks to Sarah Ferrell, PharmD, for her contributions

Disclosure

The authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:
Allison Clemens: Nothing to disclose | Sarah Meeks: Nothing to disclose | Bryan Statz: Nothing to disclose