

Outcomes of *Clostridioides difficile* infection in Hospitalized Patients with Generalized Anxiety Disorder

Shivani Patel MD¹, Alexander Kaye MD¹, Sarah Meyers DO², Pooja Saiganesh BS³, Sushil Ahlawat MD⁴

¹Department of Medicine, Rutgers New Jersey Medical School, ²Department of Psychiatry, Rutgers Robert Wood Johnson Medical School, Piscataway, NJ, ³Rutgers New Jersey Medical School, Newark, NJ, ⁴Division of Gastroenterology and Hepatology, Rutgers New Jersey Medical School, Newark, NJ

Introduction

- Clostridioides difficile* infection (CDI) is a significant burden for healthcare facilities. Clinical presentation can range from mild diarrhea to colitis.
- Higher levels of anxiety have been seen in patients with recurrent CDI.
- Generalized anxiety disorder (GAD) is a common form of anxiety.
- In patients with recurrent CDI, prior studies have demonstrated higher levels of anxiety.
- Prior studies have demonstrated an interplay between anxiety and CDI; however, no study has investigated the impact of a diagnosis of GAD on CDI outcomes.

Aim

- Our study aims to understand the impact of comorbid GAD on the outcomes of hospitalized patients with CDI.

Methods

- Hospitalized patients with CDI were selected from the 2014 National Inpatient Sample database based on ICD-9 codes.
- Patient demographics and outcomes of CDI were compared between groups with and without GAD.
- The outcomes included respiratory failure, renal failure (AKI), sepsis, megacolon, colonic perforation, hypotension/shock, intestinal abscess, hepatic failure, and inpatient mortality.
- The proportions and means were compared using chi-squared tests and independent t-test respectively.
- After adjusting for age, race, sex, and Charlson Comorbidity Index (CCI), a multivariate logistic regression analysis was used to assess GAD as an independent predictor of the outcomes.

Results

Table 1: Patient Demographics and Characteristics

Variable	With GAD	Without GAD	P-value
N = 72,379	N = 8,963	N = 63,416	
Patient age, mean (SD)	62.1 (18.1)	65.4 (19.6)	<0.001
Sex, N (%)			<0.001
Female	6,483 (72.3%)	35,707 (56.3%)	
Male	2,480 (27.7%)	27,713 (43.7%)	
Race, N (%)			<0.001
White	7,202 (84.0%)	43,860 (72.6%)	
Black	620 (7.2%)	8,270 (13.7%)	
Hispanic	488 (5.7%)	5,071 (8.4%)	
Asian or Pacific Islander	59 (0.7%)	1,323 (2.2%)	
Native American	49 (0.6%)	415 (0.7%)	
Other	158 (1.8%)	1,441 (2.4%)	
Length of stay, in days (SD)	9.6 (11.0)	10.7 (14.3)	<0.001
Total hospital charges, in \$ (SD)	77,039 (127,031)	95,129 (182,509)	<0.001
Charlson Comorbidity Index (SD)	3.91 (2.67)	4.57 (2.74)	<0.001

Table 2: Multivariate Regression Analysis of Outcomes

Outcomes	*Adjusted odds ratio	95% Confidence Interval	P-value
Inpatient mortality	1.57	1.40 - 1.76	<0.001
Sepsis	1.26	1.20 - 1.34	<0.001
Hypotension/Shock	1.12	1.06 - 1.19	<0.001
Acute Hepatic Failure	1.47	1.15 - 1.89	0.003
Acute Respiratory Failure	1.23	1.14 - 1.33	<0.001
Acute Renal Failure	1.27	1.20 - 1.33	<0.001
Intestinal Abscess	0.99	0.70 - 1.40	0.969
Colonic perforation	1.62	1.08 - 2.43	0.019

*Adjusted for age, sex, race, and the Charlson Comorbidity Index

Discussion and Conclusion

- Hospitalized CDI patients with a history of GAD are more likely to have increased mortality, sepsis, multi-organ failure and colon perforation.
- The concomitant inflammatory states of CDI and GAD may result to an additive or synergistic effect, potentially explaining more frequent negative outcomes seen in GAD subgroup.
- Prior research found GAD associated with reduced intestinal microbiota richness and diversity may predispose to develop CDI.
- Decreased gut microbiota may lead to increased permeability that allows translocation of colonic bacteria into the blood stream to increased risk of colonic perforation, sepsis, and subsequent sepsis complications.
- These findings are likely due to GAD's association with a pro-inflammatory state, inconsistent healthcare utilization, and altered gut microbiota.

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