Effect of Clostridium difficile Infection on Hospita

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Effect of *Clostridium difficile Infection* on Hospital-Based Outcomes in Patients With Gastric Ulcer

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Introduction

Gastric Ulcer (GU) is a prevalent cause of gastrointestinal disease with a significant healthcare-associated burden. Patients hospitalized with GU have many risk factors for developing *Clostridium Difficile infection* (CDI). CDI is associated with poor outcomes in many diseases, but limited data is available in the GU population. We utilized the National Inpatient Sample (NIS) to understand the effect of CDI on inpatient mortality in GU patients.

Methods

We used NIS 2017 to generate ICD-10 codes for GU and CDI. The primary outcome was inpatient mortality. Secondary outcomes were hospital length of stay and cost utilization.

We then ran multivariate logistic regression analysis in STATA MP 16.1. Various comorbidities were accounted for by adding them into the analysis. These included the previous history of coronary artery disease (CAD), congestive heart failure (CHF), cerebrovascular disease (CVA), smoking, hyperlipidemia (HLD), myocardial infarction (MI), percutaneous coronary intervention (PCI), and coronary artery bypass graft (CABG).

Results

The gastric ulcer patients under investigation were all adults more than 18 years of age and numbered 13,776 patients. The mean age was 65.75 years. Among these, 54% were females.

While examining inpatient mortality, we see that for patients that had CDI, the odds of inpatient mortality are higher (Odds Ratio (OR) 8.0, p = 0.0005, 95% Confidence Interval (CI) 1.87 – 34.6). History of CHF and increasing age also appear to contribute towards higher odds of mortality.

Mean LOS was 4.5 days. Patients with Clostridium difficile infection stayed in the hospital longer by ~5.0 days (Coef. 4.91, 95% CI 1.99 – 7.83). LOS was higher in patients with CHF.

The total charge for hospitalizations from CDI is higher by $63,722 (95% CI 23,600 – 103,845). Other factors incurring higher costs include the history of CHF, increasing age, Hispanic race, and teaching hospitals (Table 1).

Discussion

Among patients that present with a principal diagnosis of GU, having CDI, adversely affects patient outcomes that include mortality, hospital length of stay, and total hospitalization cost.

Previous studies have reported adverse outcomes in patients with CDI who are on proton pump inhibitors (PPI). Although we cannot prove directly, we can presume that most of these patients with GU were on PPI. Therefore, this can serve as indirect evidence that PPI use could be the factor contributing to adverse outcomes in patients with GU and CDI.

Table 1

INPATIENT MORTALITY

Variable (Mortality)	Odds Ratio	p-Value	95% Confidence Interval
CDI	8.04	0.005	1.87–34.62
History of CAD	0.75	0.153	0.51–1.11
History of CHF	3.23	0.000	2.35–4.43
History of smoking	0.86	0.418	0.61–1.23
Hyperlipidemia	0.65	0.010	0.47–0.90
Prior Myocardial Infarction	0.68	0.252	0.36–1.31
Prior PCI	1.00		
Prior CABG	0.45	0.043	0.21–0.98
History of CVA	0.47	0.029	0.23–0.92
Weekend Admissions	0.85	0.379	0.59–1.22
Age	1.04	0.000	1.03–1.05
Female	0.55	0.000	0.41–0.75

LENGTH OF STAY

Variables (Length of Stay)	Coefficient	p-Value	95% Confidence Interval
CDI	4.91	0.001	1.99–7.82
History of CAD	-0.02	0.855	-0.22–0.18
History of CHF	1.55	0.000	1.29–1.82
History of smoking	-0.17	0.050	-0.33–0.00
Hyperlipidemia	-0.50	0.000	-0.65–-0.35
Prior Myocardial Infarction	-0.57	0.000	-0.83–-0.31
Prior PCI	0.13	0.716	-0.58–0.84
Prior CABG	-0.34	0.015	-0.62–-0.07
History of CVA	-0.30	0.008	-0.52–-0.08
Weekend Admissions	0.11	0.226	-0.07–0.28
Age	0.02	0.000	0.01–0.02
Female	-0.14	0.091	-0.30–0.02

TOTAL HOSPITAL CHARGE

Variable (Total Charge)	Coefficient	p-Value	95% Confidence Intervals
CDI	63722.77	0.002	23,600.13–10,3845.40
History of CAD	3239.82	0.206	-1,781.47–8261.10
History of CHF	19170.06	0.000	14,095.65–24,244.48
History of smoking	-1541.47	0.361	-4,850.57–1,767.63
Hyperlipidemia	-5870.29	0.000	-8,589.46–-3,151.11
Prior Myocardial Infarction	-10195.54	0.000	-14,452.02–-5,939.06
Prior PCI	-2640.91	0.516	-10,614.76–5,332.95
Prior CABG	-6789.63	0.003	-11,332.16–-2,247.09
History of CVA	-4962.36	0.002	-8,090.52–-1,834.20
Weekend Admissions	1315.94	0.340	-1,386.67–4,018.55
Age	82.22	0.021	12.26–152.18
Female	-4776.38	0.000	-7,270.59–-2,282.17
Race (compared to White)			
Black	3885.47	0.069	-2,97.13–8,068.07
Hispanic	6617.52	0.016	1,216.5–1,2018.495
Asian or Pacific Islander	3619.00	0.288	-3,061.33–10,299.33
Native American	-3451.31	0.627	-17,388.30–10,485.68
Other	10173.36	0.006	2,886.96–1,7459.76
Hospital Teaching Status	5893.39	0.000	2,684.14–9,102.65

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