Clostridium Difficile Infection Increases In-hospital Mortality, Length of Stay, and Hospital Cost but not 30-Day Mortality in Cirrhotic Patients: A Systematic Review and Meta-Analysis

Aunchalee Jaroenlapnopparat[1,2], Nipith Charoenngam[1,2,3], Ben Ponvilawan[4], Palapun Waitayangkoon[5]

[1]Department of Medicine, Mount Auburn Hospital/Beth Israel Lahey Health, Cambridge, MA, USA, [2]Department of Medicine, Harvard Medical School, Boston, MA, USA, [3]Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, [4]Department of Translational Hematology and Oncology Research, Taussig Cancer Institute, Cleveland Clinic, Cleveland, OH, USA, [5]Department of Medicine, Metrowest Medical Center, Framingham, MA, USA

Introduction

- Clostridium difficile infection (CDI) is a leading cause of nosocomial infection and is associated with higher morbidity and mortality
- Cirrhotic patients are more susceptible to CDI because of impaired gut immune response, frequent hospitalization, and use of proton pump inhibitor and antibiotics
- We aim to investigate the impact of CDI on cirrhotic patients in terms of in-hospital and 30-day mortality, length of stay, and hospital cost

Methods and Materials

- Potentially eligible studies were identified from Embase, Medline, and Web of Sciences databases from inception to April 2022 using search strategy that comprised of terms for “cirrhosis” and “CDI”
- Eligible study must consist of one group of cirrhotic patients with CDI and control group of cirrhotic patients without CDI
- The study must provide odds ratio (OR) and 95% confidence interval (95% CI). We extracted such data from each study to calculate mean difference (MD) or OR. Pooled MD/OR were then calculated by combining MD/OR of each study using random-effects model
- Funnel plot was used to assess for the presence of publication bias

Contact

Aunchalee Jaroenlapnopparat, MD
Department of Medicine, Mount Auburn Hospital
Email: ajaroenl@mah.harvard.edu
Twitter: @annaunchaleeMD

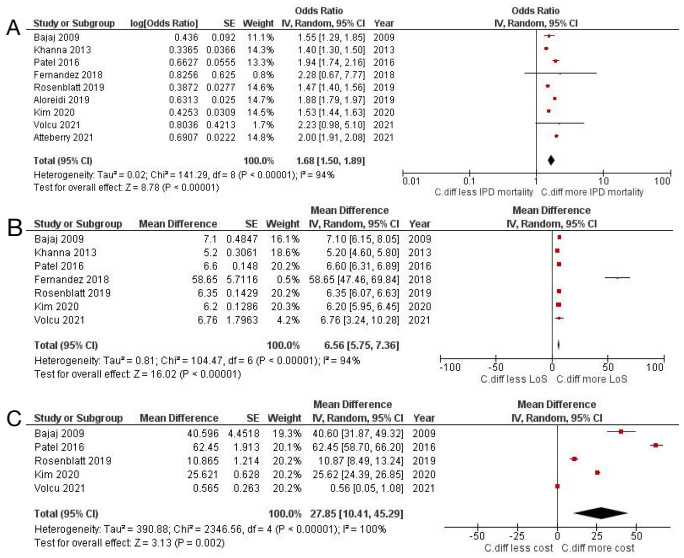

Figure 1) Forest plot of the associations between CDI in cirrhotic patients and A) in-hospital mortality, B) length of stay, C) hospital cost

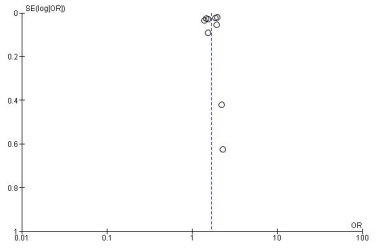

Figure 2) Funnel plot of the association between CDI in cirrhotic patients and in-hospital mortality

- Reduced functional capacity due to loss of muscle mass, hepatic encephalopathy, and ascites
- Regular endoscopy
- Higher risk of acute kidney injury
- Immunocompromised state
- multiple infections

Results

- A total of 2,320 articles were identified. After two rounds of independent review by three investigators, nine studies reporting in-hospital mortality and three reporting 30-day mortality of cirrhotic patients with CDI versus those without CDI were included into the meta-analysis

- The meta-analysis of nine studies consisting of 7,746,126 patients revealed a **significant association between CDI and in-hospital mortality in cirrhotic patients with the pooled OR of 1.68** (95%CI 1.29-1.85, I2 94%, Figure 1A). **Length of stay and hospital cost were also higher in the CDI group** (pooled MD of 6.56 days [95% CI 5.75-7.36, I2 94%, Figure 1B] and 27.85 (x $1,000) [95% CI 10.41-45.29, I2 100%, Figure 1C] consecutively)

- The funnel plot for the meta-analysis of the association between CDI and in-hospital mortality was fairly symmetric and was not suggestive of publication bias

- From three studies comprising of 3,694 patients, we found that **CDI was not associated with 30-day mortality in cirrhotic patients** (pooled OR 1.20, 95%CI 0.75-2.24, I2 74%)

Conclusions

CDI is associated with increased in-hospital mortality, length of stay, and hospital costs, but not with 30-day mortality in cirrhotic patients. Aggressive monitoring for CDI during admission is needed in this patient population