

EDITORIAL

고령환자에서의 *Clostridium difficile* 감염의 임상적 특징

전성란

순천향대학교 의과대학 내과학교실, 소화기병센터 소화기연구소

Clinical Characterization of *Clostridium difficile* Infection in Elderly Patients

Seong Ran Jeon

Institute for Digestive Research, Digestive Disease Center, Department of Internal Medicine, Soonchunhyang University College of Medicine, Seoul, Korea

Article: Clinical Outcomes in Hospitalized Patients with *Clostridium difficile* Infection by Age Group (**Korean J Gastroenterol** 2016;67: 81-86)

Clostridium difficile infection (CDI) is the most commonly recognized cause of healthcare-associated infections since the pathogen was first reported in the late 1970s.¹ The clinical manifestations of CDI vary from self-limited diarrhea to severe complications such as toxic megacolon, bowel perforation, renal failure, sepsis, and death.² The Agency for Health Care Policy and Research reported that the absolute number of hospital stays in the United States with CDI increased fourfold from 1993 to 2009.³ Similarly, a nationwide multicenter study in Korea reported that the incidence of CDI increased significantly from 2004 (1.7 cases/1,000 adult admissions) to 2008 (2.7 cases/1,000 adult admissions).⁴ Furthermore, the prevalence of community-acquired CDI and hospital-acquired CDI, without recent exposure to antibiotics, continues to rise.^{5,6} Therefore, CDI is perceived as a significant burden on the healthcare system.

Major risk factors for CDI include systemic antibiotic exposure, prolonged length of hospital stay, comorbidities such as chronic kidney disease, inflammatory bowel disease, im-

munodeficiency and immunosuppression, hypervirulent strains, and old age (≥ 65 years).^{5,7,8} Most hospital-acquired CDI occur in elderly patients due to a high burden of chronic comorbidities, frequent use of antibiotics, more health care exposure, and biological changes associated with aging.^{2,9} However, the number of studies that compare young and elderly patients with CDI are limited.

In the current issue of Korean Journal of Gastroenterology, Lee et al.¹⁰ compared clinical characteristics and outcomes between young and elderly patients hospitalized with CDI. They enrolled a total of 225 patients with hospital-acquired CDI and grouped them by age (young < 65 years, elderly ≥ 65 years). In this study, the elderly group (68%) was more frequently affected by CDI compared with the younger group (32%). According to the 2010 clinical practice guidelines for CDI in adults, the severity of CDI can be defined by leukocytosis and increased serum creatinine levels.¹¹ In another recent study, which compared 52 CDI patients with 150 non-CDI patients among elderly (> 60 years) hospitalized pa-

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교신저자: 전성란, 04401, 서울시 용산구 대사관로 59, 순천향대학교 의과대학 내과학교실, 소화기병센터 소화기연구소

Correspondence to: Seong Ran Jeon, Institute for Digestive Research, Digestive Disease Center, Department of Internal Medicine, Soonchunhyang University College of Medicine, 59 Daesagwan-ro, Yongsan-gu, Seoul 04401, Korea. Tel: +82-2-709-9202, Fax: +82-2-709-9696, E-mail: 94jsr@hanmail.net

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tients, the authors reported that increased serum creatinine levels due to dehydration or inadequate renal perfusion were independently associated with CDI.¹ In the study by Lee et al.,¹⁰ renal failure did not differ significantly between the elderly and young patient groups; however, leukocytosis, hypoalbuminemia, and right colon involvement were more prevalent in the elderly patients who also had a higher mean severity score. According to the results of a previous study that analyzed 70 patients (>80 years) with CDI, higher white blood cell counts were independently associated with treatment failure.¹² The results of Lee et al.¹⁰ showed that the failure of first-line treatment was also more common in the elderly group (37.9% vs. 23.6%, $p=0.034$). They reported that old age, leukocytosis, and hypoalbuminemia were the factors associated with first-line treatment failure by univariate analysis, but not by multivariate analysis. Based on clinical practice guidelines,¹¹ they suggested that intensive therapy such as vancomycin be used as a first-line therapy in elderly patients (≥ 65 years) with leukocytosis and/or hypoalbuminemia.

The factors that lead to frequent and severe cases of CDI in elderly patients remain unclear. However, the effect of old age on CDI can be explained by biological factors, as well as clinical factors associated with aging such as comorbidities, health care exposure, polypharmacy, and contact with hypervirulent strains.² The biological changes of the aging host include dysregulated inflammation, inadequate antibody production, altered intestinal microbiota, altered gastrointestinal physiology, and impaired functional status. The hypervirulent strain, designated as North American pulsed-field gel electrophoresis type 1 (NAP1) or restriction endonuclease analysis B1, PCR ribotype 027 (NAP1/BI/027), may also be the cause of severe CDI as partial deletions of the *tcdC* gene have been shown to induce hyperproduction of toxins A and B.¹³ In a previous prospective study, the hypervirulent strain was shown to significantly increase the 30-day mortality rate after the age of 60 years, which further increased in patients above the age of 80 years.¹⁴ These factors lead to poor clinical outcomes such as increased disease severity, susceptibility to infection and recurrence, decreased response to treatment, and death in advanced age.²

Contrastingly, there are studies which show that old age is not an independent risk factor for worse disease outcomes for patients with CDI.^{15,16} In the study by Lee et al.,¹⁰ there were no significant differences in recurrence (15.0% vs.

8.3%, $p=0.162$) and mortality rates (5.9% vs. 1.4%, $p=0.127$) between the elderly and young patient groups. These conflicting findings may be due to differences in age cut-off, differences of the strain of *C. difficile*, which was not analyzed by Lee et al.,¹⁰ the number of patients enrolled in the study, and the lack of adjustment for potential confounding factors influencing the retrospective analysis. Therefore, these limitations must be considered when interpreting the findings of Lee et al.¹⁰ Regardless of whether aging affects the outcome of CDI, advanced age may promote the severity of CDI as the mortality rate in elderly patients (≥ 65 years) with CDI is approximately 92%.¹⁷

Considering findings of clinical trials (including the Lee et al.'s study) that have so far investigated the effects of age on CDI, advanced age due to the complexity of the aging host is an important factor affecting CDI incidence, severity, and clinical outcomes. However, in order to clarify clinical characteristics and outcomes of elderly patients with CDI in Korea, a large and prospective trial is required in the future.

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