

Are Community-Based Hospitals Safe from Carbapenem-Resistant *Enterobacteriaceae* in Korea?

Chang-Seop Lee^{1,2}

¹Department of Internal Medicine, Chonbuk National University; ²Biomedical Research Institute of Chonbuk National University Hospital, Jeonju, Korea

Carbapenems are used with increasing frequency to treat multidrug-resistant isolates, especially strains producing extended-spectrum β -lactamases [1, 2]. Resistance to carbapenems has been uncommon among *Enterobacteriaceae*. However, the emergence of β -lactamases with direct carbapenem-hydrolyzing activity has contributed to an increased prevalence of carbapenem-resistant *Enterobacteriaceae* (CRE) [3]. CRE are particularly problematic given the high mortality associated with infections caused by CRE, and the potential for widespread transmission of carbapenem resistance via mobile genetic elements [3, 4].

We should recall 2 outbreaks in New York City [5]. At hospital A, 2 patients with carbapenem-resistant *Klebsiella pneumoniae* (CRKP) were identified. During the next 6 months, a total of 30 additional patients were identified as having CRKP. Thirty of 32 isolates were considered to be acquired nosocomially, with median length of hospital stay before a positive culture result of 18.5 days. At hospital B, an initial case of CRKP was recognized, followed by 2 more cases within 2 months. In the ensuing 3 months, another 24 cases were identified. All isolates were considered to be acquired nosocomial-

ly. We assume that horizontal transmission of carbapenem-resistant organisms occurred at these 2 hospitals.

The emergence of carbapenem-resistant Gram-negative bacteria has been increasingly reported, especially *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Enterobacter* spp. in Korea [6]. Among Gram-negative bacteria, the proportion of CRE has been very low, compared with that of *P. aeruginosa* and *A. baumannii* [1, 6]. However, the trend is increasing [6].

Lee *et al.* [7] investigated the prevalence and risk factors of CRE in a single community-based hospital in Korea. Until now, most research on carbapenem-resistant Gram-negative bacteria including CRE was performed in tertiary acute care hospitals in Korea. However, Lee *et al.* conducted their study at a mid-sized community-based hospital, including not only the intensive care unit but also the general wards. Many patients had been transferred from long-term care facilities (LTCFs). In this study, a total of 41 (1.6%) CRE isolates were identified, including 13 of *Enterobacter aerogenes*, 8 of *K. pneumoniae*, 5 of *Enterobacter cloacae*, and 15 others. They reported that risk factors for CRE included vascular catheters,

Corresponding Author : Chang-Seop Lee, MD, PhD

Department of Internal Medicine, Chonbuk National University Medical School, 567

Baekje-daero, Deokjin-gu, Jeonju-si, Jeollabuk-do 54907, Korea

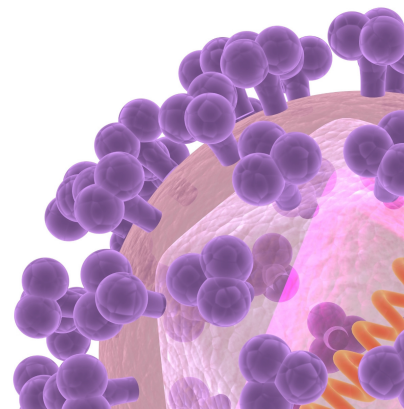
Tel: +82-63-250-2391, Fax: +82-63-254-1609

E-mail: lcsmd@jbnu.ac.kr

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high comorbidity score, and regular visits to the outpatient clinic.

CRE carriage has been described in a number of investigations involving those in LTCFs. In one study, 9 carbapenem-resistant *Escherichia coli* isolates harboring *K. pneumoniae* carbapenemase were identified in patients residing in 7 different LTCFs [8]. In other reports, about 60% of patients with CRKP were admitted from post-acute care facilities [9]. These results suggest that LTCFs can be important reservoirs for the transmission and dissemination of these organisms. Well-known risk factors for CRE acquisition or infection include recent organ or stem-cell transplantation, mechanical ventilation, exposure to antimicrobials, and longer length of stay [3, 10]. In one study, the risk factors for CRKP included previous use of carbapenems, cephalosporins, and fluoroquinolones [4, 10]. In other reports, poor functional status and intensive care unit stay were risk factors for CRKP [4].

In conclusion, CRE is threatening not only tertiary acute care hospitals but also mid-sized community hospitals in Korea. LTCFs are possible reservoirs for the threat of CRE. Because of high mortality rates and the possibility of outbreaks, each hospital must detect CRE as soon as possible and aggressively perform infection control to perfection.

For CRE prevention, we recommend active surveillance in high-risk groups admitted to the hospital, whether in a tertiary acute care or mid-sized community-based hospital. In addition, we should apply antimicrobial stewardship to decrease carbapenem consumption in hospitals and to minimize device usage in clinical settings. We absolutely should perform appropriate infection control procedures, including use of personal protective equipment and good hand hygiene following exposure to patient environments.

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Conflicts of Interest

No conflicts of interest.

ORCID

Chang-Seop Lee

<http://orcid.org/0000-0002-2897-2202>

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