



Prevalence of *Escherichia coli* Carrying *pks* Islands in Bacteremia Patients

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Escherichia coli can harbor genomic *pks* islands that code for a polyketide-peptide genotoxin known as colibactin. *E. coli* strains carrying *pks* islands trigger genetic instability. *pks* islands have been significantly associated with bacteremia. We investigated the molecular epidemiology of bacteremic *E. coli* isolates and the prevalence of bacteremia-causing *E. coli* carrying *pks* islands. A total of 146 *E. coli* isolates were collected at a tertiary-care hospital from January 2015 to December 2016. The phylogenetic groups were determined by multiplex PCR. All isolates were screened by PCR for sequence type 131 (ST131)-associated single-nucleotide polymorphisms (SNPs) in *mdh* and *gyrB*. For detection of *pks* islands, we performed PCR for the *clbB* and *clbN* genes as colibactin system markers. Phylogenetic group B2 was the most common, accounting for 54.1% (N=79) of the isolates, followed by group D with 29.5% (N=43), group A with 11.6% (N=17), and group B1 with 4.8%. Of the group B2 isolates, 40.5% were ST131 strains and 32.9% carried *pks* islands. Only three ST131 isolates in group B2 carried the *clbB* and *clbN* genes, while the other 23 ST131 isolates did not. The *pks* gene might not be associated with ST131 strains.

Key Words: *Escherichia coli*, *pks* islands, *clbB*, Bacteremia, ST131

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Escherichia coli is one of the most common bacteremia-causing pathogens; it has several virulence factors associated with bloodstream invasion and infection [1, 2]. Of these, the *papG* class II gene is thought to play a more important role in the development of *E. coli* bacteremia in patients with an upper urinary tract infection (UTI) than in patients with acute cholangitis [2]. However, the role of *E. coli* virulence factors in the pathogenesis of bloodstream infections remains unclear. Among its virulence factors, *E. coli* can harbor genomic *pks* islands that code for a polyketide-peptide genotoxin known as colibactin. *E. coli* strains carrying *pks* islands induce DNA damage and trigger genetic instability [3], and *pks* islands were significantly associated with bacteremia [4]. Therefore, we investigated the molecular epidemiology of bacteremic *E. coli* isolates and the prevalence of bacteremia-causing *E. coli* carrying *pks* islands in Korea.

A total of 146 *E. coli* isolates (one isolate per patient) were collected from blood samples consecutively at a tertiary-care hos-

pital from January 2015 to December 2016. Blood cultures were incubated in the BacT/ALERT system (bioMérieux, Marcy-l'Etoile, France). Each isolate was identified using the MicroScan Walkaway (Beckman Coulter, Brea, CA, USA) or Bruker Biotyper (Bruker Daltonics, Bremen, Germany) matrix-assisted laser desorption ionization-time of flight (MALDI-TOF) mass spectrometry systems. Antimicrobial susceptibility testing (AST) was performed using the MicroScan Walkaway system (Beckman Coulter). The AST results were interpreted based on the CLSI guidelines [5]. Phylogenetic groups were determined by multiplex PCR using a combination of three genes (*chuA*, *yjaA*, and *TSPE4.C2*), as previously described; the isolates clustered into four main phylogenetic groups, A, B1, B2, and D [6]. All isolates were screened by PCR for sequence type 131 (ST131)-associated single-nucleotide polymorphisms (SNPs) in *mdh* and *gyrB* [7]. For detection of *pks* islands, we performed PCR for the *clbB* and *clbN* genes as colibactin system markers, as previously described [4].

isolates did not. These results suggest that the *pks* gene might not be associated with ST131 strains.

Our results describe the molecular characteristics of *E. coli* isolated from bloodstream infections in a Korean hospital. Approximately 54.1% of bacteremic *E. coli* isolates belonged to phylogenetic group B2. Of the group B2 isolates, 40.5% were ST131 strains and 32.9% carried *pks* islands.

Authors' Disclosures of Potential Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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