Carbapenem-resistant hypermucoviscous *Klebsiella pneumoniae*

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A carbapenem-resistant, hypermucoviscous *Klebsiella pneumoniae* (CR-HmKP) exhibiting colistin heteroresistance was isolated from a patient in the United States and reported from researchers of the Emory Antibiotic Resistance Center at the ASM Microbe, the annual meeting of the American Society for Microbiology, held from June 7th to 11th, 2018 in Atlanta, Georgia [1]. In the same conference, researchers of the University of Buenos Aires, reported KPC-2-producing CR-HmKP of the ST25 type, which is a hypermucoviscous/hypervirulent clone known to be associated with severe infections [2], as well as KPC-2-producing CR-HmKP isolates of the epidemic ST11 type were reported from the Hangzhou First People’s Hospital in China [3].

HmKP are characterized by an increased capsular polysaccharide (CPS) formation, causing resistance to phagocytosis and helping the dissemination to distant organs, with abscess formation at distant body sites. Hypermucoviscosity has been considered a marker of hypervirulence, especially for strains belonging to the capsular serotype K1 or K2, but also low-virulent HmKP strains have been described, likely due to mutations in two CPS regulator genes (rmpA and rmpA2). Most of the previously reported hypervirulent forms were largely antibiotic susceptible, however, a fatal outbreak of ST11 carbapenem-resistant hypervirulent *K. pneumoniae* occurred in 2016 in a Chinese hospital [3].

The US researchers assessed the presence of CR-HmKP by phenotypically screening the hypermucoviscosity of 255 isolates collected by the CDC’s Emerging Infections Program Multi-site Gram-negative Surveillance Initiative. They found one CR-HmKP strain, carrying the *blaKPC-3* carbapenemase gene. The isolate was susceptible to the last resort antibiotic colistin by standard diagnostic tests, but the population analysis profile (PAP) revealed that this CR-HmKP US isolate was heteroresistant to colistin [1]. Heteroresistance is manifested when a subpopulation of resistant bacteria is detected in an otherwise susceptible culture; heteroresistance may hamper the effectiveness of colistin treatment in patients [4].

Dissemination of highly resistant HmKP clones could mark a worrisome epidemiological change of health-care associated infections caused by carbapenem-resistant *K. pneumoniae* toward the establishment of these clones as major nosocomial pathogens.


Emergence of Hypermucoviscous ST25 and Epidemic Clone ST307. Abstract 7979, Session AAR Late-breakers, ASM Microbe 2018 7-11 June 2018 Atlanta, USA


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