

“ESKAPE”? No, “ESCAPE”!

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Abstract

The emergence of multidrug-resistant (MDR) bacterial has been accelerated by antibiotic misuse and weak infection control precautions. The most prevalent hospital-acquired infections are due to MDR pathogens. In order to highlight the importance of MDR bacteria in the hospitals, two Mnemonics, formerly “ESKAPE” which was transformed to “ESCAPE” were introduced by some experts in medical literature. These Mnemonics including the most common troublesome MDR pathogens in the hospitals responsible for significant morbidity and mortality.

Key words: Multidrug-resistant (MDR) bacteria, Hospital-acquired infection (HAI), “ESKAPE”, “ESCAPE”

Infections due to multidrug-resistant (MDR) bacteria are serious issues in hospital settings. (1) In 2013, the Centers for Disease Control and Prevention (CDC) released a report about the most concerning drug-resistant threats in the United States. (2) The most important pathogens in that list were involving in HAIs. Several reports by the Infectious Diseases Society of America (IDSA) also have promoted the significance of specific nosocomial MDR pathogens (3,4)

During recent years, a Mnemonic, “ESKAPE” introduced by some experts in medical literature. The “ESKAPE” is a Mnemonic consisting of names of six MDR bacterial pathogens including: Enterococcus faecium (vancomycin-resistant), Staphylococcus aureus (methicillin-resistant), Klebsiella pneumoniae (carbapenem-resistant), Acinetobacter baumannii (MDR), Pseudomonas aeruginosa (MDR), and Enterobacter spp. (carbapenem-resistant). (3) The “ESKAPE” group are responsible for majority of HAIs in the hospital wards, especially intensive care unit (ICU) and resists against most commonly used antibiotics through various mechanisms and cause significant infection-related morbidity and mortality. (5-9)

In 2017, the World Health Organization (WHO) provided a global “priority pathogen list” (PPL) of MDR bacteria in order to promote researches and create new effective antibiotics. The PPL categorized pathogens into 3 classes: priority 1 (Critical), priority 2 (High), and priority 3 (Medium). Again, four of the “ESKAPE” group pathogens ranked in the critical priority list and the other 2 pathogens the high priority list. (10)

In 2019, CDC issued the antibiotic resistance threats report. Two pathogens within the ESKAPE group, Carbapenem-resistant Acinetobacter (CRAB) and Carbapenem-resistant Enterobacteriaceae (CRE) are on the top five of the antibiotic resistant bacteria on the CDC’s 2019 urgent threat list, and the other four pathogens ranked on the serious threat list. (11)

The “ESKAPE” group pathogens show increasing resistance to most commonly used antibiotics such as penicillins, cephalosporines, quinolones, vancomycin and even carbapenems. Common mechanisms of their resistance include the production of enzymes (for example, β -lactamases), modification of the target sites, efflux pumps, and biofilm production. (12)

Over the years, some experts were facing with some changes in HAIs epidemiology, especially the increasing rate of clostridioides difficile infection (CDI) worldwide, so, they felt there is a need to change from the initial suggested Mnemonic “ESKAPE”, to new one, “ESCAPE”. The “ESCAPE” group is consisting of E. faecium, S. aureus, C. difficile, A.

baumannii, P. aeruginosa and Enterobacteriaceae spp. (13,14) This Mnemonic was proposed in order to promote the significance of CDI and subsequently merged K. pneumoniae and Enterobacter spp. with the other Enterobacteriaceae spp. (namely, Escherichia coli and Proteus spp.) The emergence of extended-spectrum β -lactamase-mediated and carbapenemase-mediated resistance in the family of Enterobacteriaceae makes a global threat in the field of HAIs as well. (14,15)

In conclusion, both the “ESKAPE” and “ESCAPE” Mnemonics are useful markers to bring attention on the most troublesome MDR bacterial pathogens that we are facing now worldwide.

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