



Prevalence and Risk Factors for Carbapenem Resistant and Extended Spectrum Beta-lactamase-producing Bacterial Acquisition in a Thai University Hospital Setting



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Background

- Carbapenem resistant (CR) and extended spectrum beta-lactamase (ESBL)-producing bacteria are major emerging pathogens in hospital-acquired infections.
- Surveillance and monitoring for prevalence of antimicrobial-resistant pathogens are one of important components of infection control efforts.
- We aimed to determine prevalence and risk factors for CR and ESBL-producing bacterial acquisition among patients who were admitted in the medical intensive care unit (ICU).

Materials and Methods

- A cross sectional study was conducted at a 1,200-bed medical school hospital, between November 2010 and April 2011
- Perianal swab cultures were performed in all patients who were admitted in the medical ICU.
- Additional cultures, such as tracheal suction, urine, and wound were performed in all patients with related medical devices/condition.
- Identification and susceptibility testing were performed using standard procedures following recommendations of the Clinical Laboratory Standards Institute (CLSI) 2012.
- Factors for CR and ESBL-producing bacterial acquisition were determined by logistic regression analysis.

Results

- 89 patients who were admitted in the ICU for more than 48 hours had surveillance culture performed.
- 44 (49.4%) patients were male, mean (SD) age was 60.9 (16.7) years, and 52.8% patients were hospitalization in another ward before ICU admission.
- 54 (60.7%) patients had positive culture results for CR or ESBL-producing bacteria (Table1).
- Characteristics of patients with and without CR or ESBL-producing bacterial acquisition were compared in Table 2.
- By multivariate analysis, only age (OR 3.03, >60 vs. <60 years; 95% CI 1.08-8.4, p=0.034) was an independent factor associated with CR or ESBL-producing bacterial acquisition.

Table 1. Distributions of positive culture for resistant pathogen

Organisms	N (%)
ESBL-producing <i>E. coli</i>	36 (66.7)
ESBL-producing <i>K. pneumoniae</i>	8 (14.8)
Carbapenem-resistant <i>A. baumannii</i>	16 (29.6)
Carbapenem-resistant <i>P. aeruginosa</i>	4 (7.4)
Other ESBL-producing Gram-negative bacteria	3 (5.6)
Mixed organism	10 (18.5)

Table 2. Demographic, clinical characteristics, and outcome

Characteristics	Negative culture (N=35)	Positive culture (N=54)	P-value
Male, n (%)	13 (37.4)	31 (57.4)	0.062
Mean (SD) age, years	59.8 (16.8)	61.6 (16.7)	0.632
Mean (SD) duration of hospitalization, days	3.6 (10.0)	8.6 (11.7)	0.010
Prior antibiotic use, n (%)	10 (28.6)	28 (51.8)	0.030
Mechanical ventilator, n (%)	2 (5.7)	14 (25.9)	0.015
Hemodialysis, n (%)	6 (17.1)	2 (3.7)	0.030
Neutropenia, n (%)	1 (2.9)	10 (18.5)	0.045
Mean (SD) APACHE II, score	26.2 (8.7)	26.3 (7.4)	0.960
Mortality, n (%)	11 (31.4)	25 (46.3)	0.163

Conclusions

- High prevalence of CR and ESBL-producing bacteria acquisition is determined in our ICU setting.
- Age is the only factor for CR or ESBL-producing bacterial acquisition.
- Regular surveillance and monitoring system for drug-resistant organisms, especially in ones with risk factors, may be crucial for controlling drug resistant problem.