Risk Factors of Vancomycin-resistant Enterococci at Tertiary Care Hospital in Northern Thailand: A Case-control Study

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Background: Vancomycin-resistant enterococci (VRE) are low virulence human flora with high-level resistance to vancomycin. Its prevalence increased rapidly in a tertiary care hospital including Faculty of Medicine Chiang Mai University.

Objectives: This study aimed to determine risk factors of VRE colonization/infection.

Methods: A case-control study was conducted at Faculty of Medicine, Chiang Mai University between January 2014 and June 2016. Two hundred and twenty-eight VRE cases were enrolled during the study period. A number of 232 controlled were randomly selected from 3,114 cases of vancomycin-sensitive enterococci (VSE).

Results: Of 228 patients, 121 patients were male (52.1%), with median age of 66 years (IQR 54, 79). The isolates were collected from urine (156 specimens, 68.4%), blood (13 specimens, 5.7%), sputum (1 specimen, 0.44%), pus (45 specimens, 19.7%), bile (5 specimens, 2.2%), and others sites (5 specimens, 2.2%). Factors independently associated with VRE infection/colonization included male (OR 1.87, 95% CI 1.12, 3.10), admission to the internal medicine units (OR 1.77, 95% CI 1.00, 3.12), pulmonary infection (OR 2.59, 95% CI 1.27, 5.26), anemia (OR 2.78, 95% CI 1.63, 4.17), as well as prior exposure within 90 days to meropenem (OR 1.93, 95% CI 1.08, 3.43), ertapenem (OR 9.75, 95% CI 2.04, 46.52), and vancomycin (OR 8.69, 95% CI 4.01, 18.83). Overall mortality was noted in 84 patients (36.8%) of the cases and 40 patients (17.2%) of the controls (p-value <0.001). Factors associated with death included previous hospitalization (OR 1.81, 95% CI 1.11, 2.94), prior antibiotic exposure (OR 3.38, 95% CI 1.52, 7.52), pulmonary infection (OR 2.30, 95% CI 1.29, 4.11), thrombocytopenia (OR 1.91, 95% CI 1.13, 3.24), and shock (OR 5.16, 95% CI 2.74, 9.71).

Conclusions: VRE compared with VSE increases mortality. Prior exposure to antibiotics results in higher risk of VRE colonization/infection. Antibiotic stewardship may decrease the risk of VRE through the prudent use of antibiotics, yet strongly recommended particularly in the tertiary care setting with heavy use of antibiotics.

Keywords: VRE, Drug resistance enterococci, Risk factor of drug resistance enterococci