Success and Unsuccess Stories of VRE Outbreak Management: An 8-year Experience in Tertiary Care Hospital

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Background: Vancomycin-resistant enterococci (VRE) infections result in increased mortality and cost of care. The long-term studies of VRE outbreak management are somewhat limited.

Objective: To describe the infection control measures for VRE outbreaks in a 2,100-bed tertiary care hospital in Thailand.

Methods: A retrospective study of VRE control was conducted during 2008-2015. The conventional VRE outbreak management included strict contact precautions for VRE patients, active surveillance culture, cohort ward/zone, chlorhexidine bathing, enhanced environmental cleaning, and electronic tagging of VRE status. All VRE isolates were confirmed by polymerase chain reaction (PCR) for van A and van B genes.

Results: VRE prevalence of *E. faecium* in our hospital slightly increased from 0% (2007) to 2% (2012) and rapidly increased from 5% to 17% during 2013-2015. There were 4 major VRE outbreaks in medical, surgical, and anesthesiology departments, including 6 critical care units and 13 multi-bed room wards. Among 3,571 active surveillance culture samples from 2,082 patients, 114 (5.5%) had van A VRE *faecium* and 75 (3.6%) had van B VRE *faecium*. During the first episode of van A VRE outbreak (February 2008, Department of Medicine; n=20), the conventional VRE management protocol and ward closures were unable to control the outbreak. After implementing universal contact precautions, the outbreak was terminated within 3 months (July 2008) and the VRE prevalence remained low for several years. By using the latest VRE outbreak protocol and ward closure, the second outbreak (May 2013, Department of Surgery and Anesthesiology; n=36) was subsequently terminated within 7 months. We were unable to control the third (June 2013, Department of Medicine; n=120) and fourth episodes of VRE outbreak (June 2014, Department of Surgery and Anesthesiology; n=14). This was possibly due to late polyclonal outbreak, unavailable critical care unit for non-VRE contact patients, and high VRE prevalence of referred patients from other hospitals.

Conclusion: Our data suggest that active surveillance culture during hospital outbreaks is not sensitive for VRE detection. Besides, conventional interventions, universal contact precautions and ward closures can effectively control VRE transmission. However, these measures may be impractical for widespread outbreak, especially in critical care units.

Keywords: Vancomycin-resistant enterococci, Outbreak management, Active surveillance, Universal contact precautions, Cohort ward, Critical care units