

## Optimization of intermittent vancomycin dosage regimens for Thai critically III population infected by MRSA in the era of the MIC Creep phenomenon

Eko Setiawan, author

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### Abstrak

**Background:** the shifting of minimum inhibitory concentration (MIC) of methicillin-resistant *Staphylococcus aureus* (MRSA) strains to the higher value has emerged to worsen clinical outcome to the patients particularly critically ill population. The aim of this study was to identify the most appropriate dosage regimen of vancomycin to treat infection caused by MRSA with higher MIC in critically ill Thai population.

**Methods:** 10,000 replications of intermittent vancomycin dosage regimens were performed using Monte Carlo simulation. Pharmacokinetic parameters were derived from a population pharmacokinetic study conducted specifically in Thai population. The probability of target attainment (PTA) and cumulative fraction of response (CFR) of each dosage regimen were calculated. Risk of nephrotoxicity was also calculated and used as a consideration in determining the most appropriate dosage regimen of vancomycin.

**Results:** in order to achieve desired PTA > 80% vancomycin at higher dosing regimens were needed including 3g/day and 4 g/day for MIC 1.5mg/L and 2.0 mg/L, respectively. Highest CFR of 94.40% and 93.57% were from vancomycin 1 g every 6 h and 2 g every 12h. Standard dose of vancomycin and total dose of vancomycin 3 g/day provided approximately 51% and 73% CFR. Risk of nephrotoxicity afforded by giving 1.5g every 12h and 2g every 12h of vancomycin were 26.59% and 31.20%, respectively.

**Conclusion:** the result from this study recommended intermittent dosage regimen 1.5g every 12h and 2g every 12h should be implemented as definite antibiotic treatment when considered infection caused by MRSA with MIC 1.5 and 2.0 mg/L, respectively.