

Abstract

Preliminary study to evaluate the trough vancomycin levels among patients who are on vancomycin for methicillin resistant *Staphylococcus aureus* infections and to determine minimum inhibitory concentrations of vancomycin in these MRSA isolates in selected hospitals

Introduction

Vancomycin is a first line antibiotic used to treat infections with methicillin-resistant *Staphylococcus aureus* (MRSA). To achieve the maximum benefit of the drug and to prevent the toxicity and resistance development, therapeutic drug monitoring is recommended where trough serum level is considered the best predictor of efficacy. For complicated infections with MRSA, a trough of 15-20 mg/L is recommended.

Objectives

To determine the trough serum levels and proportion of patients who achieved therapeutically adequate trough serum level of vancomycin and to determine the minimum inhibitory concentrations (MICs) of those MRSA isolates.

Methods

This study is a descriptive cross sectional study with non-probability sampling for four months duration starting from December 2017 at Teaching Hospital Karapitiya, Colombo South Teaching Hospital and Teaching Hospital Ratnapura. Trough serum vancomycin levels were measured immediately before the fourth dose using a chemiluminescent microparticle immunoassay at the Medical Research Institute-Colombo in patients who were on vancomycin empirically or as targeted therapy for MRSA infections. MIC of the MRSA isolates were determined using vancomycin E-strips.

Results

Out of the 39 patients who had complicated infections with MRSA, only 25.6% achieved a desirable trough level of 15-20 mg/L. Resistance driving trough levels were achieved by 23.1% and 38.5% had toxic trough levels. Out of the 18 patients who had non-complicated infections 44.5% achieved a desirable trough level of 10-20 mg/L. Resistance driving trough levels were achieved by 33.3% of the patients with non-complicated infections and 22.2% had toxic trough levels. Trough serum vancomycin levels showed a statistically significant negative correlation with creatinine clearance ($p = 0.000$) and a positive correlation with age ($p = 0.002$). All the 18 MRSA isolates were sensitive to vancomycin.

Conclusion

Trough serum vancomycin levels are frequently subtherapeutic even if the patients receive an adequate dose of vancomycin according to the body weight and serum creatinine. This possesses a threat of therapeutic failure, development of undesired effects of the drug and development of resistance to the drug.