Comparison of MicroScan System Prompt and Turbidity Methods for Measuring Vancomycin Minimum Inhibitory Concentration (MIC) against Methicillin-resistant Staphylococcus aureus (MRSA) with MIC of 2ug/ml, the Clinical Implications and Economic Impact of using Alternative Antimicrobial agents to Vancomycin for MRSA with possible MIC of 2ug/ml

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Abstract

MRSA continues to increase in overall prevalence with vancomycin remaining the mainstay of therapy for serious infections. Vancomycin MIC is a determining factor for antibiotics change and false high MIC results in more cost and potential for antibiotics resistance. A single-center, observational study included 21 MRSA cultures of sterile sites with vancomycin MIC of 2ug/ml by MicroScan Prompt method. MicroScan Turbidity and BMD method correlated with each other 100%. The effect of Vancomycin MIC 2ug/ml in tertiary care hospital on antibiotics change was observed. The average increase in cost was 16.2 times of the Vancomycin price. The MicroScan Turbidity method which costs the same as Prompt method is a better test to estimate the actual VancomycMIC and its results are almost comparable to the standard BMD method.

Introduction

Vancomycin remains the mainstay of therapy for invasive MRSA infections. IDSA guideline recommends an alternative antibiotic in patients with vancomycin MIC of 2ug/ml. There is considerable variability of MIC results depending on the method used. Usually Microscan Prompt method report MIC values higher than Broth Microdilution method (BMD) and this can lead to use of alternative antibiotics.

Methods

A single-center, observational study comparing MicroScan Prompt method versus MicroScan Turbidity method. We collected 21 MRSA isolates from sterile sites with vancomycin MIC of 2ug/ml measured by Prompt method. The accuracy of MIC was confirmed by repeating the Prompt method, recheck it with Turbidity method and compare it with CLSI standard Broth microdilution (BMD) method. In addition, we identified 56 patients over 9 months with invasive MRSA infections with vancomycin MIC of 2 measured by prompt method and its impact on prescribing alternative antibiotics with calculation of cost difference.

Results

21 vancomycin MRSA of 2 or more by MicroScan prompt method were further studied. By simply repeating the same prompt method only 52.2% were 2ug/ml (n=11 of 21). Turbidity method testing by MicroScan showed only 9.5% were 2ug/ml (n=2 of 21). Using CLSI standard BMD method only 9.5% were 2ug/ml (n=2 of 21). MicroScan Turbidity and BMD method correlated with each other 100% (n=21 of 21) (Fig 1).

Which mean using MicroScan Prompt method overcall vancomycin MIC in 90% of MRSA isolates. In view of these results, we collected further data of 56 patients with invasive MRSA infection and had MIC of 2, we noticed, 86% of the patients have their antibiotics changed due to MIC of 2(n= 48 of 56). Antibiotics were changed to Daptomycin (72.9%), Ceftaroline (18.7%), Clindamycin (4.1%), Linezolid (2%) and Telavancin (2%) (Fig 2). The prices of these antibiotics in comparison to Vancomycin in multiples of Vancomycin price are Daptomycin 27, Ceftaroline 11, Clindamycin 0.3, Linezolid 25 and Telavancin 18. The average increase in cost was 16.2 times of the Vancomycin price.

Conclusion

The MicroScan Turbidity is a cost effective method to measure vancomycin MIC and comparable to the standard BMD method. MicroScan Prompt method over calculates the vancomycin MIC results in overprescribing of alternative antimicrobial agents to vancomycin, increase the healthcare associated cost and risks increase of antimicrobial resistance which defies important goal in antimicrobial stewardship.

References


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