8 Years of Characteristics and Outcomes of Patients with MRSA Endocarditis Based on Vancomycin Minimum Inhibitory Concentration: Experience at a Tertiary Care Hospital

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Background

Vancomycin has been the mainstay of treatment for methicillin-resistant Staphylococcus aureus (MRSA) infective endocarditis (IE). MRSA reduced susceptibility to vancomycin is a growing threat. Data assessing the effect of vancomycin reduced susceptibility on outcomes of MRSA related IE is limited. Our study aimed to evaluate characteristics and outcomes of MRSA-related IE based on the minimum inhibitory concentration (MIC) to vancomycin

Methods

We conducted a retrospective cohort study at a tertiary care center. Records of hospitalized adults with a diagnosis of IE by ICD-9/ICD-10 CM codes were identified from 2011 to 2018. Patients with “definitive” or “possible” IE based on the modified Duke criteria were included.
51 patients had MRSA-related IE and were selected for the analysis. Demographic, microbiologic, Imaging and outcome variables were obtained. Characteristics and outcomes of patients with MRSA-related IE according to the MIC to vancomycin (≤ vs. > 1 mcg/mL) were compared. IRB approval was obtained.

Results

51 patients (20.9%) had IE due to MRSA, among which 18 (35.3%) had MRSA with a MIC to vancomycin > 1 mcg/mL. 59% were men and mean age was 46±3 years old. 65% of patients with MRSA-related IE acquired the infection through injection drug use. Only 3.9% of patients had prosthetic valve IE.

Table 1. Characteristics and outcomes of patients with MRSA-related endocarditis according to the minimal inhibitory concentration (MIC) to vancomycin

Variable	Vancomycin MIC ≤ 1 mcg/mL N=33 (65%)	Vancomycin MIC > 1 mcg/mL N=18 (35%)	P value
Mean age, years	48 ± 19	44 ± 19	0.49
Men, n (%)	20 (60.6)	10 (55.6)	0.73
Intravenous drug use, n (%)	21 (63.6)	12 (66.7)	0.83
Co-infections			
HIV, n (%)	4 (19.0)	0 (0.0)	0.14
HCV, n (%)	11 (68.8)	6 (54.5)	0.45
HBV, n (%)	0 (0.0)	1 (7.1)	0.19
Presence of vegetations			
Tricuspid valve, n (%)	10 (30.3)	8 (44.4)	0.31
Mitral valve, n (%)	8 (24.2)	5 (27.8)	0.78
Aortic valve, n (%)	9 (27.3)	2 (11.1)	0.18
Intra-cardiac complications			
Valvular abscess, n (%)	2 (6.1)	3 (16.7)	0.22
Valvular perforation, n (%)	1 (3.0)	2 (11.1)	0.24
Intra-cardiac fistula, n (%)	1 (3.0)	2 (11.1)	0.24
Presence of central venous catheters, n (%)	2 (6.1)	3 (16.7)	0.22
Port-A-Cath, n (%)	1 (3.0)	0 (0.0)	0.46
Tunneled catheter, n (%)	1 (3.0)	0 (0.0)	0.46
Peripherally inserted center catheter, n (%)	0 (0.0)	2 (11.1)	0.05
Cardiac surgery			
During index hospitalization, n (%)	5 (15.2)	2 (11.1)	0.69
Within 6 months, n (%)	4 (12.1)	2 (11.1)	0.92
Death			
During index hospitalization, n (%)	5 (15.2)	2 (11.1)	0.69
Within 90 days, n (%)	4 (12.5)	2 (11.1)	0.88

33.3% had positive serology for hepatitis C infection and 13% were HIV positive. 35.3% of patients had tricuspid valve vegetations, 25.5% had mitral valve vegetations, and 21.6% had aortic valve vegetations. Two patients had IE possibly related to a PICC-line infection; both patients had MIC to vancomycin >1 mcg/mL, suggestive of prolonged antibiotic therapy. All patients with MRSA-related IE were started empirically on vancomycin. Patients with a MIC to vancomycin > 1 mcg/mL were more likely to be switched to a combination of daptomycin and ceftaroline, compared to those with a MIC ≤ 1 mcg/mL (44.4% vs. 6.1%; P=0.001). Thirteen patients (25.4%) underwent valvular replacement within 6 months, 7 of which had the surgery during the index hospitalization. Six patients (12%) died within 90 days. MRSA-related IE with a MIC to vancomycin > 1mcg/mL did not confer and an increase risk in in-hospital mortality (11.1% vs. 15.2%; P=0.67) or mortality at 90 days (11.1% vs. 12.5%; P=0.89).

Conclusion

In this single-center experience conducted in a modern era, 35% of patients with MRSA-related IE had MIC>1 mcg/mL. Although this is an alarming finding, we didn’t find an increase in valvular surgery requirement or mortality among those with MIC > 1mcg/d as compared to those with a more sensitive MRSA strain. A study with more power or a meta-analysis will be required to better answer this question.

ABBREVIATIONS:

HIV, human immunodeficiency virus; HCV, hepatitis C virus; HBV, hepatitis B virus