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An Evaluation of Vancomycin Use in Patients with Urosepsis

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BACKGROUND AND OBJECTIVE

Urosepsis is an infection that originates from the urinary tract and accounts for 9% of all sepsis cases.[1] Pathogens commonly associated with urosepsis include *E. coli, Proteus spp., Enterobacter spp., Klebsiella spp., and P. aeruginosa*, and gram-positive bacteria (5% of cases). Sepsis treatment guidelines do not provide specific recommendations for the management of urosepsis; however, they state to utilize anti-MRSA agents, such as vancomycin, when risk factors for MRSA exist.[2] The prevalence of urosepsis caused by gram-positive organisms has been reported at low rates. The objective of this study is to evaluate how often vancomycin is used empirically in patients with urosepsis and the outcomes that are associated with its use.

DESIGN AND METHODS

Patients were identified if they had coded diagnoses for both urinary tract infection and sepsis, which was used to designated sepsis from a urinary source. Investigator utilized the electronic medical record (EMR) to retrospectively collect data on patients admitted from January 2018 to November 2019.

To assess the primary endpoint of AKI incidence, investigators utilized a chi-square test. AKI was defined as….

RESULTS

Baseline Characteristics

Characteristic	Vancomycin (n=145)	Comparator (n=102)	P-value
Age (years)	70.2 ± 15.0	72.1 ± 16.4	NS
Male	71 (49.0%)	33 (32.4%)	0.009
BMI (kg/m^2)	30.8 ± 8.8	31.0 ± 8.4	NS
ICU Admission	34 (23.6%)	17 (16.7%)	NS
Vital signs upon admission			
SBP	124.2 ± 28.4	131.4 ± 25.8	NS
HR	104.8 ± 20.7	98.0 ± 19.3	NS
RR	20.7 ± 5.0	19.6 ± 3.9	0.001

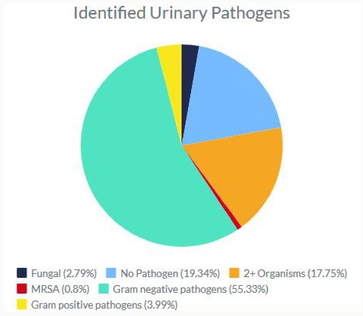
RESULTS

Baseline Characteristics	Vancomycin (n=145)	Comparator (n=102)	P-value
Laboratory values upon admission			
SCr	1.6 ± 1.9	1.6 ± 1.7	NS
WBC	15.1 ± 6.7	13.3 ± 6.4	NS
Lactic Acid	2.2 ± 1.4	2.0 ± 1.1	
Co-administered nephrotoxic medications			
Piperacillin-tazobactam	115 (79.3%)	61 (59.8%)	0.001
Other	54 (37.2%)	33 (32.4%)	
Comorbidities			
Diabetes	64 (44.1%)	42 (41.2%)	NS
CKD	36 (24.8%)	26 (25.5%)	NS
Heart failure	25 (17.2%)	22 (21.6%)	NS
Hypertension	108 (74.5%)	74 (72.5%)	NS
History of UTI	63 (43.4%)	44 (43.1%)	NS
ESRD	3 (2.1%)	1 (1.0%)	NS
Immunosuppressive Condition	11 (7.6%)	5 (4.9%)	NS
Immunosuppressive Medication	12 (8.3%)	3 (2.9%)	NS

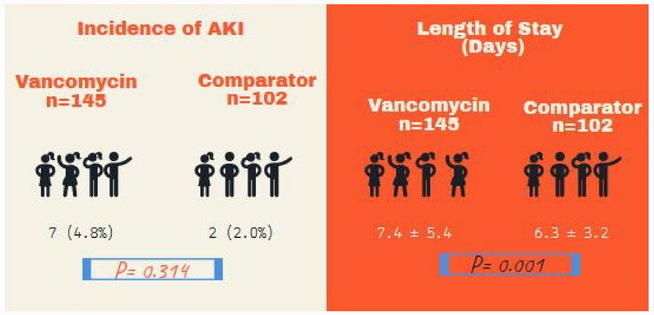
Vancomycin Dosing (n=145)

Dosing Parameter	Result
Loading dose, mg	2000 (1500-2500)
Loading dose, mg/kg	23.6 (20.6-25)
Total Dose, mg	2750 (2000-5000)
Duration of therapy, days	1 (1-3)

* Result presented as median (IQR).



RESULTS (continued)



DISCUSSION

- A small proportion of patients with urosepsis are found to have a gram-positive pathogen including MRSA
- The incidence of acute kidney injury was not higher in patients who received vancomycin for urosepsis, although the course of therapy was short in most patients
- In this analysis, two patients with MRSA as a urinary pathogen had risk factors for this pathogen which included presence of an indwelling urinary catheters, diabetes, history of UTI and antibiotic use and immunosuppression
- The use of vancomycin should be reserved for patients that present with risk factors for MRSA to provide pathogen-directed therapy and limit medication overuse
- It is likely that infectious sources other than UTI were suspected at the time of initial antibiotic ordering in which gram-positive coverage with vancomycin would likely be appropriate
- Avoidance of vancomycin in suspected urosepsis, when possible, may lead to lower drug costs and laboratory monitoring costs and future studies may wish to evaluate this potential cost-avoidance

CONCLUSION

MRSA is rarely identified as a pathogen in patients with urosepsis and empiric vancomycin is unnecessary in most cases. The use of vancomycin did not increase the risk of AKI in our study.

REFERENCES

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