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Appropriateness of Vancomycin Use and Associated Outcomes

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Summer Undergraduate Research Program

Background

- MRSA infections are associated with adverse outcomes.
- Despite vancomycin being the first line therapy in MRSA patients, there is substantial evidence for inappropriate use of vancomycin in hospitals in the range of 25-65%.
- Association of inappropriate use with patient outcomes such as mortality and length of stay have not been well examined.
- The objective of this study was to examine appropriateness of vancomycin use and outcomes based on IDSA guidelines.

Methods

- A retrospective study of adult patients who had received at least one dose of intravenous vancomycin in January 2019.
- Variables were age, gender, race, MRSA history, mortality, ICU admission, length of stay and vancomycin use, and indication.
- Any deviation from appropriate IDSA criteria of vancomycin use was considered inappropriate.
- Data was analyzed by chi-square test and t-test. A P-value of < 0.05 was considered significant.

IDSA Vancomycin Use Criteria

- Treatment of serious infections due to beta-lactam resistant gram-positive organisms.
- Treatment of gram-positive infections in beta-lactam allergy.
- Surgical prophylaxis in patients allergic to beta-lactam antibiotics.
- Empiric treatment of skin and soft tissue infections, severe sepsis, MRSA bacteremia/ infective endocarditis, severe pneumonia, MRSA osteomyelitis, septic arthritis, CNS infections.

Population Characteristics

Total number of encounters (n)	595
Age, years (Mean ± S.D.)	61.43 ±15.79
Gender	
Male (n, %)	313, 52.61%
Female (n, %)	282, 47.39%
Length of Stay, Days (Mean ± S.D.)	13.08± 19.46
ICU admission (n, %)	227, 38.15%
Mortality (n, %)	55, 9.24%
Total Vancomycin Use, Days	1697
Total Vancomycin Use, Days (Mean ± S.D.)	2.85 ± 2.73
Total Vancomycin Appropriate Days (n, %)	1246, 73.42%
Total Vancomycin Inappropriate Days (n, %)	451, 26.58%

Appropriate Use of Vancomycin

	Appropriate	Inappropriate
Total number of encounters (n, %)	391, 65.71%	204, 34.29%
Age (Mean ± S.D.)	61.37 ± 15.72	61.55 ± 15.95
Gender		
Male (n, %)	189, 48.34%	124, 60.78% **
Female (n, %)	202, 51.66%	80, 39.22%
Total Vancomycin Use, Days (Mean ± S.D.)	2.64 ±2.61	3.25 ± 2.91**
Total Appropriate Vancomycin Use, Days (Mean ± S.D.)	2.64 ±2.61	1.05 ± 1.58***
Total Inappropriate Vancomycin Use, Days (Mean ± S.D.)	---	2.20 ± 1.95

† Includes empiric use with de-escalation allowed 72h but overall inappropriate use.
** Denotes P value < 0.05

Associated Outcomes of Vancomycin Use

Outcome Measured	Appropriate Use	Inappropriate Use
Length of Stay, Days (Mean ± S.D.)	12.60 ± 18.23	14.01 ± 21.64
ICU admission (n, %)	162, 41.43%	66, 32.35%**
Mortality (n, %)	42, 10.74%	13, 6.37%

** Denotes P value < 0.05

Reasons for Appropriate Use

Reason for appropriate vancomycin use	Appropriate (n=391)
MRSA infections (n, %)	62, 15.86%
Beta lactam Allergy (n, %)	55, 14.67%
Surgical prophylaxis (n, %)	88, 22.51%
Empiric Use for Severe Infections (n, %)	186, 47.57%

Reasons for Inappropriate Use

Reason for inappropriate vancomycin use	Inappropriate (n=204)
Empiric Use without De-escalation (n, %)	66, 32.4%
Surgical Prophylaxis in absence of beta lactam allergy or MRSA (n, %)	85, 41.67%
Did not meet any criteria (n, %)	53, 25.98%

Conclusions

- The study reveals that there was inappropriate use in about **one-third** of all vancomycin use encounters.
- It also showed some outcomes such as **ICU admission** to be statistically significant between the groups.
- Common indications of inappropriate use were identified and will be used to target further interventions.

References

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