It Takes a Village: Reducing Empiric Vancomycin Use by Leveraging Primary Team Pharmacist Oversight of a 72-hour Approval Process

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Abstract *(revised)*

Background: Vancomycin is often initiated empirically in hospitalized patients for broad spectrum gram-positive coverage, however in many cases it is initiated unnecessarily and/or continued empirically for longer durations than necessary. Strategies to facilitate timely discontinuation of vancomycin when unnecessary may reduce antibiotic toxicity (e.g. nephrotoxicity) and the development of bacterial resistance. In large hospital systems, it may not be feasible for stewardship programs to implement preauthorization or prospective audit and feedback for all vancomycin orders. Novel strategies to enlist other clinicians to serve as stewards of antibiotic use are needed. On February 1, 2020, we implemented a protocol requiring providers to obtain approval from the primary team clinical pharmacist to continue empiric vancomycin regimens beyond 72 hours.

Methods: We evaluated the standardized antibiotic administration ratio (SAAR) for antibacterial agents for resistant gram-positive infections between February 1, 2019 to January 31, 2020 (pre-intervention) and February 1, 2020 to January 1, 2021 (post-intervention) to assess the impact of this intervention. Vancomycin utilization was also evaluated in days of therapy (DOT)/1000 patient days during both time periods.

Results: The SAAR for antibacterial agents for resistant gram-positive infections pre-intervention was 1.15 and 1.04 post-intervention, p-value <0.001 95% CI (0.88, 0.92). A significant reduction in SAAR was observed in patients admitted to the ICU and floor (Figure 1). Overall vancomycin utilization according to days of therapy/1000 patient days was reduced from 111.13 to 104.08 (p-value 0.11).

Conclusion: Leveraging the oversight of primary team clinical pharmacists proved to be an effective strategy to reduce empiric vancomycin durations of therapy. Following the implementation of a 72-hour approval protocol with primary team pharmacist oversight, we observed a significant reduction in the SAAR for antibacterials for resistant gram-positive infections with a corresponding reduction in vancomycin utilization.

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Background

- Vancomycin is commonly prescribed empirically for patients with severe infections to provide broad-spectrum gram-positive (GP) coverage, including methicillin resistant *Staphylococcus aureus* (MRSA).
- After 48-72 hours of empiric therapy, if MRSA or other resistant GP organisms are not isolated in culture, vancomycin should be discontinued in most cases.
- Strategies to facilitate timely discontinuation of vancomycin may reduce antibiotic toxicity (e.g. nephrotoxicity) and the development of bacterial resistance.
- We implemented a protocol requiring providers to obtain approval from the primary team clinical pharmacist to continue empiric vancomycin regimens >72 hours, with stewardship pharmacists available for case review as needed/requested.
  - In May 2019 we also implemented a 'pharmacist-to-order' MRSA nasal swab protocol for all patients initiated on anti-MRSA therapy

Methods

Study Design
- Retrospective, observational, single-center study
- Analysis period:
  - Pre-intervention: February 1, 2019 to January 31, 2020
  - Post-intervention (year 1): February 1, 2020 to January 31, 2021
  - Post-intervention (year 2): February 1, 2021 to January 31, 2022

Intervention:
- In order to continue vancomycin beyond 72 hours, providers were required to obtain approval from the clinical pharmacist assigned to their service
- If vancomycin was continued, a note was placed in chart outlining the indication for continuation of therapy
- Difficult cases or cases where the pharmacist and provider disagreed on need for continuation were reviewed by the antimicrobial stewardship pharmacist

Study Population
- Adult inpatients ≥ 18 years old

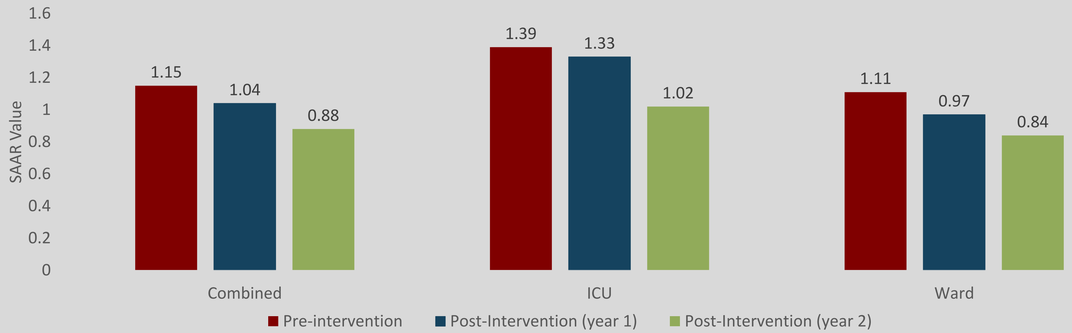
Primary Endpoint
- Standardized antibiotic administration ratio (SAAR) for antibacterial agents for resistant gram-positive infections
  - At UCM vancomycin is the primary antibiotic used for empiric coverage when resistant gram-positive organisms are a concern

Secondary Endpoints
- IV vancomycin utilization (DOT per 1,000 patient days)

Statistical Analysis
- The NHSN statistics calculator was utilized to assess differences in SAAR values
  - NHSN uses a Mid-p exact test (based on Poisson distribution) providing a 2-tailed p-value and 95% CI
- A two-sample t-test was performed to assess differences in antimicrobial utilization between pre- and post-intervention groups

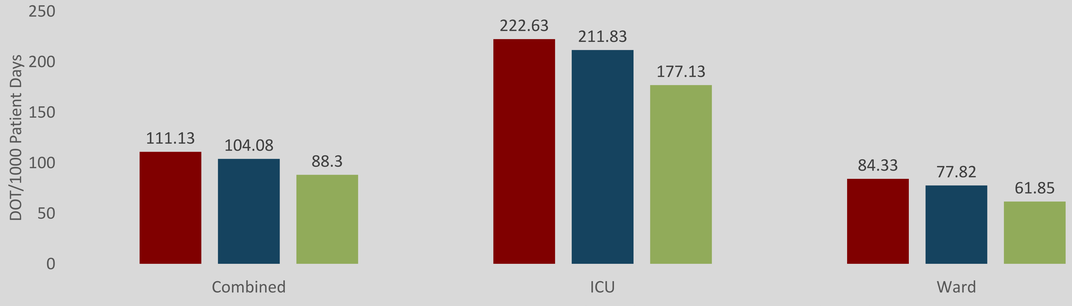
Results

Figure 1: SAAR Data - Agents for Resistant Gram-positive Infections



Pre-intervention SAAR data compared to post-intervention (year 1): Combined: p-value <0.001 95% CI (0.88, 0.92) | ICU: p-value 0.04 95% CI (0.916, 0.99) | Ward: p-value <0.001 95% CI (0.85, 0.89)
Pre-intervention SAAR data compared to post-intervention (year 2): Combined: p-value <0.001 95% CI (0.74, 0.77) | ICU: p-value 0<0.001 95% CI (0.70, 0.77) | Ward: p-value <0.001 95% CI (0.74, 0.77)

Figure 2: Overall Vancomycin Utilization



Pre-intervention vancomycin utilization data compared to post-intervention (year 1): Combined: p-value 0.11 | ICU: p-value 0.22 | Ward: p-value 0.02
Pre-intervention vancomycin utilization data compared to post-intervention (year 2): Combined: p-value <0.001 | ICU: p-value <0.001 | Ward: p-value <0.001

Conclusion

- Following implementation of an approval process for continuation of empiric vancomycin beyond 72 hours, driven by primary team clinical pharmacists, we observed a sustained reduction in the SAAR for antibiotics used for resistant GP infections (Figure 1) and in overall vancomycin utilization (Figure 2)
- The pharmacist-to-order MRSA swab protocol also likely contributed to the observed reduction in vancomycin use

Disclosure

The authors of this presentation have no financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation