Implementation and evaluation of a pharmacist-managed pediatric vancomycin protocol
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Background
The 2011 IDSA clinical practice guidelines for the treatment of MRSA infections in adults and children recommend targeting vancomycin trough concentrations between 15 and 20 μg/L for serious infections. Published literature lacks consensus on optimal dosing in pediatrics, such that achieving target trough concentrations in this population remain a challenge. At Boston Medical Center, 74% of pediatric patients did not achieve initial therapeutic troughs and 34% did not achieve therapeutic trough within 3 days in the past year. Pharmacy-managed vancomycin protocols have improved time to initial target vancomycin trough concentrations, decreased duration of vancomycin therapy, shortened time to clinical stability, and decreased length of hospital stay.

Aims
By September 1, 2017:

Primary Aims
• Increase percentage of initial therapeutic troughs from 26% to 60%
• Increase percentage of therapeutic troughs within 3 days from 66% to 90%

Secondary Aims
• Decrease incidence of supratherapeutic troughs from 9% to 5%
• Decrease incidence of vancomycin-associated nephrotoxicity from 5% to 0%

Methods
The Institute for Healthcare Improvement (IH) model was utilized to conduct this quality improvement initiative, testing change through Plan-Do-Study-Act (PDSA) cycles. Project met institutional criteria approval based on the quality initiative versus research checklist such that formal IRB review was not required.

Results
Patients achieving initial therapeutic trough

Patients achieving therapeutic troughs within 3 days

Supratherapeutic troughs

Vancomycin-associated nephrotoxicity

Appropriately drawn troughs

Provider adherence to protocol

Patient Trough Levels

Pre-implementation

Patients achieving initial therapeutic troughs

12 (25.5%)

Post-intervention

19 (47.5%)

Patients achieving therapeutic troughs within 3 days

4 (8.5%)

2 (5.3%)

90 (71.4%)

N/A

Provider adherence to protocol

40 (81.6%)

Discussion
Successful pharmacy-driven interventions:
• Higher initial starting doses, daily vancomycin monitoring, standardized dose adjustments in response to low troughs, appropriate timing of levels

Did we meet our aims?
• Increase percentage of initial therapeutic troughs from 26% to 60% %
• Not seeing full effects with short period of implementation %

Need for higher initial doses
• Increase percentage of therapeutic troughs within 3 days from 66% to 90%
• Decrease incidence of supratherapeutic troughs from 8% to 5%
• Decrease incidence of vancomycin-associated nephrotoxicity from 5% to 0% %

Study limitations:
• Variable documentation by nursing, extrapolation of levels using population kinetics (except for neonates), pre-steady state trough levels, did not exclude patients on concomitant nephrotoxins and/or pressors

Conclusions
• A pharmacy-driven quality improvement initiative increased both the percentage of patients achieving initial therapeutic troughs and percentage of therapeutic troughs within 3 days
• The implementation of a standardized pharmacy-driven protocol reduced inconsistent dosing practices
• Expansion to hospital-wide implementation will further evaluate the long-term effects of pharmacy-managed vancomycin in the pediatric population

Next Steps
• Hospital-wide implementation of pediatric vancomycin per pharmacy protocol

References

Disclosure
All authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.
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