CONTINUOUS INFUSION OF VANCOMYCIN IN CHILDREN WITH INVASIVE METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) INFECTION

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Background

- Despite the introduction of newer agents, vancomycin remains the atimicrobial of choice for invasive MRSA infections in children.
- A few studies have suggested potential pharmacokinetic advantages with administration of vancomycin by continuous infusion over intermittent dosing. However, reported experience with the use of continuous infusion of vancomycin (CIV) in the treatment of disseminated MRSA infections in children is limited.

Objective

- To demonstrate the successful use of CIV in pediatric patients with invasive MRSA infections.

Methods

Retrospective chart review was conducted in three pediatric patients with invasive MRSA infections presenting to Sanford Children's Hospital, Sioux Falls, SD between 1/1/14-7/1/15.

Chart review
- Patient demographics
- Clinical presentation
- Laboratory data
- Clinical diagnosis (defined by ICD-9)

Microsoft Excel spreadsheet (version 14.5.8) was used for data collection and analysis.

Results

Table 1. Clinical, laboratory, and pharmacokinetic characteristics

	Patient 1	Patient 2	Patient 3
Days on intermittent vancomycin before initiating continuous infusion vancomycin (CIV)	7 days	9 days	6 days
Days on CIV	9 days	6 days	13 days
Days to clearance of bacteremia after initiating CIV	2 days	1 day	4 days
Days to defervescence after CIV initiation	3 days	1 day	4 days
Range of vancomycin serum concentrations while on CIV (target 15-25 mcg/mL)	17.6-24.5 mcg/mL	12.6-18.1 mcg/mL	20.7-26.6 mcg/mL
Range of dosing on CIV (adjusted based on vancomycin levels)	45-55 mg/kg/day	41-56 mg/kg/day	16-40 mg/kg/day
Creatinine range during CIV (mg/dL) (0.2-0.8 mg/dL)	0.48-0.61	0.34-0.46	0.36-0.73
CRP on admission* (0-9.9 mg/L)	234.7 (day 1) >270 (day 2)	173.1 (day 1) >270 (day 3)	>270 (day 1)
CRP after CIV initiation	46.9 (7 days after CIV initiation)	40.8 (5 days after CIV initiation)	23.9 (11 days after CIV initiation)

*Upper limit of reporting CRP values per laboratory

- All of the children were diagnosed with MRSA bacteremia and septic shock (100%); 2/3 had pneumonia/pulmonary emboli; 3 had osteomyelitis.
- The children were aged between 2 and 15 years.
- All required ICU admission, mechanical ventilation and vasopressor support.
- CIV was initiated after lack of clinical improvement on intermittent vancomycin therapy, despite drainage of infectious foci as well as acceptable vancomycin MIC values (<1). The patients failed to achieve target trough serum concentrations on intermittent vancomycin dosing, despite frequent dose adjustments. CIV was initiated after a median of 7 days (range 6-9 days) of intermittent vancomycin.
- Desired serum concentrations were achieved within 24-48 hours after CIV initiation in all patients. Only 33% (6/18) of trough serum concentrations were in the targeted range (15-20 mcg/mL) on intermittent vancomycin compared to 82% (31/38) of random serum concentrations within the targeted range (15-25 mcg/mL) on CIV ($p<0.0007$).
- CIV was continued for a range of 6-13 days. The median duration for defervescence was 3 days (range 1-4 days) and for clearance of bacteremia was 2 days (range 1-4 days) after CIV initiation.
- CIV was not associated with any adverse effects.
- None of the children died.

Conclusion

- **This report provides evidence to support the use of vancomycin as the first line agent for invasive MRSA in children, with potential benefit of CIV in patients with vancomycin-susceptible MRSA isolates, unable to attain target serum concentrations on intermittent dosing.**

References

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