Improving Institutional Management of MSSA Infections in Children: A Quality Improvement Initiative

Amol Purandare, MD, Madan Kumar, DO, Rana Hamdy, MD
Children's National Medical Center, Division of Pediatric Infectious Diseases

Background

- *S. aureus* is a common cause of skin/soft tissue, musculoskeletal, and bloodstream infections in children, with methicillin susceptible *S. aureus* (MSSA) accounting for about 75% of cases in our institution.
- Antibiotic treatment of MSSA with anti-staphylococcal penicillins, cefazolin, and cephalexin is associated with improved outcomes compared with treatment with broader spectrum antibiotics such as vancomycin.[1,2]
- In our institution, *S. aureus* resistance to clindamycin has increased annually

Clindamycin susceptibility for MSSA at CNMC

Year	2014	2015	2016
Susceptibility	76%	74%	72%

Aim

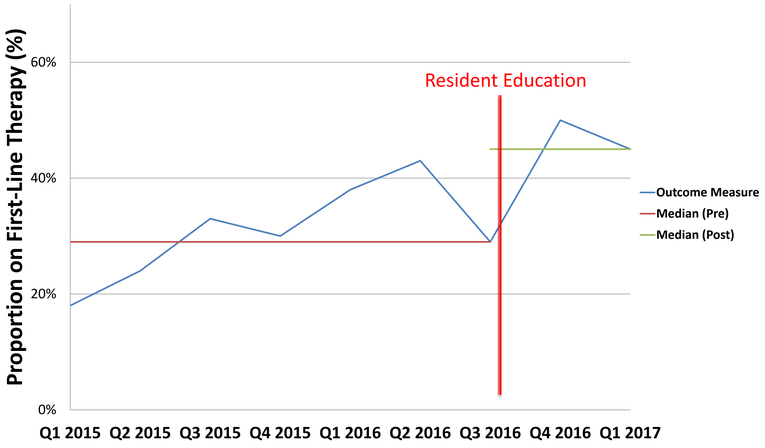
To increase the proportion of first-line therapy among children with MSSA infections at Children's National from 30% to 50% in 6 months.

Methods

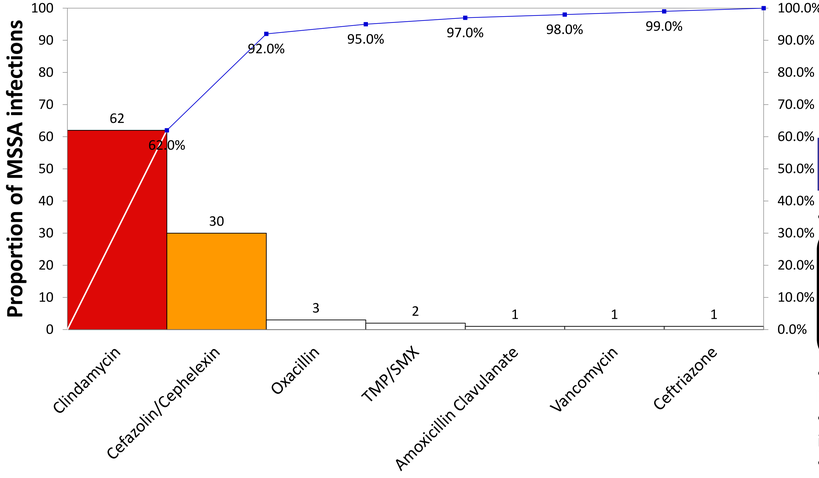
- Baseline antibiotic prescribing determined by chart reviews of all children with MSSA isolated from skin, wound, or blood cultures obtained from the Emergency Department and the inpatient setting between January 1, 2015 and March 31, 2017
- Patients undergoing therapy for additional infections and poly-microbial cultures were excluded
- Quality improvement intervention included bi-weekly ID teaching to resident teams during quarter 3 2016
  - Each resident ideally had 1 intervention
  - Format was interactive discussion on *S. aureus* osteomyelitis, skin/soft tissue, and blood stream infections with focus on empiric and targeted therapy
- Outcomes measured were proportion of patients prescribed first-line antibiotic therapy with and without infectious diseases consultation
- First-line therapy defined as treatment with cephalexin, cefazolin, oxacillin, or nafcillin

Results

Pre and Post Intervention Cases on First-Line Therapy

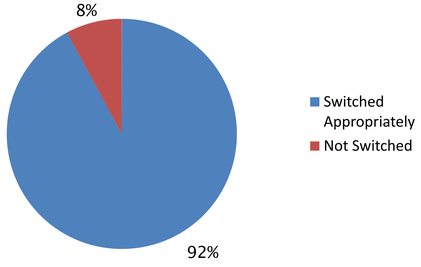


Pareto Chart: Proportion of MSSA Infections Treated With Each Antibiotic

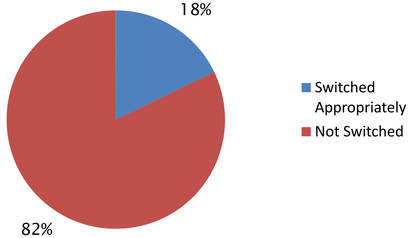


Proportion Switching to First-Line therapy for MSSA infections

Infectious Disease Consult



No Infectious Disease Consult



Results

- 464 episodes of MSSA infection met case criterion
- 33% of patients switched to first-line therapy, 62% remained on clindamycin,5% kept on other non-specific therapy
- First-line therapy over 7 pre-intervention quarters ranged between 18 and 43% (median: 29%)
- In post-intervention quarters appropriate prescribing ranged from 45 to 50% (median: 45%)
- 92% of cases with ID consult were switched to first-line therapy, vs. 18% of cases without ID consults

Next Interventions

- Addition to MSSA cultures in electronic health record

This isolate has been confirmed to be oxacillin susceptible (i.e. MSSA). If this is the only suspected bacterial pathogen, an anti-staphylococcal penicillin such as oxacillin, or (for non-CNS infections) a first generation cephalosporin such as cefazolin or cephalexin is recommended. Please call ID with questions

- Education to expand beyond residents to also reach Attending MDs, NPs, and PAs
- Skin and Soft Tissue Infections (SSTI) institutional guidelines implemented September 2017
- <u>Second Aim:</u> To increase proportion of MSSA infections treated with first-line therapy from 45% to 75% within 6 months

Conclusions

- In the absence of ID consultation, majority of MSSA isolates are treated with broader spectrum agents than necessary under current practice habits
- Medical staff education is a beneficial quality improvement focus to improve antimicrobial prescribing for MSSA infections

<u>References</u>

1. ML Schweizer et. al,Comparative effectiveness of nafcillin or cefazolin versus vancomycin in methicillin-susceptible *Staphylococcus aureus* bactermia. BMC Infect Dis. 2011; 11:279
2. JS McDanel et. al, Comparative effectiveness of beta-lactams versus vancomycin for treatment of methicillin-susceptible *Staphylococcus aureus* bloodstream infections among 122 hospitals. CID. 2015;61(3):361

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