Decreased Incidence of Methicillin-Susceptible \textit{Staphylococcus aureus} Infections After Implementation of Routine Surveillance and Decolonization in a Level IV Neonatal Intensive Care Unit

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\textbf{INTRODUCTION}

- \textit{Staphylococcus aureus} (SA)
  - Strains may be methicillin-resistant (MRSA) or methicillin-susceptible (MSSA)
  - 2\textsuperscript{nd} most common cause of healthcare associated infections and late-onset sepsis in NICUs
  - Responsible for significant morbidity & mortality in hospitalized neonates
- SA colonization is a key risk factor for SA infection
- Colonized infant 82 times more likely to become infected with SA than non-colonized infants
- Limited literature on targeted decolonization as method to decrease endemic MRSA disease
- Even less literature for MSSA

\textbf{OBJECTIVE}

- To evaluate the impact of routine SA (MSSA and MRSA) surveillance, decolonization with mupirocin and contact isolation precautions (MRSA-colonized neonates) on the incidence of clinical SA infections among NICUs

\textbf{METHODS}

\textbf{Study design:} Sequential time series
  - Pre-intervention Period: 01/2015-03/2017 (27 mos)
  - Wash-Out Period: 04/2017
  - Post-Intervention Period: 05/2017-07/2018 (15 mos)

\textbf{Population:}
- Neonates admitted to NICU with anticipated stay > 48h

\textbf{Intervention:}
- Neonates had single swab of nares, umbilicus and groin sent on weekly basis for SA surveillance culture
- Neonates with positive culture underwent decolonization with mupirocin application to nares, umbilicus and any abraded skin twice daily for five days
- MRSA-colonized neonates placed on contact precautions

\textbf{Outcome measures:}
- Comparison of rates of all clinical MSSA and MRSA infections and blood stream infections (BSI) per 1,000 hospital days during pre and post-intervention periods

\textbf{Comparator:}
- Change in rates of gram negative BSI
- Change in rates of SA BSIs in an affiliated NICU
- Same medical staff but with no intervention

\textbf{RESULTS - I}

- \textbf{MSSA}
  - Significant 89% reduction in MSSA BSI, \( p = 0.01 \)
  - Significant 73% reduction in all MSSA infection, \( p = 0.01 \)

\textbf{BURDEN OF MSSA IN NICU (DURING POST PERIOD)}

- 13.4\% (n=129) of 964 neonates were MSSA-colonized
- Median weekly prevalence of MSSA colonization was 7\%...
- Median length of stay after initial detection of MSSA colonization was 28 days...
- Interquartile Range: 4 – 52 days

\textbf{MUPIROCIN TREATMENT}

- Of MSSA colonized neonates, 94.8\% received mupirocin decolonizing treatment
- Median: 1 course of mupirocin per patient
- Range: 0.7 courses of mupirocin per patient
- Of 54 isolates acquired during post-intervention period > 100\% were mupirocin-susceptible

\textbf{MRSA}

- Outbreak of MRSA during latter part of pre-intervention period & throughout post-intervention period
- Clonal MRSA that was mupirocin-resistant
- Rate of MRSA blood stream infections (BSI): Changed from 0.223 to 0.206, \( p = 0.89 \)
- Rate of All MRSA infections: Changed from 0.273 to 0.371, \( p = 0.49 \)

\textbf{REFERENCES}


\textbf{CONCLUSIONS}

- No significant change in rate of gram negative BSI (\( p = 0.94 \))
- In the comparison NICU:
  - No significant change in rate of MSSA BSI (\( p = 0.24 \)) or MRSA BSI (\( p = 0.61 \))
- Limitations:
  - Potential confounding factor was effort of infection control measures implemented in response to MRSA cluster during the post-intervention period
  - Continued burden of incident MSSA colonization (ie, horizontal transmission) makes this less likely

- Supports the need for a multi-center randomized controlled trial evaluating decolonization for prevention of SA infections in NICUs