Clinical, Psycho-social and Cost Impacts of Performing Active Surveillance to Discontinue MRSA Contact Isolation for Patients Admitted to Medical-surgical Units

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INTRODUCTION

• Methicillin-resistant Staphylococcus aureus (MRSA) is a primary cause of hospital-acquired infections
• Contact isolation required for MRSA infection or colonization
• Cost burden for hospitals for isolation supplies
• Clinically and psychologically patients may suffer
• Ethical obligation to protect patient population without MRSA, while minimizing negative impacts on patients isolated due to MRSA
• Optimal duration of isolation unknown for those with remote MRSA+ cultures

STUDY AIMS:

• Investigates the impacts of active surveillance on known MRSA+ patients to discontinue contact isolation
• Percentage of patients successfully removed from isolation
• Patient survey regarding their experience in isolation
• Cost impact of screening

METHODS

Study Setting:

• 913-bed community-based academic tertiary care hospital in northern Delaware
• Implanted on 7 medical-surgical units
• Conducted Feb 2013-Mar 2014

Study Design:

• Mixed methods
• Retrospective evaluation
• Admitted patients with known MRSA+ status ≥1 year

Study approved by Christiana Care Institutional Review Board

Institutional Isolation Policy:

• Allows for screening of patients ≥1 year from last MRSA+ culture to remove isolation, but not consistently practiced due to multiple barriers:
  - MRSA history not readily available to clinicians caring for patients
  - MRSA+ list maintained in the Infection Prevention (IP) department
  - Staff often unaware of patient eligibility for screening
  - Two negative nares cultures required (CHROMagar®-used)
  - Unable to complete screening if MRSA+ antibiotics administered or if prompt discharge

Intervention Design:

• Collaboration between IP & unit-based bedside nurse, nurse educator, and physician to improve communication of MRSA+ status & eligibility for screening
• Nurse-driven protocol to order testing of nurses MRSA screening

Program Implementation:

• Staff training through web-based education and meetings
• Unit nurses admitted of MRSA+ patients to IP
• IP queried departmental MRSA database, identified patients eligible for screening and notified nursing to prompt screening

RESULTS

To date, 3 (2%) previously cleared patients have been readmitted with subsequent cultures growing MRSA, requiring re-isolation.

Cost Evaluation Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cost of unnecessary isolation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>Cost of equipment</td>
</tr>
<tr>
<td>$4.39</td>
<td>Cost of disposables</td>
</tr>
<tr>
<td>$16.84</td>
<td>Cost of disposable blood pressure cuff</td>
</tr>
<tr>
<td>$3.74</td>
<td>Cost of disposable thermometer</td>
</tr>
<tr>
<td>211</td>
<td># patients in unnecessary isolation over 9 months</td>
</tr>
<tr>
<td>$39,540.77</td>
<td>Total</td>
</tr>
</tbody>
</table>

Cost of protective clothing

- Cost of 1 gown:
  - $0.08
- Cost of 1 gloves:
  - $0.40
- Cost estimated no. of patients contacts per day:
  - 50
- Total cost of unnecessary isolation over 9 months:
  - $9,452.35

Cost of additional staff time required for patients in isolation

- Mean LOS of MRSA flagged patients:
  - 9 days
- Total cost of nursing time:
  - $108,940.08

Cost of additional housingkeeping

- Cost of changing staff for 30 min. to change curtain:
  - $7.50
- # unnecessarily isolated patients rooms in 9 months:
  - 130
- Total cost of laundering a single curtain:
  - $975
- Number of unnecessarily laundered curtains:
  - 130
- Total cost for nine months:
  - $81,700.06
- Total annual cost of unnecessary isolation:
  - $108,940.08

Cost of screening

<table>
<thead>
<tr>
<th>Swabs</th>
<th>Cost per swab</th>
</tr>
</thead>
<tbody>
<tr>
<td>$9.88</td>
<td>Number of swabs</td>
</tr>
<tr>
<td>500</td>
<td>Total cost of screening for nine months</td>
</tr>
<tr>
<td>$22,700</td>
<td>Total annual cost of screening</td>
</tr>
</tbody>
</table>

TOTAL COST IMPACT OF SCREENING PROGRAM FOR ONE YEAR ON SEVEN MEDICAL-SURGICAL UNITS

$101,230.21

CONCLUSIONS

• Eighty percent of patients with history of MRSA ≥1 year previously no longer MRSA+ in nine months
• Screening program targeting patients with remote history of MRSA who otherwise would be isolated improved patient outcomes and experience while reducing hospital costs
• Culture-based technology required 2 swabs, 24 hours apart, limiting ability to clear patients in timely manner
• Adoption in technology to PCR MRSA screening has allowed single swab and improved turn-around time to 4-6 hours for results and increased removal of MRSA isolation code, although at higher cost of future cost evaluation
• High rate of clearance indicates that significant opportunities still remain to improve patient experience and reduce costs

REFERENCES