Significant Reduction of Blood Culture Contamination in the Emergency Department (ED) Using the Steripath® Blood Diversion Device

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Background
• Contaminated blood cultures are a particular problem in Emergency Departments (EDs) and often lead to unnecessary antibiotic treatment.
• A potential approach to reduce blood culture contamination is to discard the initial aliquot of blood which is contaminated with skin plugs and bacteria.
• To test this approach, we performed a study using the Steripath® (SP) device (Magnolia Medical Technologies, WA) a pre-assembled, sterile blood culture system designed to divert the initial 1.5-2.0 mL of blood prior to bottle inoculation.

Methods
• This was a pre-post intervention study conducted in the ED at Rush University Medical Center, Chicago.
• During the pre-intervention phase (1 September to 30 November 2015), 2 sets of peripheral blood cultures were collected using standard aseptic technique by nurses in the ED. Skin antisepsis was performed with Chloraprep® and 5-10 mLs of blood was inoculated into BacT Alert FAN bottles (Biomerieux).
• During the intervention phase (1 February to 1 May 2016), blood cultures were collected using the SP device. All bottles were incubated for 5 days and rates of contamination were compared between the control and intervention periods.

Results
Control phase:
• There were 929 sets of blood cultures collected in the ED during the pre-intervention phase.
• A total of 40/929 sets (4.3%) from 36 patients were identified as contaminations. The list of blood culture contaminants are shown in Table 1
• 81 sets (8.7%) from 51 patients were identified as true bacteremia.

Intervention phase:
• During the intervention phase, 3/539 (0.6%) sets of blood cultures from 3 patients were contaminated (p<0.001).
• The 3 contaminants included: 1 CoNS, 1 alpha-hemolytic Streptococcus spp. and 1 Corynebacterium spp.
• 49 sets (from 35 patients) were identified as true bacteremia (9.1%).

Table 1 Blood culture contaminants during control and intervention phases.

<table>
<thead>
<tr>
<th></th>
<th>Control phase contaminants</th>
<th>Intervention phase contaminants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coag-neg Staphylococcus</td>
<td>29</td>
<td>1</td>
</tr>
<tr>
<td>Micrococcus</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Corynebacterium</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Viridans Streptococcus</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Bacillus non-anthrasis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E. faecium</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 1 Steripath® (SP) device, a pre-assembled, sterile blood culture system designed to divert the initial 1.5-2.0 mL of blood prior to bottle inoculation.

Figure 2 Comparison of the rates of true bacteremia and blood culture contamination during control and intervention phases.

Conclusion
• The use of the SP device in the ED over a 3-month period significantly reduced the rate of blood culture contamination from 4.3% to 0.6% while the rates of true bacteremia remain unchanged.
• The SP device represents a simple and effective method for reducing blood culture contamination.

References