Letter to the Editor

Further confirmation that spiking of intravenous bags does not cause time-dependent microbial contamination

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To the Editor—I read with interest the paper by Brock-Utne et al on the microbial stability of spiked bags of intravenous fluid without the use of International Standards Organization level 5 (ISO-5) conditions, in contradistinction to one interpretation of the requirements of United States Pharmacopeia (USP) Chapter 797. It was certainly encouraging to see that bags prepared in an ordinary anesthesia workroom did not show microbial contamination in their hands. I present here related data from a study in which anesthesia technicians prepared IV fluid bags either in the open anesthesia workroom or under an ISO-5 hood.

Methods

In this study, 1-L bags of lactated Ringer’s (N = 80) were spiked by anesthesia technicians with conventional intravenous tubing sets used in the operating suite. The anesthesia workroom was located in the semirestricted area of the suite, and accordingly, caps and masks were worn during bag preparation. Sterile gloves and gowns were not worn. In total, 40 bags were prepared in the open workroom, and 40 bags were prepared under an ISO-5 hood located in the workroom. Fluid was run through the tubing set, the roller clamp was actuated to stop flow, and the sterile end cap of the tubing set was replaced. Ten bags in each group were sampled at time zero (immediately after preparation), and at 1 hour, 12 hours, and 24 hours after preparation. Samples were obtained by removing the sterile end cap and extracting 5 mL into a sterile container, which was then drawn into a sterile syringe and injected into standard blood culture bottles for automated detection of microbial growth (VersaTREK, TREK Diagnostics, Cleveland, OH). Cultures were incubated for up to 5 days, and any detectable growth underwent Gram staining and subculturing to identify the organism. Each bag was sampled at only 1 time point to avoid contamination during the fluid extraction. Positive controls were samples deliberately contaminated with hand flora during sampling, and all demonstrated positive growth.

Results

The culture results are shown in Table 1 as the number of contaminated bags (n) divided by the total number of samples (N). One bag from each group was positive (P > .05). Both contaminants were normal, generally nonpathogenic contaminants—most likely skin flora.

<table>
<thead>
<tr>
<th>Time of Sampling (Preparation Time)</th>
<th>Control (Workroom)</th>
<th>ISO-5 Hood</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0/10</td>
<td>0/10</td>
</tr>
<tr>
<td>1h</td>
<td>1/10 Propionibacterium acnes</td>
<td>0/10</td>
</tr>
<tr>
<td>12h</td>
<td>0/10</td>
<td>0/10</td>
</tr>
<tr>
<td>24h</td>
<td>0/10</td>
<td>1/10 Coagulase negative Staphylococcus sp</td>
</tr>
</tbody>
</table>

Discussion

Our results are consistent with those of Brock-Utne et al in that contamination did not clearly vary with time since preparation and was rare overall. In addition, there was no discernable effect of using an ISO-5 hood on rates of contamination. Notably, the only contaminated bag in the control (workroom) condition was detected 1 hour after preparation, which would have been compatible with administration under USP 797 regulations. We detected a low but nonzero rate of contamination, in contrast to Brock-Utne et al, who found none. However, it is likely that the absolute concentration of bacteria was very low and probably not pathogenic. Other work from our department has demonstrated that contamination of anesthesia syringes is rare, and when it occurs it is of very low intensity, typically 100 colony-forming units (CFU)/mL (data not shown). This rate is at least several orders of magnitude less than that observed almost universally during dental procedures, which almost never produce clinically important bacteremia.

In summary, I agree that strict adherence to the 1-hour requirement in USP 797 regarding preparation of IV fluid infusion bags for anesthesia care is not supported by data demonstrating risk of bacterial infection. Furthermore, the use of laminar flow hoods does not appear to materially affect the rate of contamination.

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References