Operating Room Sterility: Is Falling Particulate Debris from Overhead Lights a Source of Contamination of the Operative Field?

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Disclosures

• Our disclosures are in the Final AOFAS Program Book.
• We have no potential conflicts with this presentation.
Introduction

Perioperative infection is a serious threat to patient safety.

Overhead light movement is a potential source of contamination of the operative field.

Purpose: to determine if overhead light movement leads to contamination of the sterile field from falling particulate debris.
Methods

Standard 150 mm blood agar plates were placed in different locations in the operating theatre for 60-minute trials periods. Several light movement patterns were examined in various trials. Lights moved utilizing a sterilized rod by a researcher gowned in sterile fashion.
Methods

Test plates → in the theoretical operative field
Controls → elsewhere in the operating theatre

Summary of experimental trials

<table>
<thead>
<tr>
<th>Trial</th>
<th>Plate E</th>
<th>Light movement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>covered</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>uncovered</td>
<td>None</td>
<td>Investigator away from field</td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>uncovered</td>
<td>Moderate q5 minutes</td>
<td></td>
</tr>
<tr>
<td>5 &amp; 6</td>
<td>uncovered</td>
<td>Moderate q1 minute</td>
<td></td>
</tr>
<tr>
<td>7 &amp; 8</td>
<td>uncovered</td>
<td>Aggressive q5 minutes</td>
<td></td>
</tr>
<tr>
<td>9, 10, 11</td>
<td>uncovered</td>
<td>None</td>
<td>Investigator next to field</td>
</tr>
<tr>
<td>12 &amp; 13</td>
<td>uncovered</td>
<td>Forceful contact q5 minutes</td>
<td></td>
</tr>
</tbody>
</table>
Methods

Culture and bacterial speciation performed

Sedimentation was analyzed by an infectious disease physician in a blinded fashion

Matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) was used to identify bacterial speciation.
Results

Moderate light movement q5min and forceful light contact q5min $\rightarrow$ no significant difference in bacterial colonies

Moderate light movement q1min $\rightarrow$ 2 more colonies on experimental plates

Aggressive light movement q5min $\rightarrow$ 4 more colonies on control plates
Results

Vast majority of isolates identified → coagulase negative Staphylococci

A greater number of CFUs were identified in some experimental groups, but results did not reach statistical significance (p > 0.20)

Lack of statistical significance likely secondary to the relatively small sample sizes in the subgroups
Conclusions

Moderate light movement q1min may lead to increased bacterial contamination of the operative field.

Moderate light movement q5min and forceful light contact at q5min did NOT lead to increased bacterial contamination.

Aggressive light movement q5min may lead to increased contamination away from the field.
Conclusions

Further investigation is required to determine if contamination of the sterile field by overhead light movement leads to clinical infection.

Thorough cleaning of overhead structures may help to reduce the burden of bacterial colonization on these surfaces.

References: