CHG Pre-operative Skin Bathing

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Cynosure Health
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Learning Objectives

- Describe the most common organisms associated with surgical site infections
- Discuss the goal of pre-operative skin cleansing
- Describe 2 challenges related to the effectiveness of chlorhexidine gluconate (CHG) pre-operative showers
Time for Sharing
Disclosures
SSI Impact

Burden-US
• ~300,000 SSIs/yr (17% of all HAI; second to UTI)
• 2%-5% of patients undergoing inpatient surgery

Mortality
• 3 % mortality
• 2-11 times higher risk of death
• 75% of deaths among patients with SSI are directly attributable to SSI

Morbidity
• long-term disabilities

SSI Impact

Length of Hospital Stay

• ~7-10 additional postoperative hospital days

Cost

• $3000-$29,000/SSI depending on procedure & pathogen
• Up to $10 billion annually
• Most estimates are based on inpatient costs at time of index operation and do not account for the additional costs of rehospitalization, post-discharge outpatient expenses, and long term disabilities

What do we know about skin?
Skin Flora 101

• Can never be sterilized
• At least 80% of resident and transient flora is found in the first 5 epidermal layers of the skin
• About 20% of skin flora remains on the skin even after antisepsis
• Bacterial re-growth begins immediately (back to original level by 24 hours)
Surgical Site Infections

- Most SSI’s result from colonization of the surgical site with patient’s own flora
- *Staphylococcus aureus* is the most common organism that causes SSI’s
## Organisms Causing SSI
### January 2006-October 2007

<table>
<thead>
<tr>
<th>Organism</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>30.0%</td>
</tr>
<tr>
<td>Coagulase-negative staphylococci</td>
<td>13.7%</td>
</tr>
<tr>
<td>Enterococcus spp.</td>
<td>11.2%</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>9.6%</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>5.6%</td>
</tr>
<tr>
<td>Enterobacter spp</td>
<td>4.2%</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td>3.0%</td>
</tr>
<tr>
<td>Candida spp.</td>
<td>2.0%</td>
</tr>
<tr>
<td><em>Klebsiella oxytoca</em></td>
<td>0.7%</td>
</tr>
<tr>
<td><em>Acinetobacter baumannii</em></td>
<td>0.6%</td>
</tr>
</tbody>
</table>

N=7,025

Hidron AI, et.al., Infect Control Hosp Epidemiol 2008;29:996-1011
Hidron AI et.al., Infect Control Hosp Epidemiol 2009;30:107–107(ERRATUM)
Goal of Pre-op Skin Cleansing

• Remove soil and transient microorganisms from skin
• Reduce resident microbial count to subpathogenic levels quickly with least amount of tissue irritation
• Inhibit rapid, rebound growth of microorganisms
Key Notes About CHG
What is So Great (or not) About CHG?

• >20 years ago we learned that bathing with CHG was more effective than povidone-iodine or antiseptic bar soap in reducing staphylococcal skin colonization

• Did not document reductions in SSI
CHG Tidbits

• It has been around for over 50 years
• It binds to the stratum corneum of the skin
• Is rapid, prolonged, persistent
• Target is the bacterial cell wall
• Is bactericidal, virucidal and fungicidal
• Is effective in the presence of protein (but less so)
• It is everywhere (skin antiseptics, surgical scrubs, bathing cloths, oral rinses, IV catheters, topical dressings, implantable surgical mesh)
More tidbits about CHG

• Not absorbable through intact adult skin
• Remains on the skin and is shed on the skin
• Reports of irritation are local and mild
  – Associated with misuse such as eye exposure, ingestion, enema, ear exposure
  – Skin must be DRY when applied and CHG must be allowed to dry
Effectiveness of CHG washes depends mainly on the residual antimicrobial effect, which is increasingly effective the more consecutive days it is used.

Compare 3 washes to 2 or 1.

Cochrane Meta-analysis: 2006

- 7 clinical trials (1983 – 2009)
- 10,157 patients (CHG v placebo v bar soap v no soap)
- Conclusion = preoperative bathing with CHG did **not** significantly reduce infection in clean surgical procedures (Class I)
However...

- Limitations of review was quality of some of the studies
- Lack of a standardized process for applying the skin antiseptic agent
- Studies had many limitations:
  - Variable SSI definitions and follow-up
  - No monitoring of compliance with CHG use
  - Most used only 1 or 2 applications of CHG soap
Recommendations

• AORN (2013)
  – CHG more effective than povidone-iodine or soap
  – More than one shower is necessary to achieve maximum antiseptic effectiveness

• HICPAC (1999)
  – Shower or bathe with an antiseptic agent at least the night before the operative day (category 1B)
Should we be afraid about resistance?

- 50 years of research and experience
- No evidence of resistance
- No case of a patient becoming resistant to the effects of CHG
- If is DOES happen, likely to be associated with inappropriate use
“to educate,”
Who are we serving?
Teach and Verify

**SURGERY PREPARATION CHECKLIST**

**UNIVERSITY JOINT REPLACEMENT CENTER**

NAME: ____________________________  DATE OF SURGERY: __________________________

Enter Dates, ✓ - Check circles to indicate Completed or Not Applicable.

<table>
<thead>
<tr>
<th>DATE</th>
<th>MUPIROCIN NASAL OINTMENT</th>
<th>BODY CLEANSING</th>
<th>Explain Non-Compliance with Mupirocin/Cleansing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 1</td>
<td>Morning ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evening ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>DAY 2</td>
<td>Morning ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evening ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>DAY 3</td>
<td>Morning ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evening ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>DAY 4</td>
<td>Morning ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evening ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>DAY 5</td>
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<tr>
<td></td>
<td>Evening ✓</td>
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</tr>
<tr>
<td>Surgery Day</td>
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<td>✓</td>
<td></td>
</tr>
<tr>
<td>DAY 6</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

PLEASE COMPLETE and BRING THIS CHECKLIST WITH YOU TO THE HOSPITAL to give to your nurse on the Joint Replacement Unit.

***** You will be notified if you need to use Mupirocin Nasal Ointment*****

Provided by: University of Tennessee Medical Center
Measures – What & How

Showered With CHG Soap
What is Everyone Doing?
Permission to Share Practices

• Main Line Health System, PA
• West Valley Medical Center, ID
• Vanderbilt Medical Center, TN
• Mercy Joint Replacement, AR
• University of Tennessee Medical Center, TN
Common Themes
Thoughts? Questions?
Thanks
My idea of a pre-surgical bath

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