Evidence-Based Practice Summary
Preoperative Bathing

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ASK THE QUESTION

Question 1: Does preoperative bathing or showering with chlorhexidine reduce the incidence of surgical site infections (SSIs)?

Objective: To review the literature about the prevention of nosocomial SSIs related to preoperative bathing or showering with antiseptics.

Background: Based on the Centers for Disease Control and Prevention (CDC)’s National Nosocomial Infections Surveillance (NNIS) system reports, SSIs are the third most frequently reported nosocomial infection, accounting for 14% to 16% of all nosocomial infections among hospitalized patients (Nfection et al., 1999). Preoperative bathing or showering with an antiseptic skin wash product is a well-accepted procedure for reducing skin bacteria (microflora). It is less clear whether reducing skin microflora leads to a lower incidence of surgical site infection (Webster & Osborne, 2012).

SEARCH FOR EVIDENCE

Search strategies included articles published in the English language, articles published in the last 10 many years, research-based articles, and hand searches of reference lists

Databases included PubMed MeSH Database, CINHAL

Key words/terms included chorhexidine; surgical wound infection; chlorhexidine; preoperative bathing; subheading-infection and control
CRITICALLY ANALYZE THE EVIDENCE

Question 1: Does preoperative bathing or showering with chlorhexidine reduce the incidence of surgical site infection (SSI)?

Grade Criteria: Preoperative bathing or showering with chlorhexidine should be considered in the prevention of SSI. Weak Recommendation, Low Quality Evidence.

Randomized controlled trials reviewed in the Cochrane Database were mixed, but largely report no statistical significance in preoperative bathing or showering with chlorhexidine versus other agents and no washing. There are individual study reports stating reductions in SSI rates using chlorhexidine for this intervention. There is evidence supporting reduced microbial colony counts on the skin and a documented reduction in other hospital acquired infections reported in the literature.

For the RCTs, there were 7 trials involving 10,157 participants for this review. Four of the trials had three comparison groups using chlorhexidine as the antiseptic agent for all trials. There is one pre and post intervention study which is not a RCT.

Three trials involving 7791 participants compared bathing with chlorhexidine versus placebo and did not result in a statistically significant reduction in SSIs.

Three trials involving 1443 participants comparing chlorhexidine with bar soap also did not result in any statistically significant reduction in SSIs.

Of the three trials with 1192 participants that compared chlorhexidine bathing with no washing, only one large study found a statistically significant reduction in SSIs using the antiseptic. The smaller studies in this group found no difference between the groups.

The pre and post-intervention study was a one hospital, quality improvement process, involving one surgical population only (orthopedic patients) undergoing total joint procedures, with 727 pre-intervention participants and 736 post-intervention participants.

The Hospital Infection Control Practices Advisory Committee (HICPAC) endorses the “Recommendations for Prevention of Surgical Site Infection”, which is part II of the CDC’s “Guideline for the Prevention of Surgical Site Infection, 1999”. When data from well-designed scientific studies are not possible, some recommendations in Part II are based on strong theoretical rationale and suggestive evidence in the absence of confirmatory scientific knowledge.

There should be more RCTs to gather definitive evidence in the role of chlorhexidine preoperative bathing or showering in the reduction of SSI.
**PICO Question #1**

**Does preoperative bathing or showering with chlorhexidine 4% reduce the incidence of surgical site infection (SSI)?**

<table>
<thead>
<tr>
<th>Author/Date</th>
<th>Purpose of Study</th>
<th>Study Design</th>
<th>Sample Size/Patient Population</th>
<th>Outcomes</th>
<th>Design Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webster J, Osborne S 2012</td>
<td>Review the evidence for preoperative bathing or showering with antiseptics for prevention of hospital acquired (nosocomial) surgical site infections (SSIs)</td>
<td>Cochrane Database of Systematic Review</td>
<td>10,157 participants 7 trials, 4 of which has 3 comparison groups children, men, women various elective surgeries</td>
<td>RR=0.91 (95% CI 0.8 to 1.04) With only high quality trials: RR=0.95 (95% CI 0.82 to 1.10) Shows no stat. significance SSI rates: chlorhex=9.1%, placebo=10.0%, chlorhex=3.3%, placebo=9.7%, RR=0.01.02 (95% CI 0.57 to 1.84) Shows no stat. significance SSI rates: (3 studies combined) Chlorhex=10.9%, bar soap=13.6% One large study: RR=0.36 (95% CI 0.17 to 0.79) Showed stat. significance Smaller trials found no stat. significance SSI rates: one large study Chlorhex=1.7%, no wash=4.6% SSI rates: smaller studies Chlorhex=37.5%, no wash=28% Chlorhex=0.2%, no wash=0%</td>
<td>Study Limitations = None Insufficient sample size Stopped early for benefit Lack of allocation concealment Selective reporting of measures Large losses to F/U</td>
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</tbody>
</table>

**Level of Evidence**

- **High**
- **Moderate**
- **Low**
- **Very Low**

**Lower Quality Rating if:**
- Studies inconsistent (When there are differences in the direction of effect, the size of the differences of effect, and the significance of the differences that cannot be reasonably explained)
- Studies are indirect (Your PICO question is quite different from the available evidence in regard to population, intervention, comparison, or outcome)
- Studies are imprecise (When studies include few patients and few events and thus have wide confidence intervals and the results are uncertain)
- Publication Bias (e.g. pharmaceutical company sponsors study on effectiveness of drug)

**Increase Quality Rating if:**
- Large Effect
To determine whether implementation of the 2% CHG no-rinse cloth in the preoperative preparation protocol would reduce the rate of SSI in orthopedic surgery patients

Pre and Post intervention study

A community acute care hospital for 1 year for all patients for orthopedic surgery for total joint procedures; 727 patients included in the 3-quarter pre-intervention period; 736 patients in the post-intervention period

Pre-intervention average SSI rates = 3.19%
Post-intervention average SSI rates = 1.59%
Represents a 50.16% difference in the rate of SSIs

Continued f/u monitoring for 3 months after completion of the study showed SSI rate = 1.1%, then 0.6%

Study Limitations =
- None
- Insufficient sample size
- Lack of blinding
- Stopped early for benefit
- Lack of allocation concealment
- Selective reporting of measures
- Large losses to F/U

**APPLY THE EVIDENCE**

- The results of the studies on the effectiveness of preoperative bathing or showering with chlorhexidine in reducing SSIs are mixed and mostly report no significant difference in SSI rates. There are non-RCTs that report reduced numbers of SSIs using chlorhexidine as their preoperative intervention. (Eiselt, 2009)
- The “Guideline for Prevention of Surgical Site Infection, 1999” presents the Centers for Disease Control and Prevention (CDC)’s recommendations for the prevention of SSIs. This important guideline references specific clinical studies which demonstrate and corroborate the fact that a preoperative antiseptic shower or bath does decrease skin microbial colony counts. However, it does state they have not definitively been shown to reduce SSI rates. They still include a Category IB recommendation for healthcare facilities to adopt, which is preoperative bathing or showering of patients with an antiseptic agent at least on the night before the operative day. (Nfection et al., 1999)
- We should continue with our current policy which endorses the use of chlorhexidine solution the night before and the morning of the operative procedure. We may consider the use of chlorhexidine 2% cloth wipes (no rinse) in place of the chlorhexidine 4 % solution (rinsed off) pending further review of this specific intervention.
- There should be more RCTs to gather definitive evidence in the role of chlorhexidine preoperative bathing or showering in the reduction of SSI.
REFERENCES


Webster, J., & Osborne, S. (2012). Preoperative bathing or showering with skin antiseptics to prevent surgical site infection (Review), (9).