Reducing the Risk of SSIs: Evaluating the Skin Antiseptic Using 4% Chlorhexidine Gluconate (CHG) Soap Versus 2% CHG-Impregnated Polyester Cloth

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INTRODUCTION

The preoperative antiseptic shower has been long considered an important strategy for reducing the risk of surgical site infection. The Centers for Disease Control and Prevention (CDC) through recommendations, guideline 36 that patients shower with an antiseptic agent prior to undergoing an elective surgical procedure. This practice has recently been called into question when it was determined that application of CHG-impregnated polyester cloths, shore therapy reduces the number of skin flora recovered in surface samples collected at the time of incision. However, a careful review of the analysis suggests several potential shortcomings with the sentinel studies cited by the Cochrane investigators. First, in the 6 studies cited in this analysis, no routine standard of practice was applied to skin washing and no clinical outcomes were assessed. Second, the testing was performed in a standardized duration of the antiseptic soap.

The surgical population was highly heterogeneous, encompassing patients undergoing elective clean, clean-contaminated and contaminated surgical procedures.

No single indication based upon review of the studies is to the level of patient compliance to the study protocols.

In an effort to improve standardization of the preoperative shower and/or validate patient compliance the present study compares skin surface concentrations of CHG achieved after showering with a 4% CHG cloth versus use of any CHG agent application, which has been shown in clinical trials to significantly reduce the microbial load on both the intended and adjacent skin surface. The present study was reviewed and approved by the Institutional Review Board (IRB).

MATERIALS AND METHODS

Recovery of Staphylococcal Skin-Surface Flora

The time of study enrollment, a moist swab was collected from the site and then evaluated. All staphylococcal isolates were identified according to standard protocols. The CHG minimal inhibitory concentration (MIC) for each isolate was determined according to Clinical Laboratory Standards Institute (CLSI) recommended broth susceptibility method.

Preliminary Pilot Study – 10 subjects were selected to participate in a small pilot study to assess the skin concentration of CHG post antiseptic shower. Specific instructions were given to the subjects as to subject participation. No routine standard of practice was applied to skin washing and no clinical outcomes were assessed.

Subjects were given a 4 ounce bottle of 4% chlorhexidine gluconate (CHG) antiseptic solution and were instructed to take a traditional preoperative shower with 4% CHG soap. The antiseptic soap in the morning. For the subjects who showered with 4% CHG in the morning. The study analysis was conducted using the MINITAB statistical software package.

RESULTS

A total of 70 subjects participated in the study (15 in group A, 20 in group B, 20 in group C, 15 in group D). Subjects were randomly assigned to one of the three standard skin antiseptic groups:

- Group 1A (4% CHG)
- Group 2A (2% CHG)
- Group 3A (2% CHG + 4% CHG)

Group 1A was an open label (4% CHG soap), Group 2A was a double blind and placebo (2% CHG cloth) control and Group 3A was the traditional 4% CHG preoperative shower.

Subjects who showered with 4% CHG in the morning. No significant difference was observed between the CHG groups for skin antiseptic concentration levels.

Subjects who showered with 4% CHG in the morning. The CHG skin surface concentration range: 75.2 to 200 ppm. The CHG skin surface concentration range: 6 to 89 ppm. The CHG skin surface concentration range: 75.2 to 200 ppm.

Table 1 reports the skin surface concentration range from 75.2 to 200 ppm. The CHG skin surface concentration range: 6 to 89 ppm. The CHG skin surface concentration range: 75.2 to 200 ppm.

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Figure 2 A comparison of the CHG skin surface concentration range: 6 to 89 ppm. The CHG skin surface concentration range: 75.2 to 200 ppm.

Figure 3 A comparison of the CHG skin surface concentration range: 6 to 89 ppm. The CHG skin surface concentration range: 75.2 to 200 ppm.

In the pilot study, the relative mean CHG concentrations in subjects who showered in the morning with 4% CHG are presented in Figure 1. The relative CHG concentrations ranged from 2% to 27 mg/liter. The CHG skin concentrations that were significantly higher (p<0.001) than observed in the 4% CHG arm of the study.

The antimicrobial activity of the 2% CHG impregnated cloth group was variable. The CHG skin concentrations in subjects who showered with the 4% CHG soap formulation, a greater relative mean CHG skin concentrations in subjects using the 2% CHG impregnated cloth ranged from 12 to 23 times higher than those in subjects who showered with the 4% CHG impregnated cloth. The CHG skin concentrations in subjects who showered with the 4% CHG soap formulation were significantly higher (p<0.001) than those observed in the 4% CHG arm of the study.

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REFERENCES

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