Evaluation of CHG Compatibility of Skin Care Products in an Ex Vivo Porcine Dermal Model

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Background

The use of preventative measures to reduce healthcare-associated infections, including the use of the antimicrobial chlorhexidine gluconate (CHG), is becoming more widespread. It is known that under certain circumstances, commonly used components of skin care products can reduce the antimicrobial effectiveness of CHG. Although review of ingredients has been recommended, this does not provide definitive guidance for the clinician. Therefore, an ex vivo porcine skin model was used at an independent microbiology laboratory to test the CHG compatibility of three skin care products using methods that simulated clinical usage while allowing assessment of CHG antimicrobial activity.

Methods

Skin model. Porcine skin was selected as a model for human skin, based on anatomical similarities. Pig dorsal skin was harvested post mortem and then disinfected with betadine. Full thickness, 2 cm diameter skin samples were cut and frozen at -20°C prior to the experiment, for which they were aseptically thawed and pre-warmed to 37°C.

Inoculum. Prior to the experiment, gram positive Staphylococcus epidermidis (CNS) and gram negative Pseudomonas aeruginosa (Pig isolate) were cultured separately and then combined to yield a Tryptic Soy Broth (TSB) suspension. On the morning of experiment, the organisms were diluted to a final density of approximately 10^7 colony forming units (CFU)/mL in Phosphate-buffered saline (PBS). An aliquot of the suspension was reserved to determine the initial number of colony forming units (CFU)/mL in Phosphate-buffered saline (PBS).

Methods (cont.)

Test & Control Articles.

- Restore DimethiCreme (Hollister Incorporated)
- Restore Skin Conditioning Crème (Hollister Incorporated)
- Restore Cleanser & Moisturizer (Hollister Incorporated)

Sterile PBS served as a negative control.

Study Design. For each experimental test article or control, 3 skin samples were used per treatment group.

1. Test articles Restore DimethiCreme, Skin Conditioning Crème, and control saline were rubbed into the skin surface in the control and treated samples at 24h.

Results & Conclusions

Initial inoculation levels. P. aeruginosa: 1.7 x 10^6 CFU/mL  S. epidermidis: 2.8 x 10^6 CFU/mL

Figure 1. Log CFU’s of Total Bacteria (TSB) of 4mm biopsies with 4 treatment types and CNS and P. ISO

Figure 2. Log CFU’s of S. epidermidis (MSA) and P. ISO (PIA) of 4mm biopsies with 4 treatment types

Figure 3. S. epidermidis & P. aeruginosa counts showed a lack of interference with the antimicrobial activity of 2% CHG.

The dimethicone cream, skin conditioning cream, & skin cleanser/moisturizer products in this in vitro study did not reduce the antimicrobial effectiveness of 2% CHG cloths.

References