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The in vitro antimicrobial activity of wound and skin cleansers at nontoxic concentrations

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Abstract

Objective: To determine in vitro antibacterial activity of commercially available skin, wound, and skin/wound cleansers at cell-safe (nontoxic) concentrations.

Design: Saline and 19 other commercial wound and skin cleansers were evaluated for cytotoxic effects on mouse dermal fibroblasts. Cells were exposed to serial 10-fold dilutions of each cleanser until treatment-induced cytotoxicity was comparable to the baseline cytotoxicity of unexposed control fibroblasts. Antimicrobial "time-kill" kinetics of these test concentrations of cleansers was tested against methicillin-resistant *Staphylococcus aureus*.

Results: The experimental design allowed calculation of relative cytotoxicity indexes ranging from 0 to 100,000. Shur-Clens Restore Wound Cleanser (ConvaTec, Skillman, New Jersey) and saline were found to be the least toxic (toxicity index: 0); Hibiclens (Mölnlycke Health Care, Norcross, Georgia), Restore Skin Cleanser (Hollister Inc, Libertyville, Illinois), and Betadine Surgical Scrub (Pursue Products LP, Stamford, Connecticut) were found to be the most toxic (toxicity index: 10,000). At noncytotoxic concentrations, NeutroPhase (NovaBay Pharmaceuticals Inc, Emeryville, California) was the most rapidly bactericidal, achieving a 4-log reduction in colony-forming units in less than 1 minute. Puracyn (Innovacyn Inc, Rialto, California) was next at 30 minutes, whereas most of the agents tested required more than 24 hours.

Conclusions: Wound healing depends on controlling bacterial balance while maintaining the viability of the healing tissues. In vitro toxicity indexes provide helpful guidelines subsequent to in vivo evaluations and clinical applications. The study findings suggest that NeutroPhase, in contrast with many commercially available wound cleansers, has rapid bactericidal activity at concentrations that

are safe for human cells.

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