PRE-OPERATIVE USE OF A CHLOROHEXIDINE-IMPREGNATED SPONGE REDUCES SKIN SOIL CONTAMINATION

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Purpose: Guidelines for the prevention of surgical site infection strongly recommend pre-operative bathing with antimicrobial soap. Although shown to reduce skin flora colony counts, its efficacy to reduce gross soil contamination of the skin remains unknown. We aimed to determine whether pre-operative cleansing with a chlorhexidine gluconate (CHG)-impregnated sponge reduces gross skin contamination compared with standard bathing alone.

Methods: Study subjects were consecutive patients undergoing elective knee surgery performed by a single, pediatric fellowship trained, orthopaedic surgeon. Subjects received a CHG-impregnated sponge with instructions to clean the entire operative extremity with special attention paid to the area about the knee immediately after completion of routine bathing the night before surgery. Immediately prior to sterile prep of the operative site, both knees were sampled with an alcohol-soaked gauze with the non-operative knee serving as a control. The samples were imaged using a flatbed scanner and the mean gray value (MGV) was quantified for the operative and control samples together with an unused gauze. The degree of contamination was defined as the MGV of each sample minus the MGV of the unused gauze. The degree of residual contamination was defined as the MGV ratio of the operative vs control samples. Additionally, samples were dichotomized by gender, age (greater versus less than 16 years old), and operative laterality. Results are presented as means ± standard deviations. Observed differences between cohorts were evaluated using Wilcoxon Signed-Rank and Rank-Sum tests with statistical significance set at the $p < 0.05$ level.

Results: Control and operative knees were sampled from 22 consecutive patients undergoing elective knee surgery. The subject population was 48% male and 16.1 ± 2.3 years old. The right knee was the surgical side for 48% of subjects. The degree of contamination was 3.3 ± 1.6 fold lower for the operative samples compared with the control side ($p < 0.001$). The degree of residual contamination was not measurably different between the surgical and the control side for subjects compared by gender, age, or laterality.

Conclusions: Cleansing with a CHG-impregnated sponge in addition to routine pre-operative bathing significantly reduces gross contamination at the surgical site. This correlates well with previously reported reductions in bacterial skin flora. Gender, age, and operative laterality do not impact the degree of residual contamination at the operative site.

Significance: This is the first study to demonstrate that cleansing with a CHG-impregnated sponge in addition to routine pre-operative bathing significantly reduces gross contamination at the surgical site.