1224. Factors Associated with Aerosolization of Gammaproteobacteria from Intensive Care Unit (ICU) Sinks in a Randomized Trial of Copper Alloy vs. Standard Chrome Sink Drains

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Background. Hospital wastewater environments are recognized as reservoirs for multi-drug-resistant bacteria, and sink drains in ICUs have been implicated in numerous outbreaks. The mechanism of pathogen transmission to patients, and the best approach to risk mitigation remains unclear. We tested a new copper alloy sink drain for its effect on detection of gammaproteobacteria in sink drains and adjacent aerosols.

Methods. We randomized 90 sinks in 76 ICU rooms/bedspaces in 7 ICUs to new standard chrome or copper alloy drains. We sampled sinks on 4 occasions over 4 months. Drain tailpieces were sampled using cotton swabs of 140 cm^2 of the interior surface, inserted into 1mL of Dey-Engley neutralizing broth, and cultured semi-quantitatively for gammaproteobacteria on Mac3CV. 850L samples of air adjacent to sinks were obtained by impaction onto Mac3CV. Faucet swabs were also cultured. Multivariable analysis adjusting for factors associated with growth in air and drains used conditional logistic regression, GEE with an exchangeable correlation matrix, a robust estimate of variance, negative binomial distribution and log link function.

Results. Gammaproteobacteria were detected in 247/424 (58%) tailpiece swabs, 137/456 (30%) air samples, and 31/456 (7%) faucet swabs. In multivariable analysis, growth was less likely from air adjacent to sinks with copper vs. chrome drains [IRR 0.50 (95% CI 0.35, 0.73), $P < 0.0001$], with reduced effect size observed when drain growth was included in the model [IRR 0.64 (95% CI 0.43, 0.94)], $P = 0.025$]. Growth in air was more likely when drain growth was 1–899 cfu/cm^2 [IRR 2.38 (95% CI 1.46, 3.88), $P = 0.001$] or ≥900 cfu/cm^2 [IRR 3.55 (95% CI 1.87, 6.86), $P < 0.001$] vs. no growth. Tailpiece swab growth was more likely if rooms were occupied compared with empty [IRR 1.85 (95% CI 1.25, 2.76), $P = 0.002$], and less likely from copper drains compared with swabs from chrome drains [IRR 0.51 (95% CI 0.47, 0.75), $P \leq 0.001$].

Conclusion. Sinks with new copper drains are less likely to have detectable gammaproteobacteria in adjacent air when compared with standard chrome drains, and results suggest this is mediated through reduced bacterial growth in the drains. Ongoing study is needed to determine whether this influences patient risk for hospital-acquired infection.

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1225. How Frequently Should Sink Drains Be Disinfected?

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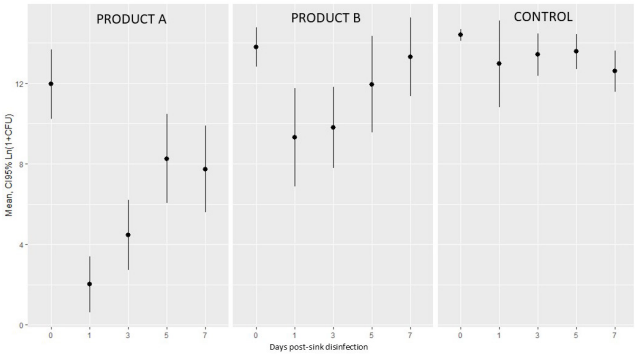
Background. New evidence shows the relevance of sink drains in the horizontal transmission of multidrug-resistant organisms. We recently demonstrated that a peroxide-based disinfectant (product B) was better than bleach at disinfecting sink drains; however, we did not determine the duration of this effect. In this study, we evaluate the duration of bacterial reduction in sink drains treated with product B and compared it to an enhanced hydrogen peroxide agent (product A).

Methods. Testing was performed in a 26-bed medical intensive care unit at a 566-bed tertiary care hospital in Milwaukee, WI. Two disinfectants were compared: product A (hydrogen peroxide, octanoic acid, and peroxyacetic acid; Virasept, Ecolab) and product B (hydrogen peroxide-based disinfectant; Peroxide Multi Surface Cleaner and Disinfectant, Ecolab). Sinks were randomly assigned to product A, product B, and control (no disinfection). On day 0, baseline cultures were obtained and disinfectant agents were applied. On post-intervention days 1, 3, 5, and, 7, samples from each drain were collected using E-swabs (Copan, Italy). Quantitation of Gram-negative burden was determined by serial dilution in saline plated to MacConkey agar and dilutions that contained 20–200 colonies were used for bacterial colony-forming units (CFU). ***Multivariate multiple linear regression and analysis of variance were used to compare mean Ln(1+CFU) between groups using R v3.***5.0. Environmental sampling, cultures, and statistical analyses were performed blinded to the disinfected used.

Results. All three groups had similar CFU counts at baseline ($P > 0.05$). On day 1, a statistically significant reduction in bacterial CFUs was observed in the group treated with product A compared with sinks treated with product B ($P = 0.04$) or the control group ($P < 0.01$). The same differences were observed on day 3 post-intervention. There were no significant reductions on days 5 and 7.

Conclusion. Product A was the most effective product at disinfecting sink drains but its effect disappeared at 5 days post-disinfection. These results suggest that treating sink drains every 5 days with a hydrogen peroxide mixture would be ideal for healthcare facilities dealing with sink drain contamination.



Disclosures. **All authors:** No reported disclosures.

1226. Application of a Foam Disinfectant Enhances Sink Drain Decontamination in Hospital Sinks

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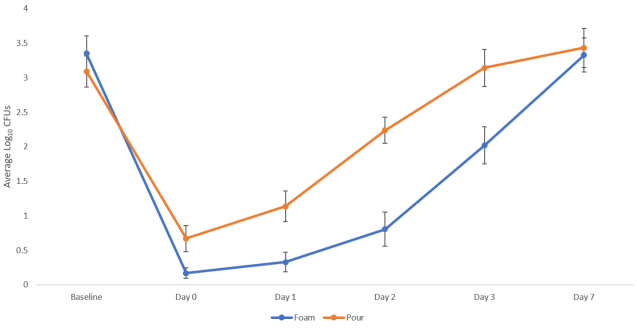
Background. Sink drainage systems are a potential reservoir for the dissemination of pathogens in healthcare facilities. Pouring of liquid disinfectants down drains may have limited efficacy due to inadequate contact time and suboptimal penetration into areas harboring biofilm-associated organisms. We hypothesized that a foam application of a disinfectant would enhance sink drain decontamination in comparison to pouring of the same disinfectant.

Methods. We compared the antimicrobial efficacy of 300 mL of a hydrogen peroxide-based liquid disinfectant applied to sink drainage systems ($N = 30$ sinks per treatment group) using a hand-pumped foaming device vs. poured down the drain. Swabs were used to collect quantitative cultures from the proximal sink drain to depth of 1 inch below the strainer before treatment and at 15 minutes and 1, 2, 3, and 7 days after treatment. We also investigated the efficacy of the foam when applied every 3 days for a 2-week period ($N = 10$ sinks).

Results. As shown in the figure, pouring the hydrogen peroxide-based disinfectant down the drain significantly reduced the bacterial load on day 0 and day 1, but the bioburden returned to baseline levels within 2 to 3 days. In comparison, the foaming application of the disinfectant resulted in significantly greater reductions in bacterial recovery on days 0, 1, 2, and 3 ($P < 0.01$). With repeated foam treatments every 3 days, there was a progressive decrease in the bacterial load recovered from sink drains. Application of the foam required ~3 minutes per sink.

Conclusion. An easy-to-use foaming application of a hydrogen peroxide-based disinfectant was effective in suppressing recolonization of the proximal drainage system of sinks for at least 3 days. Intermittent application of the foaming disinfectant could potentially reduce the risk for dissemination of pathogens from sink drains.

Figure. Effectiveness of sink drain decontamination with a hydrogen peroxide-based disinfectant poured as a liquid or applied as a foam



Disclosures. **All authors:** No reported disclosures.