Are sinks in the operating theatre clean?

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Background

A surgical site infection linked to *Serratia marcescens* (SM) occurred on September 23 following a hip arthroplasty. A retrospective review of the year revealed an additional six cases of post-operative healthcare-associated SM infections, with five of the seven cases diagnosed as surgical site infections (SSIs). Given the well-documented propensity of sinks to harbor Gram-negative bacteria (Chia et al., 2020; Ta et al., 2020), concerns arose regarding potential cross-transmission from these sources. Consequently, environmental samples were collected from sinks within the operating theatre (OT) where these patients underwent procedures.

Method

During environmental sampling, the team noted the thick layers of pink buildup covering the sink traps in the OT (Fig 1). Several interventions were then implemented to clean and disinfect all sinks within the OT. These measures included steaming via a hose introduced into the sink, followed by flushing the sink drainage with hot water for two minutes at 70°C, and then steaming for an additional minute at 90°C (Fig 2). The sink traps were replaced, and a daily regimen of pouring sodium hypochlorite 1000ppm was instituted. For sinks that still tested positive for SM following the initial disinfection, an additional step involving manual cleaning with alcohol-impregnated disinfectant wipes affixed to disposable bamboo sticks was implemented to clean the sink drain (Fig 3).

Fig 1. Pink buildup in sink traps

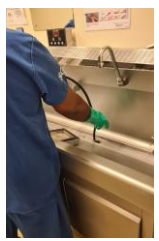

Fig 2. Steaming process

Fig 3. Manual cleaning

Results

Seven patients were identified to have post-operative healthcare-associated infections caused by SM, with six cases observed within the orthopedic discipline and one within the hand surgery discipline. Among these cases, five were SSIs as defined by the Centers for Disease Control and Prevention (CDC) National Health Safety Network (NHSN) 2024 criteria. Three cases were categorized as organ/space infections, while two cases were classified as superficial incisional surgical site infections.

Nine out of the 12 OTs where the patients underwent procedures yielded SM from environmental sampling. Twenty-two out of 169 samples (13%) collected from sink faucets, sink drains, and traps yielded SM; these were from 16 sinks. Following the implementation of interventions, re-sampling of the previously positive sinks took place two weeks later, resulting in the clearance of SM from six out of the nine affected operating theaters. Furthermore, manual cleaning of sink drains, coupled with steaming and replacement of sink traps, was conducted in three scrub sinks across three different OTs. Subsequent re-sampling of these sinks indicated the absence of SM. Lastly, the analysis of Whole Genome Sequencing (WGS) analysis showed that clinical isolates (n = 2) and environmental isolates (n = 22) were not genetically related.

Discussion

Surgeons were recommended to perform surgical hand rub instead of hand scrub prior to surgery and to exclusively don sterile gowns within the OT, instead of at the scrub room. This protocol aimed at mitigating any potential splash occurrences, thus preempting cross-contamination of sterile gowns. Additionally, a scheduled quarterly replacement of sink traps across all OTs in 2024 was implemented to effectively curtail biofilm formation. This underscores the paramount importance of upholding stringent hygiene standards within the OT environment to mitigate the risks for healthcare-associated infections. Given their pivotal role, sinks necessitate meticulous maintenance to minimize biofilm development and subsequent pathogen colonization. Furthermore, future OT designs may need careful consideration to be given to optimizing gowning areas to mitigate the risk of water splashing, thereby reducing the likelihood of sink-related cross-transmission events.

Conclusion

In summary, the critical importance of meticulous sink hygiene practices in safeguarding patient safety within the OT cannot be overstated. Through concerted collaborative efforts and the implementation of targeted interventions, healthcare facilities can significantly reduce the risks of sink-associated cross-transmission events, thereby bolstering overall infection prevention and control measures. Looking ahead, it is paramount that healthcare workers maintain sustained vigilance and proactively adopt measures to uphold the highest standards of hygiene and patient care.

References

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