Does pulsed-xenon ultraviolet disinfection add additional value to manual cleaning?


**Background**

- Novel disinfection tools have been used to supplement standard hospital cleaning protocols.
- This study was conducted to determine if the addition of Pulsed Xenon Ultraviolet disinfection (PX-UV) increased the effectiveness of manual cleaning with four different environmental cleaning and disinfecting agents and how their performance compared to the disinfection by sodium hypochlorite 10%.

**Methods**

- Research staff collected 600 pre-clean, post-clean, and post-clean + PX-UV environmental samples of aerobic bacterial colonies (ABC) and MRSA from five high touch surfaces (bedrail, call button, toilet seat, bathroom grab rail, tray table).
- The disinfectant cleaners used were: Sodium hypochlorite10% solution (SH) (Dispatch), Clorox Healthcare Services, Pleasanton, CA); hydrogen peroxide peracetic acid (HPA) (Oxycide), Ecolab, St. Paul, MN), quaternary ammonium compound (QAC) (Virex II 256®, Diversen Inc, Sturtevant, WI), and soap and detergent and water (DW) (Dawn Dish Soap®, Proctor & Gamble, Cincinnati, OH).
- The PX-UV device was used three times - one five minute cycle on each side of the patient bed and one five minute cycle in the restroom.

**Results**

- Wilcoxon signed-rank tests showed post-clean ABC counts were significantly different from post-clean ABC, post-clean + PX-UV clean counts for detergent and water (p<0.001), quaternary ammonium compound (p<0.001), and hydrogen peroxide with peracetic acid (p<0.001), but not for sodium hypochlorite 10% (p=0.78).
- A negative binomial mixed regression model showed that post-clean + PX-UV ABC counts for detergent and water were 8.6 times higher than post-clean ABC counts for sodium hypochlorite 10% solution, holding all other factors constant, p=0.001.
- Post-clean ABC counts for QAC + UV were 6 times higher than post-clean ABC counts for sodium hypochlorite 10% solution, holding all other factors constant, p=0.004.
- Post-clean ABC counts for hydrogen peroxide & peracetic acid + UV were not statistically significantly different from sodium hypochlorite 10% (p=0.18).
- A Kruskal-Wallis test indicated there was no statistically significant difference in MRSA counts between cleaning chemicals at post-clean (p=0.1563) or post-clean + UV (p=0.337), indicating that the cleaning chemicals performed equally well at each stage.
- Wilcoxon signed-rank tests showed that PX-UV further significantly lowered MRSA counts beyond the post-clean level only for the quaternary ammonium compound group (p=0.0073).

**Conclusion**

- The addition of PX-UV significantly improves disinfection of ABC beyond manual cleaning levels for detergent and water, hydrogen peroxide & peracetic acid, and quaternary ammonium compound, but not for sodium hypochlorite 10%.
- This improvement for DW and QAC does not bring microbial levels to those seen when using sodium hypochlorite 10% alone; however, hydrogen peroxide & peracetic acid + UV does have similar results as sodium hypochlorite 10% alone.
- PX-UV further lowered MRSA counts beyond the level seen after manual cleaning for the QAC group.

**References**

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