Evaluation of a New Point-of-Use Faucet Filter for Preventing Legionella and Total Bacterial Exposure

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INTRODUCTION & OBJECTIVES

Water is an important reservoir for opportunistic waterborne pathogens, such as Legionella and Pseudomonas. These bacteria may persist in water distribution systems despite municipal chlorination and secondary disinfection1-3. At even low levels these organisms may pose a threat to certain high-risk patient populations, including those in bone marrow transplant units, hematology/oncology units, or organ transplant units. Point-of-use (POU) filtration can prevent exposure to these organisms in high-risk areas of hospitals. A new POU filter was designed to extend the duration of use from 31 to 62 days and to minimize membrane clogging.

Objective: Provide an objective field evaluation of a new POU from 31 to 62 days and to minimize membrane clogging.

RESULTS

A total of 170 water samples were tested. The filters completely removed Legionella from all filtered samples for 12 weeks (84 days). One colony was recovered from one site at 13 weeks, however subsequent tests were negative through 17 weeks of testing. Control faucets had an average 292.4 CFU/mL of Legionella during the study, ranging from 1-10 CFU/mL to 1150 CFU/mL. This reduction in Legionella was statistically significant (p < 0.0001) (Figure 1, Table 1).

Total bacteria were completely removed for the first two weeks. Afterwards, there was an average of a 1.86 log reduction in total bacteria in the filtered samples compared to controls. The filters significantly reduced the amount of total bacteria in these water samples (p < 0.0001) (Table 1). Only three types of very thin gram negative rods were recovered from filtered samples. One was identified as Hydrogenophaga spp., which in a previous report was found to pass through 0.2 um filters and has not been linked to human disease. P. aeruginosa was not isolated from this water supply, so no conclusions can be made about the efficacy of these filters with respect to this organism.

Flow was evaluated at week 17 and found to be unrestricted (Figure 2).

CONCLUSION

Point of use faucet filters completely eliminated Legionella for 84 days. This exceeded the 62 days recommended by the manufacturer. We recommend following the manufacturer’s guidelines, however our results suggest that failures may not occur for some time beyond 62 days.

These filters will not exclude all bacteria. No plate count bacteria were isolated for two weeks followed by consistent recovery of Hydrogenophaga and two other bacterial species characterized as very thin gram negative rods and capable of passage through 0.2 micron filters.

New 62 day POU filter will require half the number of change-outs than 31 day filters and could be a cost effective method of preventing exposure to Legionella and other opportunistic waterborne pathogens in hospitals with high-risk patients.

METHODS

• Point-of-use faucet filters (QPPoint) (Pall Medical Corporation, Port Washington, NY) were installed on 5 faucets in a cancer center in NW Pennsylvania. Additionally 5 faucets without filters served as control sites.

• Prior to sampling, the faucets equipped with filters were wiped with an antiseptic wipe to remove surface bacteria.

• Approximately 250 mL of water was collected weekly. The hot water valve was turned on and flushed for 1 minute prior to sample collection. The study was conducted from May 8, 2013 through August 28, 2013.


• ANOVA was used to compare bacterial counts between filtered and non-filtered sites using Stata version 13.0.

• Flow was evaluated at week 17 and found to be unrestricted (Figure 2).

REFERENCES


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