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The cleaning and disinfecting of hemodialysis equipment using electrolyzed strong acid aqueous solution.

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Abstract

In general, sodium hypochlorite, formalin, and Dialox (Teijin Gambro Medical, Ltd., Tokyo, Japan [main ingredients: H2O2, CH3CHOOOH, CH3COOH, H2O]) are used to clean and disinfect hemodialysis pipelines. In this study, the suitability of electrolyzed strong acid aqueous solution (ESAAS), which has attracted considerable interest in Japan because of its strong disinfecting properties, was examined. The crossover method was used to investigate the effectiveness of ESAAS in disinfecting the dialysis pipelines in comparison to that of sodium hypochlorite (200 ppm) used alternately with 1% acetic acid. The number of bacteria and the concentration of endotoxin (Et) were measured over an approximately 3 year period, starting in September 1994. Until then, 200 ppm sodium hypochlorite had been used alternately with 1% acetic acid, and the contamination of the pipeline had been marked. However, after switching to the ESAAS disinfection method, the dialysis pipelines very rapidly became cleaner. Therefore, the decision to develop an automated ESAAS cleaning system for long-term use was made. During the development period, the original disinfectants (200 ppm sodium hypochlorite used alternately with 1% acetic acid) were used as a stopgap. After confirmation of its performance and safety, the automated ESAAS cleaning system was introduced. To find out whether the decrease in bacteria secondarily caused a decrease in the Et concentration or whether the ESAAS directly inactivated the Et, an in vitro experiment was carried out. Highly concentrated Et, which had been left in the reverse osmosis (RO) drainage pipeline, was used as a sample to investigate the effects of ESAAS on Et at various concentrations and temperatures and on the recovery test. The results showed that ESAAS directly inactivated Et. This paper reports the results of the crossover test. The results of parallel tests carried out over an approximately 4 year period have already been reported. No significant problems occurred in the dialysis. The automated ESAAS cleaning system that was developed proved to be more economical than the conventional disinfecting method.

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