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Improving Patient Safety by Improving Water Quality: A CQI Project Aimed at Reducing Positive Dialysate and Endotoxin Culture Rates

*E. James Ryan, BSN, RN, CDN, Hemodialysis Clinical Services Coordinator,
Lakeland Regional Medical Center, Lakeland, FL*

Problem: Infection is a leading cause of morbidity and mortality for End Stage Renal Disease (ESRD) patients on Hemodialysis (HD), and they have a decreased ability to mount an immune response to infection. A HD patient may be exposed to 90 to 192 liters of water per treatment. Therefore, this population is at risk due to the pathophysiology of ESRD and has an increased exposure to a possible source of bacteria and contaminants.

Purpose and Process: The purpose of this project was to reduce the number of positive dialysate and endotoxin cultures. An interdisciplinary Quality Assurance (QA) team studied the dialysate and endotoxin cultures drawn from 13 dialysis machines at an independently operated acute HD unit. Dialysate cultures were completed in the hospital microbiology lab using the spread plate technique employing Trypticase soy agar. Endotoxin cultures were sent to an independent laboratory for analysis. Interventions included purchasing new bicarbonate containers, storing minimal amounts of bicarbonate overnight, using each machine daily or as often as possible, connecting all HD machines to the main water loop during routine monthly disinfection, and having one dedicated person to draw cultures.

Results and Discussion: QA data from the 12 months prior to the study interventions showed a 35% positive dialysate culture rate (n=37) and 35% positive endotoxin culture rate (n=31). The 12 months following the interventions showed a 0% positive dialysate culture rate (n=24) and 0% positive endotoxin culture rate (n=26). Positive dialysate cultures were defined as greater than 50 CFU/mL and endotoxin cultures were considered positive if greater than 0.25 EU/mL.

Implications for Practice: The results of this study show that these interventions were highly successful at eliminating positive dialysate and endotoxin cultures for 12 consecutive months. These cost-effective strategies may be considered by any dialysis facility seeking to improve its water quality and boost patient safety.

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