

Mechanisms of hemolysis in patients undergoing hemodialysis			
Etiology	Mechanism of hemolysis	Location of defect	Indicators of contaminant
Sodium hypochlorite (bleach)	Oxidant red blood cell (RBC) injury	Inadequate rinsing during dialyzer reprocessing	Hemolytic anemia Heinz bodies Methemoglobinemia
Chloramine	Oxidant RBC injury	Activated charcoal filter (minimally removed by deionizers, but NOT by RO)	Hemolytic anemia Heinz bodies Methemoglobinemia
Copper	Oxidant RBC injury	Deionizer	Greenish hue to serum or plasma
Nitrate (common in contaminated well water)	Oxidant RBC injury	Water source	Black venous blood
Formaldehyde (seen with reuse dialyzers)	Inhibition of RBC glycolysis	Use of formaldehyde during sterilization of dialyzers	Anti-N-like cold agglutinins
Dialysate temperature >42°C	Thermal RBC injury	Temperature-sensing monitors	
Dialysate osmolarity	Osmolar trauma	Mixing error	
Tubing	Mechanical trauma	Kinked tubing	Schistocytes