

## Reduced hemodialysis-induced oxidative stress in end-stage renal disease patients by electrolyzed reduced water.

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**BACKGROUND:** Increased oxidative stress in end-stage renal disease (ESRD) patients may oxidize macromolecules and consequently lead to cardiovascular events during chronic hemodialysis. **Electrolyzed reduced water (ERW) with reactive oxygen species (ROS) scavenging ability may have a potential effect on reduction of hemodialysis-induced oxidative stress in ESRD patients.**

**METHODS:** We developed a chemiluminescence emission spectrum and high-performance liquid chromatography analysis to assess the effect of ERW replacement on plasma ROS (H<sub>2</sub>O<sub>2</sub> and HOCl) scavenging activity and oxidized lipid or protein production in ESRD patients undergoing hemodialysis. Oxidized markers, dityrosine, methylguanidine, and phosphatidylcholine hydroperoxide, and inflammatory markers, interleukin 6 (IL-6), and C-reactive protein (CRP) were determined.

**RESULTS:** Although hemodialysis efficiently removes dityrosine and creatinine, hemodialysis increased oxidative stress, including phosphatidylcholine hydroperoxide, and methylguanidine. Hemodialysis reduced the plasma ROS scavenging activity, as shown by the augmented reference H<sub>2</sub>O<sub>2</sub> and HOCl counts (Rh<sub>2</sub>o<sub>2</sub> and Rhocl, respectively) and decreased antioxidative activity (expressed as total antioxidant status in this study). ERW administration diminished hemodialysis-enhanced Rh<sub>2</sub>o<sub>2</sub> and Rhocl, minimized oxidized and inflammatory markers (CRP and IL-6), and partly restored total antioxidant status during 1-month treatment. **CONCLUSION:** This study demonstrates that hemodialysis with ERW administration may efficiently increase the H<sub>2</sub>O<sub>2</sub>- and HOCl-dependent antioxidant defense and reduce H<sub>2</sub>O<sub>2</sub>- and HOCl-induced oxidative stress.