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Effect of a hydrogen (H₂)-enriched solution on the albumin redox of hemodialysis patients

Elevated oxidative stress (OS) is associated with severe cardiovascular disease and premature death among patients treated with hemodialysis (HD). Oxidative stress is enhanced by contact between blood and dialysis membranes during HD sessions. This study aimed to clarify whether hydrogen (H₂), which is a known antioxidant, is capable of suppressing increased OS induced during HD sessions. Eight patients on regular HD treatment were studied. Two HD sessions were performed in a cross-over design trial using standard and hydrogen-enriched solutions (mean of 50 p.p.b. H₂; H₂-HD). Blood samples were obtained from the inlet and outlet of the dialyzer during HD to determine changes in plasma levels of glutathione, hydrogen peroxide, and albumin redox state as a marker of OS. Comparison of inlet and outlet blood revealed significant decreases in total glutathione and reduced glutathione, as well as significant increases in hydrogen peroxide in both HD treatments. However, the mean proportion of reversibly oxidized albumin in outlet serum was significantly lower than that in inlet serum following the H₂-HD session, whereas no significant changes were found in the standard solution session, suggesting that "intra-dialyzer" OS is reduced by H₂-HD. In conclusion, the application of H₂-enriched solutions could ameliorate OS during HD.

Related Information

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