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Original Paper

Ultrapure Dialysate Reduces Plasma Levels of β_2 -Microglobulin and Pentosidine in Hemodialysis Patients

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Key Words

- Dialysate purity
 - β_2 -Microglobulin
 - Chronic inflammation
 - Pentosidine
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Abstract

Background: β_2 -Microglobulin (β_2 MG) and carbonyl stress are reported to contribute to the development of dialysis-related amyloidosis. The aim of this study was to determine whether the purity of dialysate affects plasma levels of β_2 MG and pentosidine (a surrogate marker of carbonyl stress) in hemodialysis patients.

Methods: Sixteen patients on hemodialysis with a polysulfone membrane participated in this study. We switched the dialysate from conventional dialysate (endotoxin level 0.055-0.066 endotoxin units (EU)/ml) to ultrapure dialysate (endotoxin level <0.001 EU/ml), followed patients for 6 months, and then switched back to conventional dialysate once again. Plasma levels of β_2 MG, pentosidine, CRP and interleukin-6 (IL-6) were determined before the switch to ultrapure dialysate, 1 and 6 months after the switch to ultrapure dialysate, and 1 month after the switch back to conventional dialysate.

Results: The switch from conventional to ultrapure dialysate significantly decreased plasma levels of β_2 MG, from 30.1 ± 1.4 to 27.1 ± 1.4 mg/dl ($p < 0.05$) and pentosidine, from $1,535.8 \pm 107.5$ to $1,267.6 \pm 102.9$ nmol/l ($p < 0.01$) after 1 month of use. The change of dialysate also significantly decreased plasma levels of CRP, from 0.28 ± 0.09 to 0.14 ± 0.05 mg/dl ($p < 0.05$) and IL-6, from 9.4 ± 2.7 to 3.5 ± 0.8 pg/ml ($p < 0.01$) over the 1-month period. These changes in plasma levels of β_2 MG, pentosidine, CRP and IL-6 were maintained over 6 months after switching to ultrapure dialysate and returned to basal levels by switching back to a conventional dialysate.

Conclusions: **Ultrapure dialysate decreases plasma levels of β_2 MG, pentosidine and inflammatory markers in hemodialysis patients. The use of ultrapure dialysate might be useful in preventing and/or treating complications of dialysis, such as dialysis-related amyloidosis, atherosclerosis and malnutrition.**