

Association of oxidative and carbonyl stresses with cardiovascular events in patients on maintenance hemodialysis

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Hemodialysis (HD) patients are highly susceptible to cardiovascular diseases. Although many factors have been known to be associated with cardiovascular diseases in HD patients, oxidative and carbonyl stresses might play an important role for progression of cardiovascular diseases. We investigated the association between oxidative or carbonyl stresses and cardiovascular complications in patients undergoing HD in Iwata City Hospital. Of the 107 HD patients, 23 patients (21.4%) suffered from cardiovascular events during 36 months of follow-up. These patients had significantly higher plasma advanced oxidation protein product (AOPP) concentration (58.6 ± 4.5 vs 48.7 ± 1.8 $\mu\text{M}/\text{alb}$, $p < 0.05$) and plasma pentosidine level (45.6 ± 2.9 vs 30.7 ± 1.5 $\text{pmol}/\text{mg alb}$, $p < 0.01$) than HD patients without cardiovascular events. However, there was no difference in plasma oxygen radical absorbance capacity (ORAC) between both groups. When the patients were classified into 2 groups according to the plasma pentosidine level of 35 $\text{pmol}/\text{mg alb}$, there was a significant difference in the cumulative event-free rate between the high and low pentosidine groups by a Kaplan-Meier survival analysis (log-rank test, $p < 0.001$). A Cox proportional hazard model showed that age, duration of dialysis, hemoglobin, total cholesterol, pentosidine were significantly associated with the event-free rate, and both AOPP and ORAC had also weak associations with the event-free rate. These results suggest that the suppression of oxidative and carbonyl stresses is important for preventing cardiovascular diseases in HD patients.