Regional Differences in End-Stage Renal Disease and Amount of Salt Intake in Japan

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Summary

We recently showed regional differences in the incidence of end-stage renal disease (ESRD) within Japan which is generally ethnically homogenous, suggesting that factors other than genetic may contribute to the difference. Here, we examined regional differences in the amounts of dietary nutrient intake, especially protein and salt, in our search for an explanation.

Annually, the Japanese Society for Dialysis Therapy reports the numbers of patients entering maintenance dialysis in each prefecture of Japan. We used the findings for 1984 to 1998 to calculate the annual ESRD incidence and the increasing rate of ESRD in each of 12 regions of Japan. Then, the regional differences were analyzed in relation to the amounts of nutrient intake reported annually by National Nutrition Survey in corresponding regions for these 15 years. As in our 1982-1998 study, there were marked regional differences in both annual ESRD incidence and increasing rate of ESRD ($p<0.0001$; one-way repeated-measures ANOVA). We also found regional differences in dietary intake of each nutrient ($p<0.0001$). The annual ESRD incidence was negatively correlated with energy intake mainly due to carbohydrate ($r=-0.5$, $F=61$, $n=180$), while positively correlated with both protein (protein/energy: $r=0.3$, $F=17$) and salt (salt/energy: $r=0.1$, $F=5$) intakes. The increasing rate of ESRD was negatively correlated with energy intake ($r=-1.5$, $F=17$, $n=12$), while positively correlated with protein intake ($r=1.0$, $F=8$).

The present study, relating regional differences between ESRD dynamics and the amounts of nutrient intake in a nation wide population of Japan, on a macro level revealed the renal protective effects of dietary restriction of both protein and salt, suggested by animal models of progressive nephropathies but yet unproved by large-scale clinical trials.