

## Dietary education may reduce blood Cd and Hg levels in CKD patients with higher Cd and Hg levels

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**Background/Aims:** Heavy metals are widely distributed in the environment and dietary exposure is one of main routes causing human body accumulation. Cadmium (Cd) may cause renal injury and blood Cd levels are an important determinant of mortality in hemodialysis (HD) patients. Mercury (Hg) readily accumulates in the kidney and may induce acute kidney injury. The aim of this study was to find the possibility decreasing blood Cd and Hg levels by dietary education in chronic kidney disease (CKD) patients.

**Methods:** Patients with baseline blood Cd level > 1.4 ug/L or blood Hg levels > 5.0 ug/L were enrolled. A total of 27 CKD patients were enrolled from December 2017 to September 2020 in this prospective, single arm pilot study. We educated dietary intake that patients tried to diminish amount of external blue colored fish intake in patients with blood Hg levels > 5.0 ug/L and amount of shellfish intake in patients with blood Cd level > 1.4 ug/L. The primary outcome was the change of blood Cd and Hg level. The secondary outcomes included change of renal function and proteinuria in pre-dialytic CKD patients. Enrolled dialysis patients were asked for their average frequency and portion size of food consumption at the point of initiating the study and after 1 year.

**Results:** Seven dialytic CKD patients and 15 pre-dialytic CKD patients finished 1 year follow-up (male: 50.0%. Age:  $64.3 \pm 9.9$  years). Compared with baseline, blood Cd levels ( $2.0 \pm 0.7$  ug/L vs.  $1.8 \pm 0.7$  ug/L,  $p = 0.031$ ) and blood Hg levels ( $4.4 \pm 2.6$  ug/L vs.  $3.5 \pm 1.9$  ug/L,  $p = 0.005$ ) after 1 year were significantly decreased although dietary intakes were not different. Compared with baseline, blood Cd and Hg levels after 1 year were decreased in 15 pre-dialytic CKD patients. However, serum creatinine, cystatin C, and estimated glomerular filtration rate levels after 1 year were significantly worse than baseline levels in pre-dialytic CKD patients.

**Conclusions:** Dietary education to reduce food intake containing Cd and Hg may lower blood Cd and Hg levels in CKD patients with higher blood Cd and Hg levels. Higher blood Cd and Hg levels may affect renal progression in pre-dialytic CKD patients and further studies are necessary.