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Removal of uremic toxins with adequate renal replacement therapies ameliorates hypothalamic energy regulatory peptides in CKD

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Background & Objectives: Loss of appetite affects 1/3 of patients with CKD (chronic kidney disease) and is the leading cause of malnutrition in this population. Uremic toxins are the most suspected factors adversely effecting appetite in CKD. Orexigenic agouti-related peptide (AgRP) with neuropeptide-Y (NPY) and anorexigenic melanocyte-stimulating hormone-α (MSH-α) with cocaine amphetamine regulated transcript (CART) are known to regulate appetite. In this study, we aimed to evaluate levels of these peptides in healthy individuals and CKD patients and demonstrate the effects of uremic toxin removal.

Design, Participants & Methods: A cross-sectional study is composed with consecutive inclusion of 20 healthy individuals, 20 patients with CKD not receiving RRTs, 20 HD (hemodialysis) and 20 PD (peritoneal dialysis) patients. Exclusion criteria were active infection, history of malignancy, hypo- or hyperthyroidism, and diabetes. Patients on dialysis had targeted Kt/Vs.

Results: Demographic features and BMIs' of the four groups were similar. Median AgRP, NPY (neuropeptide-Y), AMSH (α-melanocyte stimulating hormone), and CART (cocaine-amphetamine regulated transcript) were significantly different between groups. CKD patients not on RRTs had lower hypothalamic hormones comparing healthy individuals, HD and PD patients (p=0.02, p=0.03 and p=0.07 for AgRP; p=0.02, p=0.01 and p=0.09 for NPY; p=0.02, p=0.02 and p=0.03 for AMSH; p=0.02, p=0.005 and p=0.030 for CART; respectively).

Conclusions: CKD patients not receiving RRTs have lower orexigenic and presumably indirectly lower anorexigenic peptides comparing healthy subjects and RRT groups receiving adequate therapy. Since the patients in this study had no documented systemic inflammation, uremic toxins seem to affect hypothalamic peptides. This may be the rationale of targeted Kt/V achievement enhancing energy intake regulation in CKD patients.

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