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Persistent organic pollutants are associated with chronic kidney disease.

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Objectives : Persistent organic pollutants (POPs) are well-known endocrine disrupting chemicals reported to be associated with various metabolic diseases. We hypothesized that POPs levels are increased in patients with chronic kidney disease or undergoing dialysis, thus further complicating the disease course. In this study, we measured serum POPs levels using a highly sensitive cell-based arylhydrocarbon receptor (AhR) dependent luciferase activity (CALA) assay in end stage renal disease (ESRD) patients undergoing dialysis or not, and compared differences between patients.

Methods : Patients undergoing peritoneal dialysis(22), hemodialysis(38) for at least 36 months, and pre-dialysis chronic kidney disease stage IV or V patients(28) were included. AhR binding activities and intracellular ATP levels were measured and compared according to treatment modality. We performed a correlation analysis between AhR binding activities and ATP levels and various clinical parameters.

Results : AhR binding activities differed significantly between groups, AhR binding activity was higher in non-dialysis CKD patients, compared to patients undergoing dialysis, and higher in patients undergoing hemodialysis compared to peritoneal dialysis. AhR binding activities decreased after hemodialysis treatment in HD patients. ATP level was the highest in healthy controls, second-highest in pre-dialysis CKD patients, and further decreased in patients with peritoneal dialysis and hemodialysis. AhR binding activities and intracellular ATP levels showed significant correlations with multiple clinical parameters associated with cardiovascular risk factors (Table 1).

Conclusions : POPs were associated with chronic kidney disease, and ESRD, while dialysis treatment reduced POPs levels. Further studies are mandated to specify the AhR binding activities and to evaluate the exact role in patients with chronic kidney disease.

Keywords : POPs, Arylhydrocarbon receptor binding activities, chronic kidney disease, dialysis