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Biomarkers for Predicting Progression to Chronic Kidney Disease after Acute Kidney Injury

NAYE CHOI[1], Ji Hyun Kim[2], Hee Gyung Kang[1], Dohyun Han[3], Yo Han Ahn[1]
[1]Department of Pediatrics, Seoul National University Hospital, Korea, Republic of
[2]Department of Pediatrics, Seoul National University Bundang Hospital, Korea, Republic of
[3]Department of Proteomics core facility, Biomedical Research Institute, Seoul National University Hospital, Korea, Republic of

Objectives: Acute kidney injury (AKI) is a well-known risk factor for the development of chronic kidney disease (CKD). However, there have been a lack of biomarkers for predicting CKD progression in patients with AKI. Therefore, this study aimed to identify novel biomarkers using proteomic techniques in order to predict the transition to CKD following AKI in children.

Methods: Among 807 children enrolled in a prospective AKI cohort study, 10 patients with AKI due to ischemic damage were selected, of which 6 progressed to CKD (CKD group) and the others maintained normal kidney function (non-CKD group). Serum and urine samples were collected at the time of recovery from AKI and follow-up more than two years after AKI. The samples were analyzed using label-free quantitative proteomics analysis based on liquid chromatography-tandem mass spectrometry. The multiple sample tests were performed using the Perseus software platform (http://www.perseus-framework.org) to compare the differences between the CKD and non-CKD groups.

Results: There were no significant differences in demographic and clinical data between the CKD and non-CKD groups. A total of 18 serum and urine samples were analyzed, with 1302 proteins from serum and 1699 proteins from urine samples were quantified in initial phase, and 1236 proteins from serum and 1487 proteins from urine samples were quantified in the follow-up phase. Three candidate proteins were selected from differentially expressed proteins of serum or urine samples; COLEC11 (Collectin Subfamily Member 11), F11R (F11 Receptor), and ADAM9 (ADAM Metallopeptidase Domain 9).

Conclusions: The potential biomarkers identified in this study could provide an opportunity to predict the progression of AKI to CKD in pediatric patients.