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Urinary cystatin C: pediatric reference intervals and comparative assessment as a biomarker of renal injury among children in the regions with high burden of CKDu in Sri Lanka

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Abstract

Background: Cystatin C (Cys-C) is an emerging biomarker of renal diseases and its clinical use, particularly for screening the communities affected by chronic kidney disease of unknown etiology (CKDu), is hindered due to the lack of reference intervals (RIs) for diverse ethnic and age groups. The present study aimed to define RIs for urinary Cys-C (uCys-C) for a healthy pediatric population in Sri Lanka and in turn compare the renal function of the residential children in CKDu endemic and non-endemic regions in Sri Lanka.

Methods: A cross-sectional study was conducted with 850 healthy children (10-17 years) from selected locations for reference interval establishment, while a total of 892 children were recruited for the comparative study. Urine samples were collected and analyzed for Cys-C, creatinine (Cr) and albumin. Cr-adjusted uCys-C levels were partitioned by age, and RIs were determined with quantile regression (2.5th, 50th and 97.5th quantiles) at 90% confidence interval.

Results: The range of median RIs for uCys-C in healthy children was 45.94-64.44 ng/mg Cr for boys and 53.58-69.97 ng/mg Cr for girls. The median (interquartile range) uCys-C levels of children in the CKDu endemic and non-endemic regions were 58.18 (21.8-141.9) and 58.31 (23.9-155.3) ng/mg Cr with no significant difference ($P = 0.781$). A significant variation of uCys-C was noted in the children across age.

Conclusions: Notably high uCys-C levels were observed in children with elevated proteinuria. Thus, uCys-C could be a potential biomarker in identifying communities at high risk of CKDu susceptibility.

Keywords: Chronic kidney disease of unknown etiology; Cystatin C; Pediatric; Reference intervals; Renal injury; Urinary albumin-creatinine ratio.

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