THE KOREAN SOCIETY OF NEPHROLOGY
APCN & KSN 2024
June 13(Thu) - 16(Sun), 2024 Coex, Seoul, Korea
Promoting Sustainable Kidney Health: The Asia-Pacific and Beyond

Abstract Submission No.: A-1010

Assessment of Protein Energy Wasting in Children with Chronic Kidney Disease Stage 2-5: A Cross-Sectional Study

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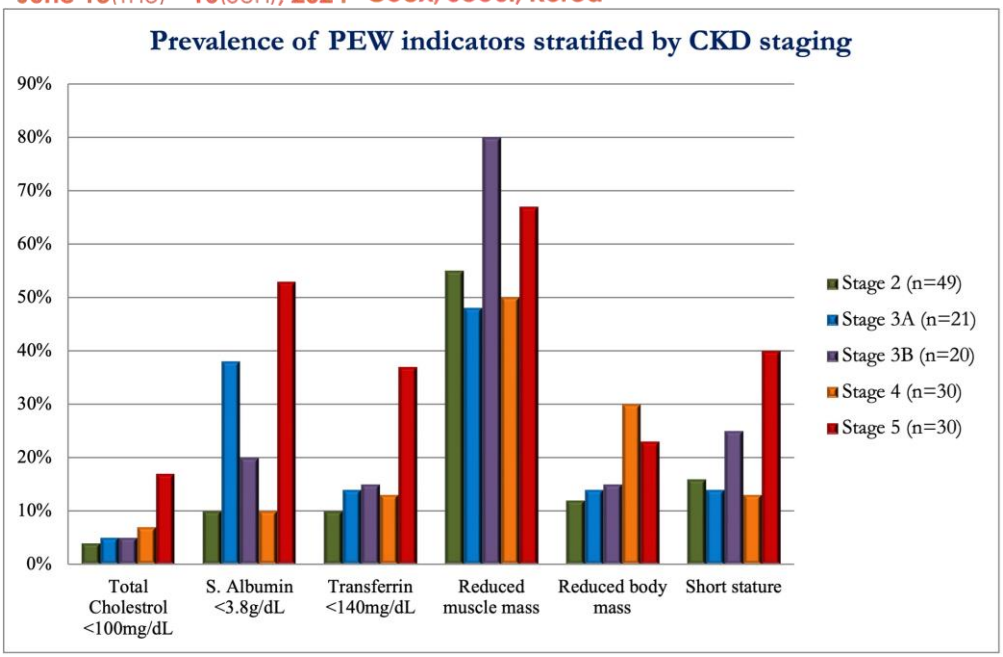
Objectives : Protein energy wasting (PEW) is a tool for nutritional assessment in children with chronic kidney disease (CKD). A tailored nutrition-inflammation scoring system helps to better characterize malnutrition in these children. Limited literature exists on PEW in pediatric population worldwide. The objectives of the study were to determine the prevalence of protein energy wasting in children aged 2-18 years with chronic kidney disease stage 2 to 5D and describe the clinical characteristics these children.
Methods : A cross-sectional study was conducted on children aged 2-18 years with CKD stage2-5D, under follow-up at Pediatric nephrology services, JIPMER over a 12-year period (2012-2024). Demographic data, clinical details and necessary biochemical investigations were recorded from patients case records for defining pediatric specific PEW criteria as proposed for CKiD cohort. The growth parameters (weight, height, MUAC, BMI) were measured at enrolment. Descriptive statistics were performed using STATA 14.0 software.
Results : 150 children (79.4% boys) with median (IQR) age of 127 (84, 158) months in CKD stages 2-5D were enrolled. CAKUT was the most common etiology in 104 (69.4%) children. The median glomerular filtration rate (eGFR) at enrolment was 42 ml/min/1.73sqm. Thirty (20%) children satisfied minimal PEW definition, 20 (13.3%) children met standard PEW definition, and 40 (26.7%) satisfied pediatric tailored modified PEW definition. Children with modified PEW were more likely to be severely wasted and severely underweight ($p<0.001$). There was an increasing prevalence of modified PEW with advancing CKD stage. Among indicators of PEW, no significant difference was noted in reduced muscle mass, reduced body mass and short stature. None of the children in cohort had CRP >3mg/L. Children with low transferrin and low serumalbumin levels were significantly higher in CKD stage 5.
Conclusions : The prevalence of PEW was 26.7% in our cohort with increased prevalence in advanced CKD stage 5 and reduced muscle mass significantly contributed to PEW.

Figure PEW.jpg


Prevalence of PEW indicators stratified by CKD staging
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Total Cholestrol <100mg/dL
S. Albumin <3.8g/dL
Transferrin <140mg/dL
Reduced muscle mass
Reduced body mass
Short stature
Stage 2 (n=49)
Stage 3A (n=21)
Stage 3B (n=20)
Stage 4 (n=30)
Stage 5 (n=30)