Indian Journal of Pediatrics
https://doi.org/10.1007/s12098-023-04500-4

SCIENTIFIC LETTER

Arterial Stiffness and Cardiac Functions in Children with Idiopathic Nephrotic Syndrome

Emre Leventoğlu[1] · Akif Kavgacı[2] · Fatma İncedere[2] · Semiha Tokgöz[2] · Bahar Büyükkaragöz[1]

Received: 21 November 2022 / Accepted: 24 January 2023
© The Author(s), under exclusive licence to Dr. K C Chaudhuri Foundation 2023

To the Editor: Idiopathic nephrotic syndrome (INS) is a common pediatric glomerular disorder [1]. Depending on the unique features of the disease and the medical treatment protocols (like steroids and calcineurin inhibitors (CNI)), cardiovascular risk has increased [2]. In this study, we aimed to determine cardiovascular dysfunction using pulse wave velocity (PWV), the augmentation index (AIx), ambulatory blood pressure measurement (ABPM), and echocardiography. Children aged 2–18 y with primary INS were divided according to treatment modalities as steroid-sensitive INS with steroid-only therapy ($n = 18$, group 1) and steroid-resistant, frequent relapsing, or steroid-dependent INS with CNI in addition to steroids ($n = 13$, group 2).

In group 2, patients were older (4.2 ± 2.8 vs. 11.7 ± 3.9 y), the cumulative steroid dose was higher (187.3 ± 123.4 vs. 375.7 ± 166.4 mg/kg), and measures of arterial stiffness, including PWV (4.32 ± 0.37 vs. 4.93 ± 0.42 m/s) and AIx (35.2 ± 8.1 vs. 40.3 ± 6.9%), were higher than in group 1. ABPM showed higher daytime systolic (8.2 ± 7.9 vs. 22.3 ± 14.4%) and diastolic BP loads (10.0 ± 10.2 vs. 21.0 ± 8.6%) and a lower nocturnal dipping rate (83.3 vs. 38.4%) in group 2. Besides, in echocardiography, left ventricular (LV) mass index (LVMI) was higher (64.1 ± 13.3 vs. 77.8 ± 16.5 g/m^2), LV tissue (2.32 ± 0.36 vs. 1.69 ± 0.56), and flow E'/A' ratios (0.81 ± 0.32 vs. 0.64 ± 0.27) were lower ($p < 0.05$ for all parameters). In this study, cumulative steroid dose was positively correlated with PWV, daytime systolic BP load, and LVMI and negatively correlated with LV tissue and flow E'/A.' Multiple linear regression analysis showed increasing age and cumulative steroid dose as significant predictors of PWV and LVMI.

To conclude, children with INS are at increased risk for cardiac dysfunction due to arterial stiffness, BP elevation, LV hypertrophy, and diastolic dysfunction [3, 4]. These pathologies may develop mostly due to hypoproteinemia and hyperlipidemia caused by INS, as well as steroids and CNIs [3, 4]. Therefore, they should be on regular and cautious cardiac evaluation throughout the course of the disease.

Declarations

Conflict of Interest None.

References

1. Wang CS, Greenbaum LA. Nephrotic Syndrome. Pediatr Clin North Am. 2019;66:73–85.
2. Patnaik SK, Kumar P, Bamal M, et al. Cardiovascular outcomes of nephrotic syndrome in childhood (CVONS) study: a protocol for prospective cohort study. BMC Nephrol. 2018;19:81.
3. Gungor O, Demirci MS, Kircelli F, et al. Increased arterial stiffness in patients with nephrotic syndrome. Clin Nephrol. 2013;79:1–6.
4. Nalcacioglu H, Ozkaya O, Kafali HC, Tekcan D, Baysal K. Cardiac functions in children with steroid-sensitive nephrotic syndrome. Pediatr Int. 2020;62:1364–8.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

✉ Emre Leventoğlu
dremrelevent@gmail.com

[1] Department of Pediatric Nephrology, Faculty of Medicine, Gazi University, Ankara, Turkey

[2] Department of Pediatric Cardiology, Faculty of Medicine, Gazi University, Ankara, Turkey

Published online: 09 February 2023