

NEPHROLOGY - I

NEPHROLITHIASIS

***Prabha Senguttuvan**

****Vidhya PS**

Abstract: Nephrolithiasis or kidney stones are being increasingly recognised in children over the last few decades. The etiology is multifactorial, but underlying metabolic disorders are the most common cause in children, warranting thorough evaluation. The clinical presentation is highly variable and ultrasound is the imaging modality of choice owing to its safety and availability. Careful identification of risk factors and modification, of them either through dietary changes or pharmacological interventions, form the mainstay of therapy. The goal should be appropriate treatment and diligent surveillance to prevent progression to chronic kidney disease. This review discusses the key aspects of nephrolithiasis in children.

Keywords: Nephrolithiasis, Nephrocalcinosis, Children, Renal stones, Hypercalciuria.

Points to Remember

- Underlying metabolic abnormalities are the most important causes of pediatric nephrolithiasis, with predominantly hypercalciuria contributing to 70-80% of cases.
- Clinical presentation is widely variable from asymptomatic presentation to chronic kidney disease.
- Extensive metabolic workup with urine and blood parameters is mandatory in childhood nephrolithiasis.
- Dietary interventions and medical management with closed surveillance can help prevent stone formation and recurrences.
- Symptomatic children or those with failed medical therapy will require definitive surgical management.

References

1. Halbritter J, Seidel A, Müller L, Schönauer R, Hoppe B. Update on Hereditary Kidney Stone Disease and Introduction of a New Clinical Patient Registry in Germany. *Front Pediatr.* 2018; 6:47. doi: 10.3389/fped.2018.00047.
2. Devi AT, Nagaraj R, Prasad A, Lakkappa DB, Zameer F, Nagalingaswamy NP. Nephrolithiasis: Insights into Biomimics, Pathogenesis, and Pharmacology. *Clin Complement Med Pharmacol.* 2023; 3(2):100077.
3. Önal B, Kýrlý EA. Pediatric stone disease: Current management and future concepts. *Turk Arch Pediatr.* 2021; 56(2):99-107. doi: 10.5152/TurkArchPediatr.2021.20273.
4. Schott C, Pourtousi A, Connaughton DM. Monogenic causation of pediatric nephrolithiasis. *Front Urol.* 2022; 2:1-22,1075711.
5. Pfau A, Knauf F. Update on Nephrolithiasis: Core Curriculum 2016. *Am J Kidney Dis.* 2016; 68(6):973-85. doi: 10.1053/j.ajkd.2016.05.016.

* Academic Director of Pediatric Nephrology

** Senior Registrar,
Pediatric Nephrology,
Mehta Multi-Speciality Hospital, Chennai.
email: vidhu.p.s.24@gmail.com

6. Hoppe B, Kemper MJ. Diagnostic examination of the child with urolithiasis or nephrocalcinosis. *Pediatr Nephrol*. 2010; 25(3):403-13. doi: 10.1007/s00467-008-1073-x.
7. Marra G, Taroni F, Berrettini A, Montanari E, Manzoni G, Montini G. Pediatric nephrolithiasis: a systematic approach from diagnosis to treatment. *J Nephrol*. 2019; 32(2):199-210. doi: 10.1007/s40620-018-0487-1.
8. Edvardsson V. Urolithiasis in Children. In: Avner ED, Harmon WE, Niaudet P, Yoshikawa N, Emma F, Goldstein SL, editors. *Pediatric Nephrology*. 7th ed. Berlin, Heidelberg: Springer; 2016; pp1821-68.
9. Sakhaei K, Maalouf NM, Sinnott B. Clinical review. Kidney stones 2012: pathogenesis, diagnosis and management. *J Clin Endocrinol Metab*. 2012; 97(6): 1847-60. doi: 10.1210/jc.2011-3492.
10. Somers MJG. Primary Hyperoxaluria: A Need for New Perspectives in an Era of New Therapies. *Am J Kidney Dis*. 2023; 81(2):131-133. doi: 10.1053/j.ajkd.2022.08.005.
11. Sriram K, Chinnasamy R, Senguttavan P, Shroff S. Primary Hyperoxaluria and Renal Cortical Nephrocalcinosis - as a Cause of Renal Failure. *Austin J Urol*. 2015; 2(2): 1023.
12. Donaldson JF, Ruhayel Y, Skolarikos A, MacLennan S, Yuan Y, Shepherd R, et al. Treatment of Bladder Stones in Adults and Children: A Systematic Review and Meta-analysis on Behalf of the European Association of Urology Urolithiasis Guideline Panel. *Eur Urol*. 2019; 76(3):352-367. doi: 10.1016/j.eururo.2019.06.018.
13. Ferraro PM, Bargagli M, Trinchieri A, Gambaro G. Risk of Kidney Stones: Influence of Dietary Factors, Dietary Patterns and Vegetarian-Vegan Diets. *Nutrients*. 2020; 12(3):779. doi: 10.3390/nu12030779.
14. Sarica K, Narter F, Sabuncu K, Akca A, Can U, Buz A, et al. Factors affecting the course of body and kidney growth in infants with urolithiasis: A critical long-term evaluation. *Arch Ital Urol Androl*. 2016; 88(4):249-54. doi: 10.4081/aiua.2016.4.249..
15. Pearle MS, Goldfarb DS, Assimos DG, Curhan G, Denu-Ciocca CJ, Matlaga BR, et al. American Urological Association. Medical management of kidney stones: AUA guideline. *J Urol*. 2014; 192(2):316-24. doi: 10.1016/j.juro.2014.05.006.
16. Assimos D, Krambeck A, Miller NL, Monga M, Murad MH, Nelson CP, et al. Surgical Management of Stones: American Urological Association/Endourological Society Guideline, PART I. *J Urol*. 2016; 196(4):1153-60. doi: 10.1016/j.juro.2016.05.090.
17. Akram M, Jahrreiss V, Skolarikos A, Geraghty R, Tzelves L, Emilliani E, et al. Urological guidelines for kidney stones: Overview and comprehensive update. *J Clin Med*. 2024; 13(4):1114.
18. Türk C, Petők A, Sarica K, Seitz C, Skolarikos A, Straub M, et al . EAU Guidelines on Interventional Treatment for Urolithiasis. *Eur Urol*. 2016; 69(3):475-82. doi: 10.1016/j.eururo.2015.07.041.