

Shifts in Pediatric Urinary Stone Composition from 2012 to 2023: A Retrospective Cohort Analysis

Saad Sualeh¹, Ashorne Mahenthiran², Pankaj Dangle³

¹Indiana University School of Medicine; ²Department of Urology – Indiana University School of Medicine; ³Department of Pediatric Urology, Riley Hospital for Children- Indiana University Heath

Background:

Multiple studies have noted shifts in urinary stone composition amongst adult populations in recent decades, often attributed to changing diets and rising obesity rates³. These trends are less studied in the pediatric population. Therefore, in this study, we investigate if shifts in urinary stone composition also existed in the pediatric population over the span of 12 years.

Methods:

A retrospective chart review of our institutional database for stone events from 2012 to 2023 was conducted. A list of pediatric patients was compiled with ICD codes for primary diagnosis of nephrolithiasis. For each year, we collected 20 stone analyses, which overall equated to 240 distinct stone analyses from 233 patients across 2012 to 2023. To increase the power of the study, we decided to create 3 cohorts (each with 80 stone analyses): 2012-2015, 2016-2019, 2020-2023. Stones were categorized based on the predominant composition. Various demographic data (e.g. age, gender) as well as clinical data (e.g. underlying conditions, stone characteristics) were collected. A Chi-square analysis was also performed to evaluate statistical significance.

Results:

A total of 233 pediatric patients were identified with the average age being 12.0 years. Calcium oxalate and calcium phosphate were by far the most common stone types in all three cohorts. Struvite stones did show an upward trend although a larger sample would be needed to draw any conclusions. Chi-square test comparing the three cohorts resulted in χ^2 (14, N=240) = 17.732, p = .2193.

Conclusion:

There was no statistically significant shift in stone composition within this pediatric cohort over the 12-year study period. Some limitations of this study were its retrospective design, potential loss of patients due to spontaneous stone passage without follow-up, and the data coming from a single institution. Further studies should be conducted to confirm these findings and to explore different time frames and pediatric populations.