



number of repeat surgical interventions ( $\rho=0.489$ ,  $p<0.001$ ), as well as between patient age and stone volume ( $\rho=0.243$ ,  $p=0.04$ ). The Kruskal-Wallis test showed a statistically highly significant difference in treatment outcomes (single intervention, re-intervention, residual fragments) depending on stone volume across the three groups ( $H=14.738$ ,  $p=0.001$ ).

**CONCLUSIONS:** Stone volume is a key predictor of treatment success for pediatric urolithiasis and directly correlates with the need for re-interventions. For stones with a volume up to  $100\text{ mm}^3$ , ESWL as a first-line treatment demonstrates maximum efficacy. With an increase in stone volume, the likelihood of requiring additional procedures to achieve a stone-free status significantly increases.

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### ASSESSING STONE VOLUME IS VALUABLE FOR SURGICAL PLANNING IN PEDIATRIC UROLITHIASIS

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**INTRODUCTION AND OBJECTIVES:** Pediatric urolithiasis requires a meticulous approach to selecting the optimal treatment strategy. While guideline-based treatment selection utilizes maximum stone diameter, this linear measurement inadequately reflects the true volume. Volume may more accurately determine stone burden in pediatric patients. This study aims to evaluate the effectiveness of treatment methods for pediatric urolithiasis based on stone volume and to determine its prognostic value on stone-free rate (SFR).

**METHODS:** A retrospective cohort study was conducted on patients aged 1 to 17 years treated for single urinary tract stones at a single center January 2023 to June 2025. Stone volume was calculated using data from non-contrast computed tomography using 3D Slicer software [Panthier F, et al. World J Urol. 2021]. Ultrasound-guided Extracorporeal shock wave lithotripsy (ESWL) was used as the first-line treatment for all patients, followed by semirigid or flexible ureteroscopy (URS) for those requiring subsequent intervention. Patients were divided into three volumetric groups: Group I  $100\text{ mm}^3$ , Group II  $101\text{-}200\text{ mm}^3$ , and Group III  $201\text{-}370\text{ mm}^3$ . The maximum linear size of the stones did not exceed 20 mm. Treatment efficacy was assessed by the SFR 3 months post-procedure on ultrasound. Statistical analysis was performed using SPSS, using Kruskal-Wallis tests to identify group differences, and Spearman's correlation analysis for relationships between variables.

**RESULTS:** The study included 72 patients, 39 (54.2%) boys and 33 (45.8%) girls. There were 37 patients in group I (51.4%), 21 in group II (29.2%), and 14 in group III (19.4%). The overall SFR was 93.1%. Group I achieved a 100% SFR, Group II achieved 90.5%, and Group III achieved 78.6%. Re-interventions (URS) were required for 10 (47.6%) patients in Group II and 8 (57.1%) patients in Group III. We identified a positive correlation between stone volume and the