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Primary versus secondary ureteroscopy for pediatric ureteral stones

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Abstract *Objective:* To evaluate the outcome of primary versus secondary ureteroscopy for pediatric ureteral stones.
Patients and methods: A retrospective chart review study that included 66 children aged less than 12 years, who were subdivided into two groups: Group A, which included 42 children who had undergone primary ureteroscopy without pre-stenting; and Group B, which included 24 children who had undergone ureteroscopy after ureteric stenting. Kidneys, ureters and bladder radiographs were done on the first postoperative day to assess the degree of stone clearance and stent position.
Results: Age, gender, stone location and stone size were not significantly different between both groups. In Group A, 31 (73.8%) children required ureteric dilation, 13 (31%) had a tight ureter that failed to respond to dilation, 25 (59.5%) displayed complete stone clearance, and of these, 13 (52%) needed postoperative stenting. One child experienced ureteric injury during stone disintegration and was stented for two weeks. Children in Group B experienced a 95.8% complete stone clearance rate, with no ureteric injury reported; postoperative stenting was performed in three (12.5%) children..
Conclusion: Secondary ureteroscopy is preferable over primary ureteroscopy in pediatric populations because of a significantly lower need for ureteric dilation, shorter procedure time and better stone clearance rate..

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Introduction

With the advent of smaller endoscopes, ureteroscopy has become part of the standard armamentarium of the pediatric urologist. Pediatric ureteroscopic procedures are similar to their adult counterparts, but accessing the ureteral orifice in children is more difficult. Active ureteral dilation via balloon dilation and serial rigid dilation of the ureteral orifice have been extrapolated for the use in children [1—5]. VUR and ureterovesical stricture occurrence after active ureteral dilation remains controversial [4—6]. Secondary ureteroscopy, after initial ureteric stenting, is currently an emerging treatment for ureteric stones in both children and adults. The resulting passive dilation of the ureter facilitates ureteroscopy and stone manipulation [7—10]. In the present study, the profiles of children who underwent either primary or secondary ureteroscopy at the Assiut University Hospital were analyzed and their outcomes and complications were evaluated.

Materials and methods

This retrospective review study was performed using the medical records of all children under the age of 12 years who had undergone ureteroscopy at the pediatric section of the Urology Department from December 2007 to June 2011. The adult endourology section, according to department policy, managed children older than 12 years.

In accordance with the protocol for management of children undergoing ureteroscopy (Fig. 1), the children were subdivided into groups A and B, depending on the timing of ureteroscopy. Group A included children who had undergone primary ureteroscopy without pre-stenting. All children with ureteric stones had an indication for ureteroscopy after failure of conservative treatment (failed spontaneous passage of stone for 30—40 days without potential renal harm or UTI). Group B included children who had undergone ureteroscopy after ureteric stenting using a 4.8 Fr JJ stent. In this group, critically ill children with calculus anuria (bilateral ureteral obstruction) or obstructive pyelonephritis underwent stenting as an urgent procedure to avoid complications related to acute renal failure or septicemia. Critically ill children with obstructive pyelonephritis presenting prior to ureteroscopy received antibiotic treatment according to culture and sensitivity until the time of secondary ureteroscopy.

Children with underlying structural urological abnormalities were excluded from the study. Data were collected for each child's: age, gender, stone site, need for active dilation, ureteric injury, ureteric stricture, stone clearance, stone migration, operative time and complications. All children were evaluated preoperatively with a kidneys, ureters and bladder (KUB) radiograph and abdominal ultrasonography. A non-contrast CT scan was limited to cases where there was high suspicion of ureteric stones not visualized by KUB or ultrasonography (radiolucent stones).

All ureteroscopy procedures were performed under general anesthesia using a 6 Fr semi-rigid ureteroscope with parenteral antibiotics given 30 min prior to the procedure. Holmium laser was used for lithotripsy under fluoroscopic guidance. Three senior endourologists performed all of the procedures. Ureteric dilations were performed using sequential Teflon dilators (6—10 Fr). A pump over the irrigant fluid was used to facilitate introduction of the ureteroscope and during stone disintegration. All stones were fragmented until deemed small enough (compared to the diameter of the guide wire or that of the lumen of the ureter) to be removed with grasping instruments or to pass spontaneously. Complete stone clearance was defined as absence of stone fragments through endoscopic visualization or on imaging, while clinically insignificant fragments were defined as stone fragments less than 3 mm. All children underwent complete ureteropyeloscopy at the end of the procedure to ensure complete stone clearance. Finally, inspection of the ureteral meatus at the end of the procedure was performed to ensure integrity of the ureteral meatus.

According to the follow-up protocol, all children were evaluated on the first postoperative day using a KUB radiograph to assess stent position and to check if radiopaque residual stones were still present. In addition, they were followed up at three and six months after the last procedure. At the follow up, urine analysis, KUB radiography for radiopaque stones and abdominal ultrasonography were performed to assess the children for UTI, residual renal fragments, or renal backpressure. Statistical analysis was done using SPSS® version 20. The Chi-squared test and Student's *t*-test were used to address any preoperative and postoperative conditions that affect the outcome of

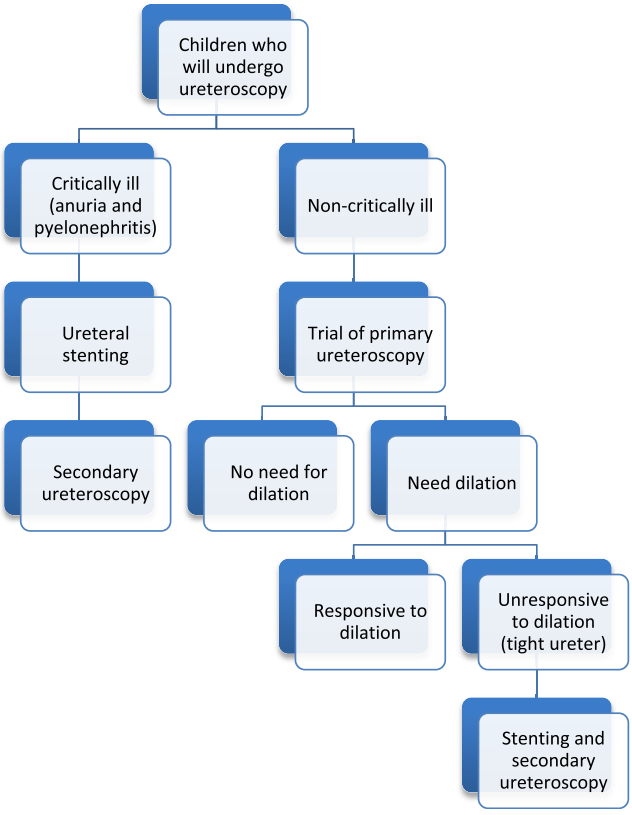

Figure 1 Algorithm of management for children undergoing ureteroscopy.