

Percutaneous Cystolithotripsy As A Reliable Modality To Treat Pediatric Vesiculolithiasis

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ABSTRACT

Background: Primary vesical stones are common in children in underdeveloped and developing countries. The treatment options available for managing bladder calculi include transurethral cystolithotripsy, open cystolithotomy and shock wave lithotripsy (SWL). Although the majority of vesical calculi in adults can be treated by transurethral lithotripsy, this procedure is restricted in children due to the narrow caliber of the urethra. For this reason, percutaneous cystolithotripsy (PCCL) is a good choice as a safe and effective method for the treatment of bladder stones in children. **Aim of the Study:** The study was aimed to evaluate outcome of PCCL in pediatric population coming with vesiculolithiasis in our center. **Materials and Methods:** Pediatric age group patients diagnosed as vesical calculus were undertaken for PCCL. Ten patients who presented between November 2014 to December 2015, were included. The procedure was done under general anesthesia. After performing cystoscopy, suprapubic puncture was made and tract dilated upto 26 Fr. Nephroscope was used for visualization and pneumatic lithotripsy for fragmentation of the stone followed by removal of all fragments. Perurethral and suprapubic catheters were placed at the end to be removed on 1st and 2nd post operative day, respectively. **Results:** Median age of the patients was 5.5 (3-13) years. Majority were male patients from hilly region of western Nepal. Mean stone size was 15 mm. All patients were rendered stone free with average operative time of 32.2 minutes. Except one minor complication of mucosal injury patients were discharged after mean hospital stay of 3.9 days. **Conclusion:** Percutaneous suprapubic lithotripsy is a safe and effective method for the treatment of bladder stones in children. It is fast and associated with negligible complications.

Key words: Bladder calculi, children, cystolithotripsy

INTRODUCTION

Bladder calculi have plagued mankind since time eternal. Archeologists discovered a stone resting in the pelvis of an ancient Egyptian skeleton dating back more than 7000 years¹. Fortunately, in the past 50 years, the incidence of vesical calculi in developed countries has declined significantly. Currently, they represent roughly 5% of all urinary calculi in the Western world². Underdeveloped nations still suffer from endemic bladder calculi, especially in children³.

Various modalities, as conventional surgery, shock wave lithotripsy (SWL), suprapubic and transurethral cystolithotripsy are used to treat the vesical calculi. With all the options of treatment, the method of choice should be both relatively non-invasive and expeditious. Open cystolithotomy is only occasionally needed⁴. The majority of vesical calculi in adults can now be treated perurethrally with the use of lithotripsy. However, the use of these devices is restricted in pediatric patients because of the narrow caliber of the urethra^{5,6}. The

role of SWL is restricted due to high retreatment rate and difficulty in the voiding of fragments. A percutaneous suprapubic approach to the bladder circumvents the problem of the narrow urethra in these situations⁷.

Using the well established principles of percutaneous access and tract dilation that have been developed with renal stone surgery, one can treat bladder stones through a percutaneous suprapubic approach in an expeditious manner. We review our experience in treating pediatric vesiculolithiasis by suprapubic approach.

MATERIALS AND METHODS

This observational study was conducted at Nepalgunj Medical College, Nepalgunj Hospital, Nepalgunj in urology unit of Department of Surgery from November 2014 to December, 2015. A total of 10 pediatric patients underwent percutaneous cystolithotripsy (PCCL) during this period.

The diagnosis was based on ultrasonography and plain X-rays. Stone diameter was determined by reviewing plain X-rays. Urine was tested for culture and sensitivity.

The procedure was performed under general anesthesia. It was initiated with urethrocystoscopy to exclude any subvesical obstruction (urethral valve, urethral stricture) or rather to push the urethral stone back into the bladder (one patient in current series). Bladder was distended with saline and suprapubic puncture was made and confirmed with the same telescope. Floppy tip guide wire was inserted and approximately 1 cm

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incision made over puncture site. Fascial dilator up to 12 Fr was used and placing guide rod one step dilatation was done with amplatz dilator of 26 Fr (Figure 1).

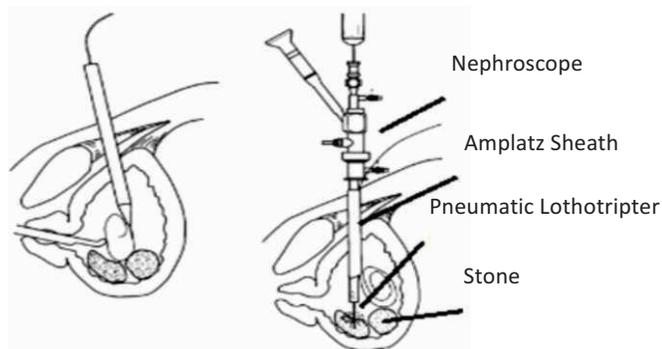


Figure 1: Diagrammatic representation of PCCL

The procedure was performed under direct vision by telescope. Nephroscope was introduced and after full inspection stone was taken intact or after fragmentation depending on the size. After the procedure suprapubic catheter was placed and left for one day while perurethral catheter was removed on 2nd post operative day.

RESULTS

A total of 10 patients of pediatric age group presented to us during one year of study period. Majority (9/10) were from hilly region of western Nepal. None of the patients had previous history of vesical calculus.

Median age of the patients was 5.5 years. Male outnumbered the procedure with ratio of 8:2. With median symptoms duration of 6.5 days, majority presented with dysuria and acute urinary retention (Table I). Median size of the stone was 17 mm. All patients were rendered stone free in one single session (Table II). All patients were voiding spontaneously at the time of discharge. There was no postoperative complication noted in short term follow up.

DISCUSSION

Nowadays, urolithiasis in childhood is rare in the developed world, it represents 1-5% of all urinary tract stones². Moreover, urinary bladder stone is very rare⁸. However, in the developing countries, the occurrence of pediatric urolithiasis is 30% of all urinary tract stones, and the so-called endemic bladder stone is still common in the childhood in the Third World⁹.

As opposed to the elderly, where the stones are invariably secondary to outflow obstruction or infection¹⁰, childhood vesical calculi are primary in nature, caused most often by dietary deficiency¹¹. In adults, transurethral disintegration for

Variables	Values
Age in years(Mean±SD)	5.4±3.02
Gender (Male:Female)	8:2
Symptom Duration in days (Mean±SD)	16 ± 26.6
Clinical Presentation	
Dysuria	7
Acute retention of urine	4
Increased frequency	4
Decreased stream of urine	6
Stone size in millimeter (Mean±SD)	15±5

Table I: Patient characteristics (n=10)

Variables	Values
Operative time in minutes (Mean±SD)	32.2±6.3(25-45)
Stone free rate	100%
Hospital stay in days (Mean±SD)	3.9±2.23
Retreatment rate	0
Intraoperative complications (mucosal injury)	1
Postoperative complications	0
Additional procedures	0

Table II: Operative and post operative data

urinary bladder stones is a common method and with the availability of different energy sources, virtually all vesical calculi can be treated endoscopically. However, urethral injury is a strong possibility in few instances specially in larger stones^{5,12}. Similarly, in children, narrow caliber of the urethra precludes the use of this procedure¹³.

High male to female ratio not exactly known but is similar to other studies^{5,7}. Clinical presentations are similar to other studies where vesiculolithiasis was studied¹⁴. With percutaneous suprapubic approach, 26 Fr or if needed 30 Fr to 32 Fr Amplatz sheath can be introduced into the bladder without urethral injury. In this manner, the large and hard stones can be disintegrated and removed in big fragments, so the intervention can be fast⁷. Here, in our series also only one minor complication of mucosal injury was noted which did not have any unfavorable outcome. Also, the procedure was fast owing to larger sheath size and fast fragmentation.

In current series, none of the additional procedure was required because mostly it is primary vesical calculus in this age group. In adults, or in cases where features of obstruction are present, they might require other concomitant procedures to relieve obstruction¹⁴.

The morbidity of PCCL is significantly less than that of open cystolithotomy. Hospital stay is far shorter and chances of wound infection is negligible⁵. Our result is consistent with the successful and encouraging results of other authors^{12,15}.

CONCLUSION

Percutaneous suprapubic lithotripsy is a safe and effective method for the treatment of bladder stones in children. It is fast and associated with negligible complications.

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