

An Audit of Stuck Urethral Calculus in Paediatric Age Group Presenting at Bacha Khan Medical Complex

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ABSTRACT

Background: Pain secondary to urine outflow obstruction is described one of most severe pain in humans. Impacted urethral calculus is one of common cause of urine outflow obstruction. Data on urethral calculus in paediatric population is sparse,

Aim: To address this and present our experience with minimal invasive technique for management of urethral calculus.

Method: This study was conducted in Pediatric Surgery Unit Bacha Khan Medical Complex from December 2017 to November 2019. Patient aged less than 14 year with diagnosis of urethral calculus were included in this prospectively.

Results: During this study period 34 patients were treated for urethral calculus. In this study 33 (97%) were male patients while only 1 (3%) female patient had urethral obstruction. Most of the patients 13 (38%) were in the age from 5-8 years. Endoscopic facilities were available so the stone which were stuck in bulbous or posterior urethra were pushed back endoscopically and were then broken into small fragments with pneumatic lithoclast.

Conclusion: Significant patients presents with urethral obstruction secondary to impacted stone. A methodical approach for treatment of urethral stone should be adopted, with treatment for each urethral stone separately based on its location, shape and size. With minimally invasive surgery complications of urethrolithotomy can be avoided by avoiding the procedure.

Keywords: Urethral calculus, Impacted children, Treatment, Pushback, Cystourethroscopy.

INTRODUCTION

Lower urinary tract symptoms in male child are mainly secondary to congenital uropathy. Urinary retention in children can be of various causes ranging from mechanical and neurological with different occurrence rates^{1,2}. Impacted urethral calculus is one of the common cause of urine outflow obstruction in paediatric age group presenting in emergency². Stone can get impacted anywhere from bladder neck to external meatus and is very painful^{3,4}. If urgent measures are not undertaken can result in complications⁴.

Various etiologic factors like renal, metabolic, endocrine and urologic may lead to the formation of crystallized material leading to urolithiasis³ dietary items like high oxalate, purines or ketogenic diet can also contribute for renal stone formation. Decreased fluid intake may lead to more concentrated urine thus increasing risk of urolithiasis⁴. Yelloly, 1829 (Europe) and Cummings, 1977 (North America) documented high prevalence of bladder stone in paediatric age group. McCarrison (1931) was first to provide an epidemiological data on urolithiasis in Indo Pak subcontinent⁵. Urethral calculus in female patients is very rare as they have short urethra and only case reports are available⁴. Study conducted by Kamal et al showed no female patient with impacted urethral stone⁶.

Minimally invasive surgery has changed the management of all the urological diseases especially the urolithiasis thus decreasing the post-operative pain, time in hospital and complications of open procedures². Paediatric cystoscope is available in our hospital and purpose of this study was to share our experience regarding the mode of presentation, gender based frequency occurrence and management of urethral calculus with ultimate goal of making algorithm with a strategy for impacted stone management.

PATIENTS AND METHOD

This prospective study was conducted in Paediatric Surgery Unit Bacha Khan Medical Complex from December 2017 to November 2019. Patient aged below 14 years with diagnosis of impacted urethral calculus were included. While patients with obstruction of urine due to causes other than stone i.e. stricture, injury, pelvic mass etc. were excluded.

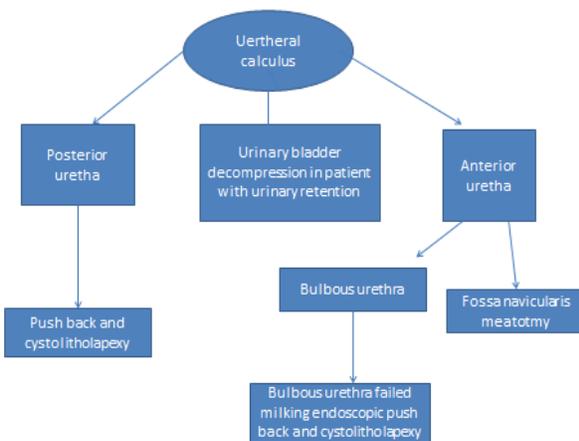
Patients were admitted after proper history and clinical examination (with palpation of penis and perineum for presence of firm structure in palpable part of urethra). Full blood count, urine analysis, urine culture, blood urea creatinine and electrolytes were performed. Ultrasound abdomen and pelvis was performed for the evaluation of urinary track. X-ray KUB and pelvis were also performed, urethral stone were confirmed via paediatric cystourethroscopy.

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In Patients with acute urinary retention, supra-pubic drainage of urine was done via 18 size cannula to relieve pain due to obstruction. A methodical approach determined by Akhtar et al depending on location of stone with some modification was adopted as shown in Figure 1. After confirming the location of the stone in urethra the stone in posterior urethra or bulbous urethra were pushed back endoscopically and the stone was fragmented into pieces via pneumatic lithoclast, patient was catheterized for 1 day and removed on discharge. For stone in penile urethra xylocaine jelly was instilled in the urethra and gentle maneuvering through urethra distally followed by manual extraction of stone through urinary meatus or by meatotomy. The ones which failed to move distally even with gentle maneuvering were pushed back endoscopically. Percentages and frequencies were calculated for gender, location of stone, selected procedure performed and complications. All these information were entered on a structured proforma after which were analyzed through SPSS version 24.

Figure 1: Algorithm for urethral calculus



RESULTS

Total of 34 children with diagnosis of urethral calculus were included in this prospective study of 2 year duration. Age ranged from 1 year to 14 year with distribution (Table 1). Majority were male i.e., 33 children while 1 female child had urethral calculus (Table 2 and Figure 2, 3). In 5 (15%) patients with gentle maneuvering after instilling lignocaine jelly, patients stone were extracted without requiring general anesthesia. 8(23%) patients required meatotomy for stone removal while endoscopic pushback was done in 21 (62%) patients. No urethrolithotomy was performed for any patient. Postoperatively 6 patients developed haematuria which resolved with conservative management, and catheter was kept till the urine cleared. One patient of cystolitholapexy had retention of urine secondary to impacted fragmented calculus after discharge, patient was catheterized and redo surgery was planned and cystolitholapexy was performed.

Figure 2: Female child with impacted calculus



Figure 3: Stone after removal



Table 1: Age distribution of patients (n=34)

Age years	No.	%
<4	8	24.0
5-8	13	38.0
9-12	11	32.0
>12	2	6.0

Table 2: Sex distribution of patients (n=34)

Gender	No.	%
Male	33	97.0
Female	1	3.0
Male to female ratio	33.0:1	

Table 3: Distribution according to presenting complaint (n=34)

Presenting complain	No.	%
Acute retention of urine	25	73.0
Obstructed urine flow with dribbling	4	12.0
Stone visible on external meatus	4	12.0
Urethral pain	1	3.0

Table 4: Location of stone stuck in urethra

Location of stone	No.	%
Posterior urethra	12	35.0
Anterior urethra	22	65.0
Bulbous	14	41.0
Navicular fossa	8	24.0

DISCUSSION

Urolithiasis is present in all parts of world with various age and area distribution but surprisingly data in urethral stones is very limited especially in paediatric age group.² They are more prevalent in paediatric age group secondary to high presence of bladder stones in this age.⁷ The presence of urethral stone in female is very rare secondary to short urethra and only case reports are available. Studies conducted by Akhter et al and Kamal et al showed no urethral calculus in female patient we only came across with single case in which the stone was almost lying outside the urethral meatus and was retrieved without giving anesthesia.^{4,6} Almost all patient had somewhat retention of urine as the urethra was obstructed but 73% of our patients had complete obstruction of urine because of stone which is also comparable with data of Kamal et al (78%) and Amin (89%).^{6,8} Most patients had impaction of stone at anterior urethra 65% which is also comparable with the study of Akhtar et al (63%), Amin and English also documented more urethral stones in anterior urethra while Selli et al reported equal stones in anterior or posterior urethra^{4,8,9,10}.

All stones were sent for chemical analysis and most patients had calcium oxalate stone 92% while 2% were struvite and 6% uric acid stones. 3 patients had associated upper urinary tract calculi as well. No anatomical urethral anomaly was detected on video endoscopy and none of the patient had neurological bladder. By conservative approach like milking with lignocaine jelly and forcep extraction we found that 5 (35%) out of 14 patients with stone stuck in bulbous urethra benefited with maneuvering and the stone could be maneuvered to navicular fossa. Kamal et al reported 15% success with conservative approach however El-Hafi and El-Sherif reported 78% success rate.^{6,11} Although patient presenting with stones in bulbous urethra were few but forcep extraction of calculus stuck in bulbous urethra seems promising, but one has to be gentle during maneuvering.

Endoscopic push back technique was used for the stone stuck in posterior urethra and which failed the forceps extraction in bulbous urethra so a total of 21 patients had pushback and was successful in all patients, which when done gently is able to push back the stone without injuring the urethra. Complications of

cystourethroscopy and cystolitholapaxy are little and less grievous and patients has early recovery and low morbidity. So when facilities are available endoscopic push back should be performed rather than performing urethrolithotomy or vesicolithotomy.

CONCLUSION

Minimally invasive procedure has revolutionized the treatment of urolithiasis. In the past urethrolithotomy used to be done which had grave complications of urethral injury, stricture formation and urethrocutaneous fistula formation. With the recent advances and availability of paediatric cystoscope this could be avoided. A methodical approach to management of urethral stone should be adopted, one with treatment for each urethral stone based on its location, shape and size.

REFERENCES

- Huang J, Tuerxun A, Tusong H, Batuer A, et al. Composition of urinary tract stones formed by children in two populations in the Uyghur region of China. *J Chinese Med Assoc.* 2018;81:949-54.
- Agarwal BK, Agarwal N. Acute urinary retention in children. *Int. Surg. J.* 2017;4:1610-15.
- Ameen AA, Kegham HH, Abid AH. Evaluation and management of urethral calculi. *Int. Surg. J.* 2017;4:2392-6.
- Akhtar J, Ahmed S, Zamir N. Management of impacted urethral stones in children. *J Coll Physicians and Surg. Pak.* 2012;22:510-13.
- Naqvi SA, Rizvi AH, Shahjehan S. Bladder stone disease in children: *Clin Studies. J Pak. Med. Assoc.* 1984;34:94-101.
- Kamal BA, Anikwe RM, Darawani H, Hashim M, Taha SA. Urethral calculi: presentation and management. *Br. J Urol.* 2014;93: 549-52.
- Aggour A, Ziada AM, AbdelHamid AZ, Abdel Rahman S, Morsi A. Metabolic stone composition in Egyptian children. *Pediatr Urol* 2009;5:132-5.
- Amin HA. Urethral calculi. *Br. J Urol.* 1973;45:192-5.
- Englisch J. Über eigelagere and eingesachte stein der Hanrohre. *Arch Klin Chir* 1904;72:487-93.
- Selli C, Barbagli G, Carini M, Lenzi R, Masini G. Treatment of male urethral calculi. *J Urol.* 1984;132:37-42.
- El-Sherif AC, El-Hafi R. Proposed new method for non-operative treatment of urethral stones. *J Urol.* 1991;46:1546-50.