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Common complications of transurethral pneumatic lithotripsy in children with bladder stone disease at a Tertiary care Hospital HMC Peshawar

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ABSTRACT

Background: Medical literature has long documented the occurrence of urinary bladder stones. The Hippocratic oath's declaration that "I will not cut for bladder stone, even for patients in whom the disease is manifest^{1,2}" contains the oldest mention of bladder stones. This study will give us the most recent data on the frequency of erectile dysfunction and retrograde ejaculation among patients with benign prostatic hyperplasia following a two-month course of treatment with dutasteride and tamsulosin, as no such study has been carried out in our population in the previous five years. Furthermore, the study's findings will be shared with other medical professionals and used in future investigations.

Objective: to assess the prevalence of transurethral pneumatic lithotripsy consequences in children with bladder stone illness

Study design: a descriptive study

Duration and place of study: from July 1, 2022, to June 30, 2023, from the Department of Urology, hmc, Peshawar

Methodology: 369 kids with bladder stones were the subjects of this research, which ran from July 1, 2022, to June 30, 2023, at the Department of Urology, HMC, Peshawar. A suitable nonprobability sampling approach was used in the selection process. All the stones were broken up using a paediatric straight working channel, a pneumatic Swiss lithoclast, and a cystoscope. In SPSS 22, data analysis was done.

Results: The research sample had a mean age of 7 years, SD = 8.43. 32% of patients were female, and 68% were male. Common complications were bladder perforation, which affected 5% of patients; hematuria, which involved 7% of patients; acute urine retention, which involved 4% of patients; and fever, which affected 7% of patients.

Conclusion: According to our research, bladder perforation occurred 5% of the time after transurethral pneumatic lithotripsy, hematuria 7% of the time, acute urine retention 4% of the time, and fever 7% of the time in children with bladder stone illness.

Keywords: complications, transurethral pneumatic lithotripsy, pediatric bladder stone diseases

Authors Contribution

ZA. Concept & Design of Study AND Drafting HA. Data Analysis and . Critical Review , ZA, SR. Final Approval of version

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Introduction:

Medical literature has long documented the occurrence of urinary bladder stones. In actuality, the Hippocratic oath's declaration that will not cut for bladder stone, even for patients in whom the disease is manifest" contains the oldest mention of bladder stones.^{1, 2} In most industrialized nations, urinary bladder stones are uncommon. However, it is still a widespread condition of suffering in impoverished countries due to low nutritional status, particularly vitamin A deficiency and endemic infections.^{3,4} Pakistan is located in the Stone Belt. In this area, paediatric urolithiasis is prevalent.⁵ In our region, the prevalence of urolithiasis in children is between 5 and 15%, whereas in developed countries, it is between 1 and 5%.⁶ Interestingly, about 50% of paediatric urolithiasis is caused by bladder stones.^{6, 7} Adult bladder stone treatment is not a major concern since endoscopic technology, such as trans-urethral cystolitholapaxy, has made open stone surgery almost unnecessary, with few grounds for managing adult bladder stones.^{8,9} Pediatric bladder stone therapy, however, poses a challenge because a child's urethra is too narrow to pass a stone punch sheath. 24 Fr down into his or her bladder for formal open vesicolithotomy or percutaneously cystolithotomy is two surgical methods that can be used to cure bladder stones in children. However, there is one question that remains unaddressed: which method works best for young patients with bladder stones? A literature review shows that children's urinary bladder stones can be successfully treated by means of endoscopic or urgent open surgical therapy with smaller morbidity. When compared with the open procedure, suprapubic cystolithotomy requires a shorter hospitalization.¹⁰ In contrast, percutaneous cystolithotomy has a lower risk of complications than formal open vesicolithotomy. However, both operations leave behind scars and entail greater danger of UTI, nosocomial wound infection, longer catheterization periods and longer stays in the hospital.¹⁰ Compared with the open procedure, cystolithotomy involving a suprapubic incision means less time in hospital. Conversely, percutaneous cystolithotomy has less risk of accident than formal open vesicolithotomy. Hence, the scarring, longer hospital visit, longer time on your back with a drip in your arm (catheter period), higher chance of nosocomial wound infection and UTIs is the result of either operation. the purpose of the present study was to find out what are the common transurethral pneumatic lithotripsy sequelae among children who first present with bladder stone illness¹¹. Our research may vary from the existing literature due to our people's diverse cultural, economic, social, and environmental backgrounds. My summary is based on the study question, which states that a novel modality that has shown to be a breakthrough in the treatment of paediatric bladder stones is transurethral pneumatic lithotripsy employing a straight working channel paediatric cystoscope. The study's findings will be disseminated to other medical professionals and used in future investigations.

Methodology:

The current investigation was conducted as a descriptive study over a year, from July 1, 2022, to June 30, 2023, at the Department of Urology, HMC, Peshawar. Based on the WHO method, which accounted for the 4%¹⁶ prevalence of urine retention in transurethral pneumatic lithotripsy, the 95% confidence interval, and the 2% margin of error, the sample size was 369. A handy non-probabilistic sampling strategy was used to get the samples. Children presenting with feverish urinary tract infections (UTIs) identified by clinical history of suprapubic pain/flank pain, frequency, dysuria, fever, and urine routine investigation revealing pus cells more than 6-7, confirmed by culture and sensitivity, small calibre urethra not permitting endoscopic instruments were excluded from the study. Children presenting with bladder stones larger than 6 mm, children aged 5 to 13 years, and both genders were included. Every patient had a thorough history and physical, a

standard urine examination, a urine culture and sensitivity test, and a estimation of their urea and creatinine levels. We used ultrasounds of the abdomen and pelvis and X-rays of the kidney, ureter, and bladder to diagnose bladder stones. A general anaesthetic was used for each treatment. In every instance, a paediatric Wolf straight functioning channel cystoscope was used to conduct cystourethroscopy. Swiss lithoclast was used in pneumatic intracorporeal lithotripsy to break up the bladder stones. Using a paediatric cystoscope and Stone removal forceps and fragments of the stones were extracted. Paediatric urethral catheters were inserted into a limited number of individuals who had bigger stones and were at risk of hematuria 24 hours after the procedure. To assess the frequent intraoperative and postoperative consequences of transurethral pneumatic lithotripsy—hematuria, bladder perforation, acute urine retention, and fever—all patients were monitored for 48 hours. In SPSS 22, data analysis was done. Age and stone size were examples of numerical variables for which mean and standard deviation were computed for categorical parameters such as gender, bladder abnormality, stone consistency, and frequent consequences from transurethral pneumatic lithotripsy (hematuria, bladder perforation, acute urine retention, fever), frequency and percentages were determined.

Results:

In this research, 192 patients (52%) were between the ages of 5 and 7, 103 patients (28%) were between the ages of 8 and 10, and 74 patients (20%) were between the ages of 11 and 13. The age mean was seven years, SD = 8.43. Table No. 1 Among the patients, 118 (32%) were female, and 251 (68%) were male. Table No. 2 A total of 111 patients (30%) had stones measuring 6-10 mm, 170 patients (46%) had stones measuring 11-15 mm, and 88 patients (24%) had stones measuring 16-20 mm. Stone sizes ranged from 10 mm to 5.77 mm on average. (Table Number 3) A bladder abnormality was seen in 30 cases (8%) but not in 339 patients (92%). (Table Number 4) Fifty-five patients (15%) had hard stone consistency, compared to 314 (85%) with soft stone consistency. (Table Number 5) Furthermore, 18 (5% of patients) had bladder perforation, 26 (7% of patients) had hematuria, 15 (4% of patients) had acute urine retention, and 26 (7% of patients) had fever.

Table no 1. Age distribution

Age	Frequency	Percentage
5-7 years	192	52%
8-10 years	103	28%
11-13 years	74	20%
Total	369	100%

Table no 2. Gender distribution

Gender	Frequency	Percentage
Male	251	68%
Female	118	32%

Total	369	100%
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Table no 3. Size of the stone

STONE SIZE	FREQUENCY	PERCENTAGE
6-10 mm	111	30%
11-15 mm	170	46%
16-20mm	88	24%
Total	369	100%

Table no 4. Bladder anomaly

Bladder Anomaly	FREQUENCY	PERCENTAGE
Yes	30	8%
No	339	92%
Total	369	100%

Table no 5. Consistency of stone

CONSISTENCY OF STONE	FREQUENCY	PERCENTAGE
Soft	314	85%
Hard	55	15%
Total	369	100%

Table no 6. Common complications

COMPLICATIONS	FREQUENCY	PERCENTAGE
Bladder Perforation	18	5%
Hematuria	26	7%
Acute urinary retention	15	4%
Fever	26	7%

DISCUSSION

Medical literature has long documented the occurrence of urinary bladder stones. The Hippocratic oath's declaration that "I will not cut for bladder stone, even for patients in whom the disease is manifest" contains the oldest mention of bladder stones.¹² In the majority of industrialized nations, urinary bladder stones are uncommon. However, it is still a widespread condition of suffering in impoverished countries due to low nutritional status, particularly vitamin A deficiency and endemic infections.^{13,14} Pakistan is

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located in the Stone Belt, where paediatric urolithiasis is prevalent.¹⁵ In our region, urolithiasis in children is between 5 and 15%. In contrast, it is between 1 and 5% in developed countries.¹⁶ Surprisingly, bladder stones account for over 50% of paediatric urolithiasis cases.^{16,17} According to our analysis, the mean age was seven years, SD +8.43. 32% of patients were female, and 68% were male. Common complications were bladder perforation, which affected 5% of patients; hematuria, which involved 7% of patients; acute urine retention, which affected 4% of patients, and fever, which involved 7% of patients. Comparable outcomes were noted in further research, which found that in extracorporeal shock wave lithotripsy, patients with calculus-free rates range from 75–100%; in transurethral cystolithotripsy, from 63–100%; in percutaneous cystolithotripsy, from 89–100%; and in open surgery, 100%.¹⁸ There have been reports of a 10% complication incidence for transurethral pneumatic lithotripsy in paediatric bladder stone disease cases. And haematuria (10%),⁸ and postoperative fever (5%) are the most frequent side effects. Urinary bladder perforation (7.4%), urinary retention (4%) and urine retention (15). It has been observed that up to 10% of juvenile bladder stone disease patients may have complications with transurethral pneumatic lithotripsy. Urinary retention (4%),¹⁶ postoperative fever (5%), hematuria (10%),¹⁵ and urinary bladder perforation (7.4%) are the most frequent consequences. In different research in Karachi by Khosa AS et al.¹⁹ The patients' average age was 4.95±3.3 years. The ratio of men to women was 11.5 to 1. A 9.2±2.5-hour hospital stay was the average. Twenty-five (10–65) minutes was the average operation time. Ten individuals (10%) had mild problems, of which five (5%) experienced hematuria, and four (4%) had trouble urinating. One patient (1%), after surgery, had urinary retention. After the treatment, none of the patients had any stones. The patients' mean age in different research by Ali L et al.²⁰ 6.2±2.03 years (range 3-12 years). The stone size average was 14.1 + 3.30 mm. In all, 117 instances (97.5%) had a fully fractured stone; 45 (37.5%) patients had sobbing after micturition and tugging of the penis; 40 (33.3%) patients had recurrent febrile UTIs; and 35 (29.2%) patients had acute urine retention. A mean of 1.23±0.65 days (1-3 days) was spent in the hospital after an average operation lasting 27.5±5.48 minutes (range: 15-40 minutes)²¹. In 97.5% of instances (n=117), the bladder stone was effectively shattered using a pneumatic lithoclast. In the same scenario, the patients who had failed surgery (2.5%) had formal vesicolithotomy. By the third postoperative day, every patient had lost all their stones.²² In 12.5% (n=15/120) of the patients, there were early problems, such as moderate hematuria (5%), urethral discomfort (4.2%), febrile UTI (2.5%), and difficulty urinating (0.8%). After an 18-month follow-up, no urethral stricture was found.²³

CONCLUSION:

According to our research, the following side effects of transurethral pneumatic lithotripsy were common in paediatric bladder stone disease: bladder perforation (5%), haematuria (7%), acute urine retention (4%), and fever (7%).

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