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# Percutaneous Suprapubic Cystolithotripsy in a 2 Year Old Boy with Large Urinary Bladder Stone: Case Report

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## ABSTRACT

Urinary calculus is more commonly known in infants, and the urinary bladder is the most common location in the lower urinary tract for stone formation. There are three basic types of bladder calculus: Primary idiopathic/endemic, secondary, and migrant. Bladder stones account for approximately 5% of all urinary system stones and are prevalent among children living in poor or rural regions. The symptoms and findings in children with bladder stones are usually urgency, frequency, incontinence, dysuria, pyuria, difficulty voiding, and fever, small caliber of urinary stream, lower abdominal pain and urinary intermittency. Most bladder stones are composed of calcium oxalate, followed by calcium phosphate, and they are usually larger than 2.0 cm in diameter. The standard treatment of bladder calculus is open cystolithotomy or transurethral cystolitholapaxy However, the use of a percutaneous approach has been promoted. We performed percutaneous cystolithotripsy in 2 years boy with single large bladder stone. The procedure was done without any ultrasound or fluoroscopic guidance. The diagnosis was made based on anamnesis, ultrasonography, physical examination, and X-ray imaging. The operation was successful, and intraoperative results showed a single large stone in urinary bladder. This report aims to define the surgical challenges presented by bladder stones and the multidisciplinary approach needed to deal with them. Under general anesthesisa, we performed percutaneous suprapubic cystolithotripsy in 2years boy. A Foley catheter was inserted in the urethra and left for a period of 5 days. The rectus fascia defect was closed using the 2-0 vicryl suture. Percutaneous suprapubic cystolithotripsy is a safe and successful procedure for treating bladder stones in children. It is fast and linked to negligible complications.

***Keywords:*** bladder stone, percutaneous suprapubic cystolithotripsy

## INTRODUCTION

Bladder stones are still prevalent in children living in poor or rural regions.1−3 The etiology of stone formation in pediatric populations is largely unknown, although the commonest causes are developmental anomalies, infections and metabolic risk factors.1,2 In developed countries in Europe or America, bladder stones have virtually disappeared due to improvements in diet, though they remain an endemic problem in a number of developing or underdeveloped countries in Africa and Asia. There appears to be a correlation between stone formation and malnutrition.4−6 They are commoner in males than females, but the reason for this is unclear. The clinical manifestations of bladder stones are often more subtle in children, particularly younger children, when compared with the dramatic presentation in adults, which is characterized by sudden, debilitating flank pain. Among children aged 5 years and younger, symptoms such as urgency,

frequency, incontinence, dysuria, pyuria and fever are noted in approximately 20−50% of patients. Microscopic or macroscopic hematuria is frequently the presenting sign, reported in 33−90% of patients.1−3 Urinary tract infection and vesicoureteral reflux may complicate stones.7 If a bladder stone is available for analysis, its composition can help to determine its underlying cause.2,4 Based on published reports, most stones are composed of calcium oxalate (45−65%), followed by calcium phosphate (14−30%).5−8 Bladder stones tend to be larger in younger children and therefore have a lower rate of spontaneous passage. open cystolithotomy, transurethral cystolithotripsy, shock wave lithotripsy (SWL), and percutaneous cystolithotripsy are several treatment methods available for the management of bladder stones. Transurethral cystolithotripsy may be more difficult in children, especially in boys, since urethral diameters are small and there are concerns about iatrogenic urethral restriction.11Percutaneous cystolithotripsy is a safe alternative with low morbidity and complication rates for large-loaded bladder stones. On the other hand, percutaneous cystolithotomy has been performed safely for bladder stones up to 5 cm in size.12 In this report, we present a case of percutaneous cystolithotripsy in 2 years boy with single 20mm bladder stone.

## CASE REPORT

A 2 years boy brought by parents to our institute with c/o pain abdomen, painful micturition for 3 days and unable to pass urine for 1 day. With a visual analogue scale score of 6, the patient seemed to be in severe pain. The patient noticeably shied away from suprapubic and abdominal palpation on general inspection. History of malnutrition present. No similar history in the family. Routine profile shows leucocytosis and on urine examination revealed significant bacteriuria. Radiological imaging like x ray abdomen and ultrasound done. X ray abdomen shows a single large stone bladder. After consent for surgery, percutaneous cystolithotripsy performed under general anesthesia and the bladder is first filled with normal saline. The child is positioned in the Trendelenburg position to reduce bowel injury risk during access and tract dilation/formation. Into the distended bladder midline, one to two fingerbreadths above the pubic bone, an 18-gauge needle is inserted. A wire is passed through the needle and into the bladder when the correct location is validated by the return of fluid. A tract is set up with a dilator to complement a sheath of 30-Fr Amplatz dilators was and a 26-Fr nephroscope is inserted through it. Intraoperative showed a single 20 mm × 15 mm stone. Then with help of lithotripter, fragmentation of large stone done into small pieces. stone fragments removed with help of rigid stone forceps. A Foley catheter is left in the urinary bladder and the rectus fascia defect is closed with a 2-0 vicryl suture.15 Foleys catheter removed on 5$^{th}$ post operative day and discharged on 7$^{th}$ POD. The patient did not show any signs of complications during the most recent follow-up visit to the outpatient clinic.

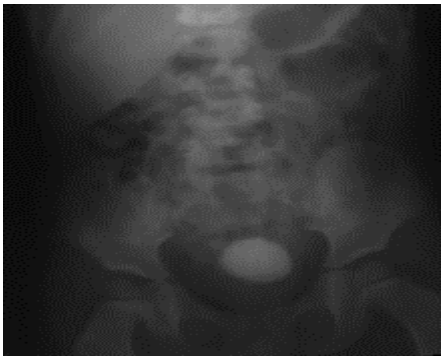

**Figure-1(x ray abdomen shows single bladder stone)**

**Figure-2(fragmentation of stones with lithotripter**

## DISCUSSION

Bladder stones are commonly found in children from underdeveloped and developing countries and are thought to be endemically related to malnutrition. In addition to Vitamin A deficiency, it is understood that diets low in animal protein and phosphorus (breast milk as opposed to cow's milk) are helpful.11 Most commonly, children's bladder stones are composed of ammonium urate acid. Bladder stones are most often found in children from developing countries. However, children with spinal cord injury and/or congenital abnormalities such as spina bifida often undergo augmentation cystoplasty and/or are cleanly catheterized intermittently to manage their bladders. It has been documented that 50% of children with reconstructed bladders grow bladder stones in their lifetime. The development of bladder stones may lead to urinary stasis, bacterial colonization or infection with urea-splitting species, retained mucus, and foreign bodies. However, many of these bladder stones had a noninfectious origin. In addition, an infectious stone does not suggest a recurrent infectious stone, and no known clinical variables appear to be associated with stone composition, suggesting that there is a possible metabolic component in stone formation after bladder augmentation.13

The conventional approach for treating bladder stones is open cystolithotomy. Transurethral cystolithotripsy is an option, but in pediatric patients, it is not optimal. A lower caliber urethra prevents the successful treatment of large bladder stone loads in infants. However, with the benefit of shorter hospital stays, smaller scars, and less indwelling catheter time postoperatively, percutaneous cystolithotripsy is used worldwide.14 Currently, percutaneous cystolithotripsy is the preferred method of treating bladder stones that have formed in reconstructed bladders. Percutaneous lithotripsy has been the first-line treatment procedure in developing countries for treating bladder stones in bladders that have not been enlarged. Percutaneous cystolithotripsy has been used successfully to clear bladder stones in infants younger than 1 year.

In our case, percutaneous cystolithotripsy in 2 years boy performed under general anesthesia and the bladder is first filled with normal saline. The child is positioned in the Trendelenburg position to reduce bowel injury risk during access and tract dilation/formation. Into the distended bladder midline, one to two fingerbreadths above the pubic bone, an 18-gauge needle is inserted. A wire is passed through the needle and into the bladder when the correct location is validated by the return of fluid. A tract is set up with a dilator to complement a sheath of 30-Fr Amplatz dilators was and a 26-Fr nephroscope is inserted through it. Intraoperative showed a single 20 mm × 15 mm stone. Then with help of lithotripter, fragmentation of large stone done into small pieces. stone fragments removed with help of rigid stone forceps. A Foley catheter is left in the urinary bladder and the rectus fascia defect is closed with a 2-0 vicryl suture.15 Foleys catheter removed on $5^{th}$ post operative day and discharged on $7^{th}$ POD. No post operative complications noted.

## CONCLUSION

In underdeveloped and developing countries, primary bladder stones are common in infants. Transurethral cystolithotripsy, open cystolithotomy, and Shock wave lithotripsy are the treatment options available to control bladder calculus. While most adult vesical calculi can be handled with transurethral lithotripsy, this technique is often limited in pediatric patients because of their small urethral caliber. A safe and successful procedure for the treatment of bladder stones in children is percutaneous suprapubic cystolithotripsy. It is quick and linked to negligible complications.

### *Declaration by Authors*

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