



## CASE REPORT

# Large Bladder Stone in Sasak Young Teen Boy

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## ABSTRACT

**Background:** The incidence of bladder stone in children approximately 1-2% of that in adults, and are common in the first 3 years old and more than 60 years old. Children in underdeveloped countries are more likely to have endemic bladder stones. Large bladder stones in children are not very common. The choice of treatment depends on the number, size, location, composition of the stones and the anatomy of the urinary tract.

**Case Presentation:** A Sasak young teen boy, 12 years old, complained pain on micturition in the last 5 years. The pain became worse in the last one week before admission. On abdominal ultrasound and plain abdominal x-ray, we found large bladder stone with diameter 4 cm. Then we performed open cystolithotomy on this patient. One day after surgery, patient discharged from hospital with urethral catheter still inserted.

**Discussion:** The incidence of endemic bladder stones is higher in developing nation mostly in families with low protein and phosphate diets, and recurrent diarrhea. The clinical presentation ranges from asymptomatic to the presence of urgency, frequency, incontinence, fever, hematuria, etc. In pediatric bladder stones, conventional open cystolithotomy has been considered the gold standard surgical procedure.

**Conclusion:** The incidence of bladder stones in children living in endemic areas is mostly caused by nutritional problems. Prevention, early diagnosis and management of bladder stones in the pediatric age group is very important to reduce morbidity and mortality.

**Keywords:** Large bladder stone, endemic bladder stone, young teen boy, open cystolithotomy

## BACKGROUND

Bladder stones account for approximately 5% of all urinary stones.<sup>1,2</sup> The incidence in children approximately 1-2% of that in adults.<sup>1</sup> The age distribution has two peaks, the first at age 3 years old for children in developing countries and the second at age 60 years old.<sup>3,4</sup> Children in underdeveloped countries are more likely to have endemic bladder stones than kidney stones.<sup>2,5</sup> These areas include Eastern Europe, Southeast Asia, India, and the Middle East.<sup>5</sup> However, recent epidemiological studies have shown that in the Western world, especially among girls, Caucasians, African-Americans, and older children, the prevalence of childhood calculi is also increasing.<sup>6</sup>

Bladder stone etiology is classified into primary and secondary, related to association with other diseases. Primary or endemic bladder stones occur in the absence of other urinary tract diseases. It usually occurs in children in areas of low animal protein intake, poor hydration, and recurrent diarrhea.<sup>1,7</sup> Secondary bladder stones occur in the presence of other urinary tract abnormalities, including bladder outlet obstruction, chronic bacteriuria, neurogenic bladder dysfunction, bladder diverticula, bladder augmentation or urinary diversion, and foreign bodies including catheters.<sup>1</sup>

Children may be asymptomatic or have symptoms such as urgency, frequency, incontinence, dysuria, pyuria, difficulty in voiding

small-caliber urinary stream, lower abdominal pain, and intermittent voiding. Fever also one of the symptoms of bladder stone in children age  $\leq 5$  years old, which were reported in approximately 20-50 % cases.<sup>2,4</sup> From urine analysis, 33-90% show microscopic or macroscopic hematuria.<sup>2</sup> The approximate frequency of kidney stone types in the pediatric age group is calcium with phosphate or oxalate (57%), struvite (24%), uric acid (8%), cystine (6%), endemic (2%), mixed (2%), and other types (1%).<sup>5</sup> Most bladder stones consist of calcium oxalate (45-65%), followed by calcium phosphate (14-30%), most stones are around 0,6 cm to 1,27 cm in size.<sup>2,8</sup> Large bladder stones in children are not very common and are usually related to nutritional factors.<sup>9</sup>

The choice of treatment depends on the number, size, location, composition of the stones and the anatomy of the urinary tract.<sup>6</sup> In pediatric bladder stones, conventional open cystolithotomy has been considered the gold standard surgical procedure. However, recent advances in minimally invasive technology and endoscopic techniques have improved the urological armamentarium for the definitive treatment of bladder stones in children.<sup>10</sup> In this report, we present a case of a large bladder stone with diameter larger than 4 cm in a Sasak young teen boy.

## CASE PRESENTATION

A 12 years old Sasak young teen boy came to Mataram University Hospital with chief complain pain on micturition in the last 5 years. The pain became worsened in the last 7 days before admission to hospital. There was no fever. Patient was admitted to hospital and being treated with antibiotic, ceftriaxone 1 gr injection, by pediatrician for 5 days, then consulted to urologist after bladder stone was found on ultrasound.

On abdominal ultrasound, we found large bladder stone with diameter 3,5 cm and cystitis. Another abdominal organ, including both kidneys, were normal. On plain abdomen X ray, we found bladder stone with diameter

4,4 cm. There was many erythrocytes, positive bacteria, and leucocytes 5-8/HPF on urine examination.



Figure 1. Abdominal ultrasound confirmed the bladder stone about 3.5 cm in diameter and cystitis, and the other organs were normal.



Figure 2. Plain abdominal X-ray revealed a large, round pelvic calculus measuring 4,4 x 3,6 cm.

Then we performed cystolithotomy (open bladder stone surgery) on Wednesday, November 30th. We made Pfannenstiel incision on suprapubic region, deepened to

rectus fascia. Fascia sharply opened; muscle then split. Bladder was incised, but before that, we instilled 200 ml saline liquid into it. After that, the stone was removed with stone tang. It was hard to remove the stone, because of its large size. After that, we wash the wound and bladder with saline liquid, until no more stone flakes and dirt. Then we close the bladder with one layer locking continuing suture, using absorbable 2-0 polyglactin thread. We close the surgical wound, without leaving drain into it. We continued intravenous antibiotic, ceftriaxone 1 gr, and paracetamol infusion for analgetic. One day after surgery, the patient condition was good, and the urine color was clear, so we let him discharged from hospital with urethral catheter still inserted.

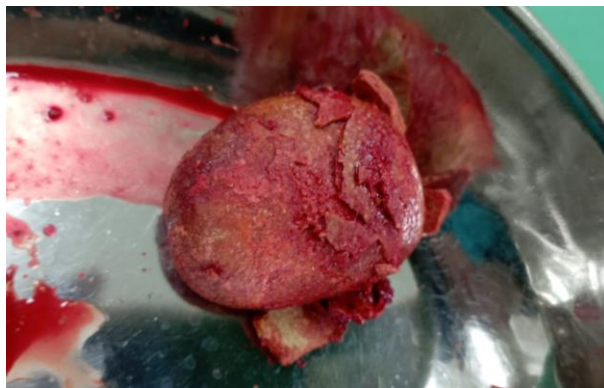


Figure 3. A bladder stone was extracted by open cystolithotomy in a young teen boy.

Six days after surgery, patient went to urology outpatient clinic. He just complained mild pain on his penis, no fever, and no hematuria seen in the catheter. The surgical wound was in good condition, no sign of inflammation. Then we removed the catheter, and patient could void spontaneously.

## DISCUSSION

Urinary bladder stone contributes about 50% of urolithiasis in children.<sup>11</sup> The incidence of endemic bladder stones is higher in developing nation, more common in males,

with male-female ratios between 10:1 and 4:1 reported.<sup>4</sup> In Indonesia, bladder stones are relatively common in children in West Sumatra, with an incidence of 8.3/100,000 population per year, and a peak age of 2-4 years, mostly seen in poor families with low protein and phosphate diets, and many children suffer from diarrhea. The climate is tropical, with an average summer temperature of 30 °C and 2,000 mm of rainfall.<sup>12</sup> Our patient comes with complaints of pain on micturition or dysuria in the last 5 years. There's no obstruction to the flow of urine, and no evidence of pathological abnormalities in the organs based on our finding. Therefore, the etiology in this patient is primary or endemic bladder stone.

One of the underlying cause or precipitating event in the initiation of primary bladder stones, namely replacement feeding of newborns on a high-carbohydrate diet. The frequent use or exclusive dependence on carbohydrate foods in place of milk feeding leads to a relative dietary deficiency of phosphate and the formation of insoluble urinary salts.<sup>13</sup> A cereal-based diet poor in animal protein and low in phosphate also causes hypophosphaturia and hyperammonuria, promoting deposition of calcium oxalate and ammonium uric acid. Coupled with low dietary intake of vitamins B1, B6, and magnesium, can cause hyperoxaluria. Deficiency of Vitamin A also causes urothelial degeneration which can increase stone formation.<sup>11</sup> Girls have a shorter urethra than boys and are not convoluted and can pass most of the calculus debris without retaining nuclei in the bladder. In some males, a stone core forms and is maintained. Subsequent stone growth is determined by the net effect of storage and resorptive mechanisms operating over months or years.<sup>13</sup>

The clinical presentation of bladder stone ranges from a complete absence of



symptoms to the presence of suprapubic pain, dysuria, intermittency, frequency, hesitancy, nocturia, and urinary retention.<sup>4</sup> Bladder stones can rarely cause kidney dysfunction. In general, they are mobile within the intravesical space. Therefore, they do not impair urine flow and barely cause bladder outlet obstruction. Large stones can be left without causing symptoms for a long time.<sup>13</sup> However, if left untreated, infra-vesical obstructive uropathy can develop, as larger stones impact the bladder neck and exert mechanical pressure on the ureteral orifice.<sup>1</sup>

Our patient underwent a cystolithotomy (open bladder stone surgery) with stone size 4,4 x 3,6 cm. Open cystolithotomy, transurethral cysto-lithotripsy, shock wave lithotripsy (SWL), and percutaneous cysto-lithotripsy are several treatment methods available for the treatment of bladder stones.<sup>14</sup> Open surgical removal may be necessary if the stones >2,5 cm in diameter.<sup>15</sup> Safe and effective minimally invasive management of bladder stones in children, such as endourological procedures, was mainly indicated for smaller stones with a diameter less than 1.0 cm.<sup>3</sup> SWL is the recommended treatment for stones smaller than 2.0 cm because it is the least invasive. The success rate of SWL is relatively high compared with (57% to 92% the long-term stone-free rate) in adults.<sup>16</sup>

In pediatric bladder stones, conventional open cystolithotomy has been considered the gold standard surgical procedure, due to the high stone-free rate and availability of published long-term data.<sup>10,11</sup> In recent years, transurethral cysto-lithotripsy has become an alternative method to open cystolithotomy. However, the applicability of this approach is limited especially in boys, since urethral diameters are small and there are concerns about iatrogenic urethral restriction.<sup>3,14</sup> Transurethral extraction using

a cystoscopic instrument is the treatment of choice in small bladder stone. However, in other cases, a simple open cystolithotomy may provide the most effective treatment with minimal patient morbidity. In some developing countries, several advanced methods and equipment are not yet available, and many patients cannot afford the costs of less invasive procedures. Under these conditions, open surgery is safe, effective, with an acceptable length of stay, excellent patient acceptability, low cost, and low morbidity, and provides good stone-free rates.<sup>3</sup>

Our patient was discharged from the hospital one day after surgery with a urethral catheter in place. After six days, the catheter was removed and he was able to void spontaneously without any sign of inflammation. It is recommended to place a catheter in the bladder after surgery to allow good healing and to place a drain in the retropubic space for a few days to allow drainage of urine or hematoma if leakage occurs after surgery. However, there are side effects of catheter use that need to be monitored such as infection and stricture.<sup>17</sup> These complications can be avoided by placement of indwelling urinary catheters for an approved indication only, aseptic technique during catheter insertion and removal, cleaning the urethral meatus with sterile water and maintenance of the drainage bag below bladder level, and prompt removal when indications are no longer present.<sup>18</sup> Catheter duration should not exceed 8 days because shorter duration of catheterization and length of patient stay have a positive impact on reducing catheter-associated urinary tract infections.<sup>19</sup>

## Conclusion

The incidence of bladder stones in children living in endemic areas is mostly caused by nutritional problems. Good prevention, early diagnosis and management of



bladder stones in the pediatric age group is very important to reduce morbidity and mortality.

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