

## SERIAL CASES REPORT : 3 CASES OF GIANT BLADDER STONE IN DILUMIL PUBLIC HEALTH CENTER, EAST NUSA TENGGARA, INDONESIA

*Adrianus Gupta Wijaya, Arley Sadra Telussa*

### ABSTRACT

*Giant bladder stone is a rare case of urinary tract stones. This case usually occurs because of delayed diagnosis due to limited medical facility. Cases Three cases of giant bladder stone were reported in Dilumil Public Health Center, East Nusa Tenggara. All patients are male. The first patient is 40 years old with a 9 x 8.7 x 6 cm bladder stone and that weighed 425 g. The second patient is 19 years old with a 6 x 5.5 x 5.5cm bladder stone and that weighed 116.5g. The third patient is 18 years old with 4.8 x 3.8 x 3.7cm stone and that weighed 105g. Two of three patient's main complaint was urinary retention, while other patient complained of dysuria. All cases were treated with open vesicolithotomy. Conclusion Giant bladder stone weighing > 100g is uncommon. Initial careful diagnosis is needed to prevent delays in handling bladder stones in primary health facilities. These patients live in the same area and share the drinking water source. The bladder stone was removed by open vesicolithotomy without any complications.*

*Keywords: giant bladder stones, open cystolithotomy, public health center*

The first bladder stone was discovered in a boy in Egypt in approximately 4800 BC.<sup>1</sup> In recent years, bladder stones are increasing. It may be associated with bladder outlet obstruction, genetic or metabolic diseases, and other environmental factors.<sup>2</sup> Bladder stones comprise 5% of urinary tract stones. The incidence in men is higher than in women.<sup>3,4</sup>

Giant bladder stones is defined as bladder stone that weigh more than 100 grams and a diameter of more than 4 cm.<sup>4,5</sup> These types of stones are uncommon. Bladder stones start to grow when there is urinary stasis that is caused by an underlying medical condition that prevent complete emptying.<sup>6</sup> Giant bladder stones are often diagnosed late because of lack of medical examination tools in a remote area. Surgical management with open vesicolithotomy is the best option for this case.<sup>2</sup>

In Dilumil Public Health Center, there were three cases of giant bladder stones from 2018-2020. All of the patients

lived in the same hamlet with a distance of less than 1 kilometer each and all of them used the same drinking water source. This serial case report shows that proper initial assessment of bladder stone is important especially in remote areas with limited medical facilities.

### CASE PRESENTATION

#### CASE 1

A 42-year-old male, who worked as a farmer, visited our emergency room with urinary retention. His last miction was prior ER visit. In the last few days, he had urinary frequency about 10-15 times a day, with a small amount of urine. He also had urgency and nocturia. It occurred several times over the last few months. He has the history of UTIs. Patient's source of drinking water comes from the river. The patient's drinking water hardness level is 240 ppm. The patient was a smoker for the past 20 years, with a total of about 10 cigarettes per day. History of certain medications and drinking alcohol was denied.

On physical examination, vital signs were within normal limits, and normal body mass index ( $21,09\text{kg/m}^2$ ). In suprapubic area, a hard mass was palpable. Costo vertebral angle (CVA) knock pain on the right side was positive. There were no abnormalities in the external genitalia. Laboratory test showed the blood glucose level of  $118\text{ mg / dL}$ . The patient was inserted a 16 Frfoley catheter with initial urine ca. 600 ml and immediately referred to the hospital for further treatment.

Patient underwent openvesicolithotomy surgical procedure. Kidney urether bladder (KUB) imaging showed radioopaque shadow at pelvic cavity ( $4,5 \times 4\text{ cm}$ ) (Figure 1). From the surgical procedure, the stone measured  $9 \times 8.7 \times 6\text{ cm}$  in size (Figure 2) and weighed 425 g. Stone analysis showed that it was composed of oxalate, uric acid, ammonium, calcium, phosphate and carbonate.



**Figure 1.** Plain X-ray shows a radiopaqueshadow, well defined, irregular margins in the pelvic cavity



**Figure 2.** A  $9 \times 8.7 \times 6\text{ cm}$  bladder stone that weighed 425 grams

## CASE 2

An 18-year-old male, visited the emergency room with urinary retention. It had occurred several times in the last 1-year. His last miction was 3 hours prior ER visit. Patient also complained of frequency ( $10\text{-}15\text{x/ day}$ ) and nocturia. here was lower abdominal pain. There were no other complaints. The patient consumed water from the same river water source as the patient case number 1. The drinking water hardness level was 262 ppm. He is smoker, 15 cigarettes / day for 3 years. History of specific illnesses and certain medications was denied.

On physical examination, vital signs were within normal limits, with normal body mass index ( $22.3\text{ kg/m}^2$ ). There was a palpable mass in suprapubic area with CVA knocking pain on the left side. There were no abnormalities in the external genitalia and digital examination. A 16 Frfoley catheter was inserted and patient was referred to the hospital for further treatment.

Patient had an open vesicolithotomy surgical procedure. The plain KUB imaging showed an oval radiopaque shadow with a size of  $4.5 \times 4\text{ cm}$  (Figure 3). From the surgical procedure a giant bladder stone was obtained. The stone was broken into several pieces due to

poor storage in transportation, with the largest fraction size of 6 x 5.5 x 5.5 cm (Figure 4). It weighed 116.5 g. The composition of mixed-type stones consisted of oxalate, uric acid, ammonium, calcium, phosphate and carbonate.



**Figure 3.** Plain X-ray shows round radiopaque shadow in pelvic cavity



**Figure 4.** Bladder stone fractions with biggest dimension 6 x 5,5 x 5 cm that weighed 116,5 grams

### CASE 3

A 19-year-old male, who worked as a farmer, visited outpatient clinic with the main complaint of dysuria. There was a burning sensation at the tip of the penis during urination accompanied by intermittent pain in the lower abdominal area in the last 1 week. This kind of pain has occurred several times during the past 3 years and is being treated as a urinary tract infection. He had urinary frequency about 15-20 times a day with nocturia. There are no other complaints. The patient's drinking water hardness level was 242 ppm, with the same water source as case 1 and 2. History of specific illnesses, certain medications, smoking, and drinking alcohol were denied.

On physical examination, vital signs were within normal limits with normal body mass index ( $19.9 \text{ kg} / \text{m}^2$ ). The bladder was not palpable. There was no CVA knocking pain. There were no abnormalities in the external genitalia. Our patient was referred to the hospital for further examination.

Patient had an open vesicolithotomy surgical procedure. The plain KUB imaging showed an oval radiopaque shadow 3,5 x 4,1 cm in size (Figure 5).



**Figure 5.** Plain X-ray shows a radiopaque lesion with smooth edge in the pelvic cavity

From the surgical procedure, it was obtained an oval giant bladder stone. It weighed 105g and a dimension of 4.8 x 3.8 x 3.7cm. Stone analysis showed that it was composed of oxalate, uric acid, ammonium, calcium, phosphate and carbonate.



**Figure 6.** A 4,8 cm x 3,8 cm x 3,7 cm bladder stone that weighed of 105 grams

## DISCUSSION

Bladder stone accounts for 5% of urinary stone and usually occur because of bladder outlet obstruction, neurogenic voiding dysfunction, urinary tract infection, or foreign bodies.<sup>2</sup> The incidence could reach 1-5% in Asians, 5-10% in Europe, and 13-15% in United States. The incidence and prevalence of urinary stone in many countries around the world are increasing.<sup>7,8</sup> In developed countries such as the United States, Europe and Australia, urinary stone are found in the upper urinary tract, while in developing countries such as India, Thailand, and Indonesia, more often found in the bladder.<sup>9</sup>

There are no definite data on the incidence and prevalence of urinary stone in Indonesia currently, but it is estimated to be high. Indonesia is included in the group of "World Stone Belt" countries, where it has a higher prevalence of urinary stone

than other countries.<sup>10</sup> Bladder stone is more common in adults, with prevalence in male higher than women. Malnutrition in the early years of life causes bladder stones to become common in Turkey, Iran, India, China, and Indonesia.<sup>8</sup>

The formation of bladder stones is thought to correlate with urinary flow disorders, metabolic disorders, urinary tract infections, dehydration, and idiopathic. There are several risk factors for stone formation, including intrinsic and extrinsic factors. Intrinsic factors include heredity (heredity), age (often found at 30-50 years old), and gender (three times as many male patients as female patients). Some of the extrinsic factors include geography, climate, temperature, water intake (lack of water intake and high levels of calcium, minerals in the water consumed), diet (diet with lots of purines, oxalate, calcium), and work (lack of activity or sedentary life).<sup>10</sup>

Our three patients live in the same area in Dilumil, East Nusa Tenggara, Indonesia. Dilumil is in area with a limestone structure at an altitude of about 200m above sea level. This limestone structure is the reason for the high levels of lime in the water source. Groundwater has a higher level of hardness than surface water.<sup>11</sup> However, the quality of drinking water used by the three patients still meets the requirements. The quality of drinking water that meets the requirements of according to ministry of health (492/Menkes/Per/IV/2010) concerning drinking water quality must have a total dissolved solids (TDS) /hardness level less than 500mg/l or 500ppm. The relationship between the bladder stone cases and the quality of drinking water cannot be concluded.

Most stones originate in the upper urinary tract. Only 16% come from the lower urinary tract.<sup>6</sup> Bladder stone is common as a result of bladder outlet obstruction.<sup>10</sup> It is caused when minerals build up in the bladder and form small

stones that can pass spontaneously. Sometimes these stones can get stuck to the bladder wall or ureter and they gradually gather more mineral crystals, becoming larger over time.<sup>6</sup> The difference in the anatomical structure of the urethra also explains why the incidence of men is higher than in women. Men have a longer urinary tract so that the possibility of substance deposition of stones is greater.<sup>9</sup> In this case series all of the patients were male.

Several studies stated that BMI, hypertension, and serum uric acid were associated with stone formation. But in the study of Nur Rasyid et al., there was no statistically significant association between them.<sup>13</sup> In our serial case, bladder stones formed in all three patients with normal BMI and normotension.

Hammad et al, in their report stated that the mean age of bladder stone patients in their study was 41 years, whereas Dounias et al and Takasaki et al reported the mean age was > 50 years.<sup>14</sup> However, in our report, the mean age of the three patients was 25.67 years. This requires further investigation to determine the cause of bladder stones in the younger population of Dilumil village.

The clinical presentation of bladder stone depends on the size and location of the stone. The typical symptoms and signs may include dysuria, suprapubic pain, terminal gross hematuria, intermittency, and urine retention.<sup>1</sup> Irritating urinary symptoms caused either by the stone itself or by associated urinary infections.<sup>12</sup> Pain in the urination is felt at the tip of the penis, scrotum, perineum, waist, to toe.<sup>10</sup> This is similar with the symptoms of the cases where in case number one and two experienced urinary retention, whereas the third case presented with dysuria.

The common tools to investigate a bladder stones are plain X-ray abdomen (KUB), ultrasonography, intravenous

urography, CT Scan etc.<sup>16</sup> In all three patients, only plain abdominal radiographs were performed. This is due to limited supporting medical equipment by our facility in remote areas. From plain abdominal radiograph examination, an oval-shaped radiopaque shadow shows the presence of stones in the bladder.

Giant bladder stone can be single or in groups, and small or large in size to fill the entire bladder space.<sup>1</sup> Bladder stone is mostly single and multiple stones are seen only in 25% to 30% of cases.<sup>15</sup> Our patients have single large stone with an oval shape.

Most bladder stones are composed of struvite calculi. However, calcium oxalate and uric acid stones are also prevalent.<sup>4</sup> These crystals remain in a metastable state (remain dissolved) in the urine, if there are no certain conditions that cause crystal precipitation to occur.<sup>10</sup> In our case, all three patients developed stones composed of oxalate, uric acid, ammonium, calcium, phosphate and carbonate stones.

Management of the stones depends on the patient's age and their general health, as well as the size, number, and the density of the stones. Methods of treatment include medical therapy, shock wave lithotripsy, endoscopic cystolithotripsy, transurethral cystolitholapaxy, and open cystolithotomy.<sup>1,17</sup> Surgical management usually gives more satisfactory results. In adults, open surgery should be strongly considered for large stones (>4cm). All bladder stones can be removed by open surgery.<sup>1</sup> A giant bladder stone may occupy most of the bladder space and causes bladder inflammation and obstruction to urinary flow by blocking both of ureteric orifices. This causes changes similar to bladder outlet obstruction leading to renal failure.<sup>16</sup> All three cases had giant bladder stones larger than 4 cm in diameter, and thus underwent an open vesicolithotomy. To prevent catastrophic sequel, these action to remove stones must be taken immediately.

## CONCLUSION

Three cases of giant bladder stones have been reported at the Dilumil Public Health Center, East Nusa Tenggara, Indonesia. All three cases are managed by the open cystolithotomy. In postoperative follow-up examinations, clinical improvement is found without complications. Giant bladder stones are one of the main causes of urinary retention and often diagnosed late. The diagnostic methods in the peripheral area include physical examination, plain abdominal radiography, and ultrasonography. Patients with recurrent lower urinary tract infection should always consider the possibility of bladder stones to avoid delays in diagnosis, especially in remote areas. Surgical follow-up can provide the best results for patients with low recurrence rates.

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