

# Giant Urinary Bladder Stone in Association with Acute Kidney Injury: A Rare Urological Emergency

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## Summary

Urinary stone remains a common urological disorder. Urinary bladder stone accounts for 5% of the urinary tract calculi. They are usually small and rarely present with complications; they may progressively increase in size, occupying the urinary bladder and resulting in the development of symptoms and complications. Our aim was to report the first case of a giant urinary bladder stone in association with severe kidney dysfunction in our Community. We report the case of a 65-year-old man with a 1-week history of decrease in urinary output and uremia following a referral from the general hospital. Remarkable findings on clinical examination were an elderly man that was confused, pale, and dehydrated. He had a suprapubic bladder Foley catheter which was inserted at the source of referral. Laboratory and imaging investigation revealed raised creatinine levels, bilateral hydronephrosis, and giant urinary bladder stone. These were suggestive of obstructive uropathy likely from the stone in association with severe

kidney dysfunction. He had emergency open cystolithotomy and a 400g stone was removed. There was an immediate improvement in the urinary output and renal function. We have reported our experience on the successful management of giant urinary bladder stone in association with acute kidney injury. The patient recovered satisfactorily from acute kidney injury following emergency open cystolithotomy.

**Keywords:** Giant urinary bladder stone, Cystolithotomy, Obstructive uropathy

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## Introduction

Urinary stones are common urological disorders (1). It is next to urinary tract infection and prostatic disease in

terms of occurrence (2). It can occur in the kidney, ureter, bladder, or urethra. Urinary bladder stones

account for less than 5% of the urinary tract calculi (3). Urinary stones are made up of different components. The most common bladder stone calculi are made of uric acid crystals (4). Urinary bladder stones can either be migrating (primary), from the upper tract, or secondary, in which it is formed *denovo* in the urinary bladder (5). Environmental factors, dietary factors, metabolic factors, infections, and all cases of bladder outlet obstruction are risk factors for the development of urinary bladder stones (5). Patients with bladder stones may be asymptomatic or symptomatic with or without complications (6). They commonly present with suprapubic pain, lower urinary tract symptoms, and hematuria (7). Urinary bladder stones rarely present with complications. Aside from being an established risk factor for the development of bladder stones, urinary tract infection may also be a complication of urinary stones. Urinary tract infection has been reported to complicate 22–34% of bladder calculi (8). This has been attributed to its foreign nature in the bladder, thus constituting a nidus for infection (9). The other rare complications are acute or chronic urinary retention and renal failure (8,10). Urinary bladder stones have also been linked with the development of bladder cancer (13). Bladder stones are usually small, but they may progressively grow in size occupying the bladder cavity, and are often referred to as giant bladder stones. The giant bladder stone has not been well defined. It has been defined as a stone that is more than 10cm in diameter by some authors, whereas others have defined it as a bladder stone that is more than 100g in size (11,12). The management of urinary bladder stone depends on the clinical presentation. The initial care may involve urgent suprapubic cystotomy and/or salvage hemodialysis in complicated cases (14). The definitive treatment is surgical removal of the stone. The gold standard surgical option is endoscopic removal (7). Open cystolithotomy could, however, be an option when emergency surgical removal is required. Any delay in such instance may lead to irreversible kidney damage. Cases of giant bladder stone are uncommon and it rarely results in urological emergency (15). Thus, it was worthwhile to report this rare case of an elderly man with giant urinary bladder stone in association with severe renal

dysfunction necessitating emergency open cystolithotomy. Our aim was to report the first case of giant urinary bladder stone in our community and to document its rare complication of severe kidney dysfunction; our objectives were to present the clinical features, investigations, and management of a case of giant urinary bladder stone.

### Case presentation

We present a 65-year-old man with a 1-week history of reduced in urinary output and uremia following a referral from the state general hospital. He had an antecedent history of lower urinary tract symptoms over a period of 2 months, which culminated in acute urinary retention. This necessitated suprapubic tubed cystostomy at the referring institution. He was on a suprapubic catheter for 6 months before presentation. He had no previous history of urethral trauma, surgery, instrumentation, catheterization, or urethritis. His past medical and surgical history was clinically unremarkable. Clinical examination revealed an elderly man who was confused with a Glasgow coma score of 12, pale, and dehydrated. His vital signs were a blood pressure of 110/80mmHg, pulse rate of 110/min, respiratory rate of 20/min, and temperature of 36.8°C. The head, neck, and chest examination were clinically unremarkable. A suprapubic bladder Foley catheter was connected to a urinary drainage bag, although it was noted to be empty. There was a palpable stony hard, tender suprapubic swelling of about 14 weeks fundal height in size. Digital rectal examination revealed a normal prostate. Examination of the external genitalia was grossly normal. He had parenteral ciprofloxacin, metronidazole, paracetamol, and fluid resuscitation. Laboratory investigations done revealed park cell volume of 22%, elevated potassium, reduced calcium and elevated phosphorus (Table 1) The urine culture was negative. Abdominopelvic sonography revealed a suspected bladder stone with bilateral hydronephrosis. Transrectal ultrasound revealed a prostate size of 25g. Plain pelvic radiogram revealed an oval-shaped radiopaque substance filling the entire bladder cavity (Figure 1). He had two pints of blood transfused on account of symptomatic anemia and subsequently had

emergency open cystolithotomy. An oval foul smelling stone measuring 8cm × 8cm × 6cm and 400g in weight was removed (Figure 2 and Figure 3). Intra-operatively,

the stone completely filled the entire bladder cavity and was impacted in the trigone of the bladder.

Table 1. Pre-operative and post-operative values of electrolyte, urea, and creatinine.

Electrolytes	Pre-operative	Post-operative (mmol/L)	Normal range (mmol/L)
Sodium	134	140	120–140
Potassium	5.8	3.7	3–5
Magnesium	1.07	*	0.65–1.25
Calcium	1.58	2.2	2.02–2.60
Phosphorus	2.08	*	0.85–1.3
Chloride	97.8	100	90–110
Bicarbonate	16.5	21	20–40
Urea	22.16	4.0	2.5–8.2
Uric acid	459	*	208–428
Creatinine	457.6	110	60–120

\*Not repeated.



Figure 1. Plain radiograph of the abdomen and pelvis showing an oval radiopaque substance filling the bladder cavity as shown by the red arrow.

There was extensive anterior bladder wall pressure necrosis. There was immediate urinary drainage from both the ureteral orifices following stonedisimpaction. There was a grossly normal bladder mucosa except in the areas overlying the bladder wall necrosis. The bladder cavity was thoroughly lavaged with warm saline. Devitalized bladder tissues were removed and repair subsequently done. The urethral catheter connected to the urinary drainage bag was passed with ease. There was gradual and eventual adequate urinary drainage, and the suprapubic catheter was not reinserted after the successful passage of urethral catheterization.



Figure 2. Size of the stone—8cm in greatest dimension.



Figure 3. Weight of the stone—400g.

The immediate post-operative period was uneventful. The patient developed vesicocutaneous fistula on post-operative day 7. This was managed nonoperatively by continuous bladder drainage via a urethral catheter for 2 weeks. The post-operative laboratory investigation was essentially normal (Table 1). The patient was discharged after 3 weeks. Follow-up at the surgical outpatient department 5 months after discharge was uneventful.

### Discussion

Giant urinary bladder stones are a relatively common urological disorder and are rarely associated with complications (15). Few cases of giant urinary bladder stones have been reported in the medical literature (16). Those cases were also rarely associated with kidney dysfunction (16). This is because a bladder stone is unlikely to obstruct the ureteral orifices due to its mobility in the bladder cavity. However, it may become impacted in the fundus compressing on the ureteral orifices with attendant renal insufficiency (17), as noted in our patient. This perhaps explains the deranged pre-operative urea and creatinine, and low park cell volume in the patient.

Our patient was noted to have a suprapubic bladder Foley catheter in place following difficult urethral catheterization. The difficulty in passing a urethral catheter may be as a result of the stone in the bladder neck, thus constituting mechanical obstruction (18).

The presence of an indwelling catheter, urinary stasis from the bladder outlet obstruction, and attendant urinary infection may explain the progressive increase in the size of the stone filling the entire bladder cavity, as noted in our case. There was no clinical, radiological, or laboratory evidence of prostatic disease that could have served as risk factors for the urinary bladder stone in this case. It is likely to be an infection stone. Biochemical stone analysis is required to establish the likely component of the stone. This was not done due to non-availability of facilities.

A clinical suspicion of urinary bladder stone was made following pelvic sonography and plain pelvic radiogram. Although the gold standard investigation for urolithiasis is noncontrast computed tomography (19), this was not performed in our patient, because

information from the pelvic radiography was sufficient; 90% of urinary stones are radiopaque, which can easily be picked on a plain radiograph (20). Waiting for a CT scan may also delay the emergency intervention, which may result in severe morbidity.

Although the pathogenesis of renal dysfunction in this case could be multifactorial, the likely factors include dehydration, urinary sepsis, and obstructive uropathy. The immediate restoration of urinary drainage after stone disimpaction coupled with improvement of renal function is a pointer to post-renal kidney injury. This may also explain that the cause of confusion at presentation may likely be due to uremia due to the pre-operative renal function and then post-operative improvement of renal function.

Open cystolithotomy was performed rather than the gold standard endoscopic management, which could be a combination of strategies such as pneumatic lithotripsy and cystolitholapaxy. This was because the patient presented with complications and there was lack of appropriate devices.

Immediate urinary drainage from the ureteral orifices explained the pathogenesis of renal dysfunction in our patient as an obstructive uropathological disorder.

The size and weight of the stone were 8 cm × 8 cm × 6cm and 400g, respectively. The largest urinary bladder stone ever documented, as contained in the Guinness World Record, was 17.9 cm × 12.7 cm × 9.5cm in size and 1.81kg in weight (21). Some works have reported a urinary bladder stone of more than 500g. In Ilorin, Nigeria, Rahman, Akande, and Mamudu reported a urinary stone of 790g (22). Abiahu et al. also reported a urinary stone size of 230g as a giant urinary stone (23). A giant urinary stone has been defined differently by several authors. Some have defined it in terms of size, while others have made reference to the weight (4). There is need for a standard, uniform, and acceptable definition. The size and weight of a bladder stone varies with the capacity of the bladder. What may be regarded as giant in children may be a small stone in adults. In fact, a stone of 16g has been reported as giant in children (24). A standard definition that will be generally acceptable will require several pools of cases of urinary bladder stones.

Our patient developed vesicocutaneous fistula. This may not be unconnected with chronic stone impaction, resulting in devitalization of some part of the wall of the bladder. This was managed successfully nonoperatively. Surgical closure was not considered due to patient preference.

### Conclusion

We reported our experience on the successful management of giant urinary bladder stone in association with severe kidney dysfunction. The patient recovered from acute kidney injury following emergency open cystolithotomy. Mechanical obstruction as a result of the stone was identified as the cause of renal dysfunction. There was post-operative vesicocutaneous fistula, which was managed by prolonged urethral catheterization.

### Ethical consideration

Informed consent was acquired from the patient for publication of the case report.

### Author contributions

NAI led in the conceptualization, data curation, resources, supervision and in the writing, reviewing and editing the original draft.

All authors equally contributed to methodology, investigation, formal analysis and project administration.

### References

1. Monico CG, Milliner DS. Genetic determinants of urolithiasis. *Nat Rev Nephrol.* 2012;8:151-62.
2. Prezioso D, Illiano E, Piccinocchi G, et al. Urolithiasis in Italy: an epidemiological study. *Arch ItalUrol Androl.* 2014;86:99-102.
3. López M, Hoppe B. History, epidemiology and regional diversities of urolithiasis. *PediatrNephrol.* 2010;25:49-59.
4. Giuffra V, Costantini L, Biasini LC, et al. Giant bladder stone in a natural mummy of the early 19th century. *Urology.* 2008;72:780-81.
5. Leslie SW, Sajjad H, Murphy PB. Bladder Stones. *StatPearls.* 2017.734-35
6. Bartges JW, Callens AJ. Urolithiasis. *VetClin North AmSmall Anim Pract.* 2015;45:747-68.
7. Torricelli FCM, Mazzucchi E, Danilovic A, et al. Surgical management of bladder stones: literature review. *Rev Col Bras Cir.* 2013;40:227-33.
8. Nugroho EA, Junita D, Wijaya YH. Giant bladder stone with history of recurrence urinary tract infections: a rare case. *Urol Case Rep.* 2019;26:100945.
9. Abrahams HM, Stoller ML. Infection and urinary stones. *CurrOpin Urol.* 2003;13:63-67.
10. Diniz ALL, de Janeiro R, de Janeiro R, et al. Giant bladder stone and renal failure: a case report, literature review and future perspectives. *Open Access Libr J.* 2017;4:1.
11. Bansal A, Kumar M, Sankhwar S, et al. Prospective randomized comparison of three endoscopic modalities used in treatment of bladder stones. *Urologia.* 2016;83:87-92.
12. Gebrehiwot FG, Adem MB, Hassen IK, et al. Giant bladder stone resulting in acute kidney injury; a case report and review of literature. *UrolCase Rep.* 2022;42:101991.
13. Farling KB. Bladder cancer: risk factors, diagnosis, and management. *Nurse Pract.* 2017;42:26-33.
14. Bestari MG, Karim MI, Melati R, et al. Giant bladder stone resulting in renal failure and concurrent bladder cancer: a case report. *Int J Surg Case Rep.* 2022;94:107170.
15. Mukherjee S, Sinha RK, Hamdoon M, et al. Obstructive uropathy from a giant urinary bladder stone: a rare urological emergency. *BMJ Case Rep.* 2021;14:e234339.
16. Tahtalı İN, Karataş T. Giant bladder stone: a case report and review of the literature. *TurkJUrol.* 2014;40:189.
17. Agrawal R, Taha K, Poudyal A, et al. Giant bladder stone in association with severe kidney injury. *Oxf Med Case Reports.* 2019;2019:omz063.
18. Shah HN, Hegde SS, Shah JN, et al. Simultaneous transurethral cystolithotripsy with holmium laser enucleation of the prostate: a prospective feasibility study and review of literature. *BJU Int.* 2007;99:595-600.
19. Boyce CJ, Pickhardt PJ, Lawrence EM, et al. Prevalence of urolithiasis in asymptomatic adults: objective determination using low dose noncontrast computerized tomography. *The JUrol.* 2010;183:1017-21.
20. Joual A, Rais H, Rabii R, et al. Epidemiology of urinary lithiasis. *AnnUrol (Paris)* 1997; 31: 80-83.
21. Moran ME. *The Largest Stone of All! Urolithiasis.* Springer; 2014. p. 351-63.
22. Rahman GA, Akande A, Mamudu N. Giant vesical calculi: experience with management of two Nigerians. *Niger JSurg Res.* 2005;7:203-05.
23. Abiahu J, Ulebe A. Giant urinary bladder stone in a Nigerian woman presenting as urinary incontinence; a case report. *Niger J Med.* 2019;28:334-36.
24. Palinrungi MA, Syahrir S, Kholis K, et al. Giant bladder stone formed around sewing-needle in childhood: a case report and literature review. *UrolCase Rep.* 2020;29:101101.