






Giant Bladder Calculus in a 70-year-old Female—A Case Report

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Summary

Vesical calculi are unusual in females, and giant calculi (weighing >100 g) are even more uncommon, considering the advances in contemporary diagnostic modalities. The entity is associated with a variety of pestering symptoms—frequency, dysuria, and hematuria, to name a few—causing serious effects on patients' quality of life. This report cites the case of an elderly female with a giant vesical calculus weighing 1.28 kg (12.5 cm in diameter). Our patient had no past surgical history or symptoms suggestive of bladder outlet obstruction or neurogenic bladder. As per our literature search, a stone as large as that of our patient has not yet been found in females. She underwent an uneventful open suprapubic cystolithotomy. A biopsy from a suspicious lesion during the surgery revealed squamous cell carcinoma. Given that such a large stone

was found in an elderly female without any predisposing causative factors, it is worthwhile looking into the etiopathogenesis and management of giant vesical calculi.

Keywords: Giant vesical calculus, Giant vesical stone in elderly female, Large bladder stone, Open cystolithotomy, Squamous cell carcinoma bladder

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Introduction

Vesical calculi are unusual in females, and giant calculi (weighing >100 g) are even more uncommon. Vesical calculi are generally associated with conditions that encourage urinary stasis and recurrent urinary tract infections (UTIs) (1). Akin to their smaller counterparts, giant bladder stones cause pestering symptoms such as frequency, dysuria, hematuria, and, of concern, hydronephrosis. Despite a decline in the occurrence of giant vesical calculi, we present a case report of an elderly female with a giant vesical calculus with no background of bladder outlet obstruction. The chronic

mucosal irritation associated with such bladder stones has been known to cause squamous cell carcinoma (SCC) of the urinary bladder (2). With this report, we hope to highlight the various manifestations and complications that come with this rare entity.

Case presentation

A 70-year-old female presented to our outpatient clinic with a 6-month-long history of dull suprapubic pain, increased urinary frequency, and burning micturition. She denied a history of an altered urinary stream,

hematuria, or retention of urine. She did not have a history of recurrent UTIs, and had an otherwise unremarkable past medical and surgical history. The physical examination was normal, except for a large, firm suprapubic mass palpable on bimanual pelvic examination.

A routine urinalysis revealed abundant pus cells. Baseline blood investigations, including renal function tests, were within normal limits. Urine culture grew *Escherichia coli*. An ultrasound of the abdomen suggested a large hyperechoic shadow bearing smooth, rounded borders, and a posterior acoustic shadow, prompting a giant vesical calculus. This was associated with bilateral grade I hydronephrosis. A giant radiopaque smooth shadow was seen in the region of the bladder on a kidney–ureter–bladder radiograph (Figure 1).



Figure 1. Radiograph showing large radiopaque vesical calculus.

Initially, an indwelling urinary catheter was placed, and intravenous antibiotics were administered for a week to control the urine infection. A formal pan-cysto-urethroscopic examination confirmed a large vesical calculus with a normal urethra. The patient then

underwent an uneventful open suprapubic cystolithotomy under spinal anesthesia (Figure 2).



Figure 2. Open suprapubic lithotomy showing large vesical calculus.



Figure 3. Dimensions of retrieved vesical calculus (12.5 x 11.5 x 8 cm³).

No evidence of outlet obstruction or bladder diverticula was found. A stone of dimensions 12.5 × 11.5 × 8 cm³,

weighing 1.28 kg, was removed, followed by a stone analysis (Figure 3).

Incidentally, a small mucosal overgrowth was observed over the right posterolateral wall of the bladder. Following a biopsy of this lesion, the bladder was closed in two layers with a 16-Fr cystostomy tube left in situ. The patient went on to make a smooth recovery, and the per-urethral catheter and the suprapubic catheter were removed serially on post-operative day-4 (POD) and POD-9, respectively.

A biopsy of the lesion revealed moderately differentiated SCC. The stone analysis reported a magnesium ammonium phosphate hexahydrate stone with traces of calcium oxalate and phosphates. Four weeks postoperatively, the patient was voiding well and symptom-free. The patient was lost to follow-up, so the staging workup for SCC in the form of contrast-enhanced computed tomography (CECT) of the abdomen and pelvis could not be performed.

Discussion

Urinary stones in humans date as far back as the beginning of civilization (3). Accounts of urinary stones have been found in ancient *Mesopotamian* texts dating back to 3200 BC (4). Literature on surgical modalities for the management of stones, described as “cutting of the stone,” was found in the ancient Indian book *Sushruta Samhita* (600 BC) (3). Approximately 5% of the urinary tract calculi are found in the bladder, with only 1% of them being labeled as giant (>100 g) (5,6). Primary vesical calculi generally traverse from the kidney to the urinary bladder via the ureter (7). On the other hand, urinary stasis from benign enlargement of the prostate, urethral strictures, and neurogenic bladder predispose to the formation of secondary bladder calculi (1).

Vesical calculi carry a male predilection (95%) (5,8). In females, vesical calculi are mostly due to recurrent cystitis/UTIs, neurogenic bladder, bladder diverticula, urethral stricture causing outlet obstruction, foreign bodies in the bladder, and, rarely, trauma and hyperparathyroidism (8–10).

Typically, vesical calculi are composed of calcium oxalate, uric acid, struvite, and calcium carbonate

(5,6,8). Stone formation as a consequence of urinary pH changes brought on by recurrent UTIs by urea-splitting organisms causing the formation of struvite stones is fairly common (11). Although denying recurrent UTIs, our patient had a giant struvite stone in the background of a positive urine culture. Foreign bodies within the urinary bladder, such as ureteral stents, urinary catheters, suture materials, etc., also act as niduses for stone formation (1,9). Muhammad et al. reported an unusual case of a 42-year-old female with a giant bladder stone formed over a migrated intrauterine contraceptive device (IUCD) (9). Primary bladder stones have also been linked to a lack of access to drinking water in patients hailing from poor socio-economic backgrounds and consuming a cereal-based diet, leading to metabolic alterations aggravating stone formation (5,11). Other than a diet high in cereals and a positive urine culture, our patient, who most likely had a primary bladder stone, did not have any known risk factors or symptoms prompting an outlet obstruction.

Bladder stones can manifest in a myriad of ways, from completely asymptomatic being diagnosed incidentally to acute urinary retention. Commonly listed symptoms include dysuria, suprapubic pain, frequency, intermittency, and hematuria. Upstream obstruction in the form of hydronephrosis and hydroureter is also seen with vesical calculi (1,5). A case of a giant vesical calculus causing defecation issues in a young male, which were relieved upon removal of the stone, has been reported (1).

Bladder stones are mostly diagnosed on ultrasound and cast a posterior acoustic shadow. Like renal calculi, vesical stones are also diagnosed on radiographs; however, about 50% are radiolucent (12). Cystoscopy remains the most accurate diagnostic modality (5). Computed tomography is also used to further evaluate associated hydroureter and hydronephrosis in cases of large vesical calculi.

Following a literature search on PubMed, we realized that vesical calculus as large as the one in our case (12.5 cm) is quite rare. The largest vesical calculus reported in the literature weighed 6294 g (13). A few reports of similar cases have been published to date (Table 1).

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Cases from the table highlight that giant vesical calculi can be seen in seemingly healthy patients without any evidence of recurrent UTI, neurogenic bladder, or outlet obstruction similar to our patient.

Table 1. Summary of various cases of giant vesical calculi

Authors/year	Age/sex	History	Urine culture	Management	Weight/size of calculus	Outcome	Stone analysis
Powers and Matflerd (13)/1952	64/male	No h/o UTI or BOO H/o hematuria, significant weight loss, and cachexia	<i>Pseudomonas aeruginosa</i> and <i>Proteus vulgaris</i>	Open suprapubic cystolithotomy	1.41 kg 14 × 10 cm ²	Had concomitant metastatic SCC of the bladder	Not performed
Aliyu et al. (14)/2013	48/male	H/o lithuria + No h/o UTI or BOO	Sterile	Open suprapubic cystolithotomy	1.6 kg 13 × 9.5 cm ²	Biopsy—no e/o malignancy	Calcium oxalate, calcium carbonate, magnesium, and phosphate
John et al. (15)/2019	23/male	Long-term h/o obstructive LUTS No e/o BOO B/L renal calculi and chronic alcoholic liver disease	Sterile	Open suprapubic cystolithotomy	1.5 kg 12 × 9 cm ²	Satisfactory	Calcium oxalate
Kumar et al. (16)/2020	27/male	No h/o UTI or BOO	Unknown	Open suprapubic cystolithotomy	570 g 10 × 8 cm ²	2 × 3 cm ² polypoidal mass excised. HPE—moderately differentiated adenocarcinoma	Magnesium ammonium phosphate hexahydrate, calcium oxalate, and xanthine
Subba et al. (17)/2022	64/male	H/o hematuria No h/o UTI or BOO Right staghorn calculus	Sterile	Open suprapubic cystolithotomy	800 g 16 × 12 cm ²	Bladder biopsy—SCC Died due to respiratory complication	Not performed
de Souza et al. (18)/2023	56/male	No h/o UTI or BOO B/L renal (right staghorn) calculi H/o significant weight loss	Not performed	Open suprapubic cystolithotomy with right nephrectomy	2.73 kg 17 × 13 cm ²	Died secondary to sepsis	Not performed
Current study/2023	70/female	No h/o UTI or BOO	<i>Escherichia coli</i>	Open suprapubic cystolithotomy	1.28 kg 12.5 × 11.5 cm ²	Biopsy—SCC Lost to follow-up for staging workup and radical cystectomy	Magnesium ammonium phosphate hexahydrate and calcium oxalate

BOO, bladder outlet obstruction; B/L, bilateral; e/o, evidence of; h/o, history of; SCC, squamous cell carcinoma; UTI, urinary tract infection; HPE, histopathology; LUTS, lower urinary tract symptoms.

Most of the patients had sterile urine, with no history of intake of antibiotics. Calcium oxalate and carbonate stones are common. Typically, struvite (magnesium ammonium phosphate) stones are formed in the background of urine infection.

Carcinoma of the urinary bladder is the most common urinary tract malignancy (2). The usual histology seen is transitional cell carcinoma (TCC) (2). SCC of the urinary bladder is rare (2–3%) and is mostly associated with chronic irritation caused by vesical stones (2,14). Radiation, immunotherapy, and adjuvant or neoadjuvant chemotherapy are among the alternatives available; nonetheless, radical cystectomy remains the primary therapeutic approach (2). It is thus vital to biopsy any visible lesions or inflamed bladder mucosa.

Suprapubic lithotomy was originally described by Pierre Franco in Suprapubic lithotomy was originally described by Pierre Franco in 1561 (3). Treatment of vesical calculi in recent times has primarily used endourological techniques; these are effective and less traumatic. Perhaps, due to earlier diagnosis of smaller vesical calculi, suprapubic cystolithotomy is rarely required nowadays. However, it remains the preferred treatment modality for giant bladder stones.

Conclusion

Giant vesical calculi are rare nowadays with advances in imaging technology. Although risk factors such as bladder outlet obstruction, neurogenic bladder, and recurrent UTIs are major causes of vesical calculi, their absence does not rule out the formation of giant vesical calculi. As per our literature search, a stone as large as that of our patient has not yet been found in females.

Ethical consideration

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

Author contributions

RS led in data curation and in writing, reviewing & editing of the original draft and VS led in supervision and conceptualization. All authors equally contributed to investigation.

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