CASE REPORT

Giant bladder stone in association with severe kidney injury

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Abstract

Minimal data exist on the causes, incidence and management of giant bladder stones considering their rare occurrence. Only a handful of case reports have reported stones larger than 10 cm, and most of these cases are managed surgically. We present a case of a 56-year-old female who presented with vague, lower urinary tract symptoms who was later found to have severe post-renal acute kidney injury due to a giant bladder stone measuring $11 \times 11 \times 10.4$ cm.

INTRODUCTION

While a wealth of literature addresses the incidence, management and long-term follow-up for kidney and ureteral stones, there is sparse literature describing the same for bladder stones.

An exceedingly rare subgroup of this entity are bladder stones measuring more than $10 \times 10$ cm that have been referred to as ‘giant’ bladder stones in the few case reports documented worldwide. Infections and urinary stasis are implicated as the inciting event for the formation of these entities; however the evidence is limited given the lack of large, epidemiologic studies [1]. Little is known about the pathophysiology, composition and etiology of these stones.

We describe a case of a 56-year-old female patient who presented with severe post-obstructive acute kidney injury (AKI) due to a giant bladder stone.

CASE REPORT

A 56-year-old woman presented to the emergency department with lower abdominal pain and dysuria for 3 days. She reported a history of multiple episodes dysuria that had been treated with unspecified antibiotics for presumed urinary tract infection (UTI) in the past 6 months in Mexico. She had also been suffering from a chronic, pressure-like sensation in the lower abdomen and increased urinary frequency with relief upon lying in a recumbent position. She did not have any gynecological history, including any prior surgical procedures. On physical examination, she was febrile to 101.9°F, tachycardic to 112 beats/min and had a firm, mobile, subumbilical mass with bilateral costovertebral angle tenderness. Laboratory findings revealed a white blood cells (WBC) count of 13 100 cells/μL with left shift, a serum creatinine of 6.1 mg/dL and a blood urea nitrogen of 115 mg/dL.
Her urinalysis revealed 676 red blood cells, 929 WBC and positive leukocyte esterase; there was no bacterial growth in the final culture. Non-contrasted computed tomography of the abdomen demonstrated a large calcified stone measuring $11 \times 11 \times 10.4 \text{ cm}$ (Figs 1 and 2) nearly occluding the urinary bladder with bilateral hydroureter and hydrenephrosis.

She was diagnosed with post-renal AKI due to urolithiasis and associated acute, bilateral pyelonephritis. Piperacillin–tazobactam was initiated and bilateral percutaneous nephrostomy (PCN) tubes were placed. On Day 3, she underwent open vesicolithotomy and suprapubic tube (SPT) placement with removal of the large, white stone (Fig. 3). The stone culture grew one colony of coagulase negative Staphylococcal species, and stone composition was not reported. On postoperative Day 3, she was discharged due to improvement of the kidney function and treated with a 10-day course of amoxicillin–clavulanate. After 2 weeks, she was seen in urology clinic where both the Foley catheter and bilateral PCN tubes were removed. SPT was removed 3 months later when her post-void urine quantity was below 50 ml and she was asymptomatic. Given complete recovery, urodynamic studies to assess underlying lower urinary tract dysfunction were not pursued.

**DISCUSSION**

Nephrolithiasis is a common problem with increasing incidence and prevalence. One in every 11 people in the USA will report a symptomatic kidney stone by the age of 70 years, with higher prevalence in men than women [2]. Additionally, rising rates of obesity have been shown to contribute to the increasing prevalence of these stones [3]. Only 5% of these calculi affect the lower urinary tract, the bladder or the urethra [1, 4].

Urinary bladder stones are usually seen in conditions associated with urinary stasis such as bladder outlet obstruction or neurogenic bladder; however spontaneous formations have also been reported [1]. Common causes of bladder outlet obstruction include an enlarged prostate, urethral strictures and medication
side effects. Pelvic surgeries and genital prolapse, resulting in obstruction, foreign bodies such as Foley catheter, hair and even intravaginal accessories have been implicated as causes for bladder stones in females [1, 4]. In these conditions, the contents of urine such as calcium, oxalate, phosphate and uric acid precipitate forming crystals, which eventually progress to form larger stones [6]. In 15% of cases, the underlying pathology is recurrent UTIs by a urease-forming organism that alters the pH of urine-forming struvite stones. Bladder stones are often associated with renal and ureteral stones; however they can occur alone. Bladder stones are rare in females accounting for only 5% of the cases [5, 6, 7]. Post-renal AKI is caused by calculi in most patients. Other potential etiologies are benign prostatic hyperplasia, prostatic or pelvic neoplasms or retroperitoneal fibrosis [8, 10]. Stones causing AKI are usually bilateral in the kidneys, ureter or urethra. It is rare for bladder stones to become large enough to cause bilateral hydronephrosis, hydrourereter and AKI but was seen in our patient where her stone was large enough to limit the flow of urine resulting in kidney injury. Management of these giant bladder stones is vesicolithotomy, as supported by prior case reports [4, 6, 9, 10].

This particular case is unique in that our patient had no discernable risk factors for the formation of a bladder stone. While she reported a history of recurrent UTIs, it is unclear whether these symptoms occurred prior to the formation of the bladder stone or if the stone resulted in urinary frequency with findings of pyuria and microscopic hematuria [1]. Lack of a complete past medical history pertaining to infections, antibiotic use and the limitations to health care access in the patient’s homel country of Mexico makes the diagnosis of underlying etiology challenging.

CONCLUSION
To our knowledge, there are only a few cases of giant bladder stones presenting with complications of kidney injury. Due to the relative rarity of giant bladder stones, there is not enough data on the incidence, management and long-term follow-up on this entity; however, an early diagnosis and surgical management are needed to prevent permanent kidney injury, ensure appropriate evaluation for underlying risk factors, as well as optimize surveillance for recurring stones.

CONFLICT OF INTEREST STATEMENT
None.

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ETHICAL APPROVAL
No ethical approval was required.

CONSENT
Although no patient identities were used, the patient provided her informed consent.

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