



Endourology

Vesical megalithiasis

Osamah Hasan^{a,*}, Alexandria Ellis^b, Ryan Powers^b, Patricia Vidal^b^a *Midwestern University Chicago College of Osteopathic Medicine, Downers Grove, IL, USA*^b *Division of Urology, Cook County Health and Hospitals System, Chicago, IL, USA*

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Introduction

Bladder stones (BS) comprise a short percentage of urinary tract stones.¹ However, they have plagued mankind for centuries. First literary references to BS dates to the time of Hippocrates, whose oath recommends leaving the treatment of BS to the lithotomists.² We present a unique case of a Guatemalan female who presented with a large bladder stone and ultimately required a cystolithotomy.

Case report

A 57-year-old female with a two-year history of recurrent urinary tract infections (UTIs) presented with bilateral flank and suprapubic pain. Past medical history consisted of recurrent UTIs for many years, treated intermittently with antibiotics in Guatemala. No further workup of these UTIs was conducted. She denied any history of hematuria or unintended weight loss. She did endorse “difficulty urinating” since she was about 9 years old. Physical exam revealed mild bilateral costo-vertebral tenderness and a hard, rock-like mass was palpated in the lower abdomen. Urethral catheterization was attempted but was unsuccessful. Labs were notable for a mild leukocytosis of 10.5 with left shift, and blood urea nitrogen and serum creatinine of 105 and 6.0, respectively. Urinalysis showed 929 WBCs and 626 RBCs and gram stain showed gram negative bacilli. A non-contrast CT demonstrated a large bladder calculus, measuring 11 cm × 8.4 cm with a value of 794 Hounsfield Units (Fig. 1). The stone filled the entire urinary bladder with severe upstream hydronephrosis. No additional stones were seen in the urinary tract.

The patient then underwent bilateral nephrostomy tube placement

due to her bilateral obstruction and declining renal function. On hospital day two, the patient underwent open vesicolithotomy utilizing a suprapubic, midline incision. A transverse incision was made in the bladder, and the stone was delivered. The bladder mucosa was thick and edematous, without evidence of masses or erythematous lesions. The ureteral orifices were not able to be identified due to significant mucosal edema. The bladder was closed in two layers and a 16-French suprapubic tube was placed via a separate cystostomy. A 16 French urethral foley catheter was placed as well. Final measurements of the stone were 11 × 9.5 × 8.6 cm and a weight of 1300 g (Fig. 2). Stone culture showed a predominance of coagulase negative staphylococcus.

The postoperative period was uneventful, and she was discharged on postoperative day-three with bilateral nephrostomy tubes, a suprapubic catheter and a urethral catheter. Her nephrostomy tubes were capped at the one-week follow up. Her renal function continued to improve, and by her two-week follow up appointment her creatinine was 2.6 from 6.0 on admission. Her nephrostomy tubes and urethral catheter were then removed. She was instructed to cap her suprapubic catheter and to uncap it after voids in order to record post void residual urine volumes. At six weeks post-operatively, the patient had variable recorded PVRs at home (ranging from 50 to 500 cc), therefore her suprapubic tube was maintained with intention to re-assess her voiding in four weeks. Unfortunately, the patient was lost to follow up and urodynamics were unable to be performed.

Discussion

Bladder stones (BS) make up 5% of all urinary tract stones.¹ Males are more commonly affected than females. Only about 5% of all BS

* Corresponding author. 981 Foxworth Boulevard, Lombard, IL, 60148, USA.
E-mail address: ohasan15@midwestern.edu (O. Hasan).

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Fig. 1a. Non-contrast CT A&P - Large bladder stone with severe right hydronephrosis.



Fig. 1b. Large bladder stone with severe left hydronephrosis and bladder wall thickness.

occur in women, usually occurring secondary to bladder outlet obstruction, neurogenic voiding dysfunction, urinary tract infections (UTIs) or foreign bodies.² Patients normally present with persistent lower urinary tract symptoms, hematuria, recurrent urinary tract infections, or urinary retention.² Anecdotes of large BS are common in developing countries when initial symptoms of UTI/lower urinary tract symptoms are often overlooked and treated empirically despite recurring symptoms.^{1–3} Our patient experienced recurrent UTIs in Guatemala and no additional workup was conducted to find the underlying etiology. Additional workup may include an ultrasound, x-ray, CT scan or cystoscopy.⁴

BS can block the ureteral orifices and cause hydronephrosis leading to renal failure, however, this is quite rare.³ This occurs in cases when a bladder calculus goes undiagnosed and increases in size overtime to obstruct the ureters. Our patient presented with renal failure secondary to a 11 cm bladder stone requiring immediate intervention with nephrostomy tubes after unsuccessful foley catheterization. Other cases employed combinations of successful foley



Fig. 1c. CT 3-D surface format showing bladder stone covering the entire volume of the bladder.



Fig. 2. Bladder stone extracted through suprapubic cystolithotomy.

catheterization + hemodialysis + cystolithotomy or foley catheterization + cystolithotomy.⁴ Some cases underwent only emergent cystolithotomy.⁴ All BS greater than 7 cm with concomitant renal failure were treated with open cystolithotomy.⁴

Stones are typically of mixed composition. In the presence of recurrent UTI infections, struvite (ammonium magnesium phosphate) is the most common stone and calcium oxalate is most common in the absence of UTIs.² Urea-splitting organisms such as *Proteus*, *Klebsiella*, *Serratia*, and *Enterobacter* species produce alkaline urine, favoring the formation of struvite stones. Approximately 50% of BS are composed of ammonium urate.⁵ The largest stone reported in the literature measured 17 cm in a male.⁴ The largest reported bladder stone in a female measured 12 cm and weighed 660 g.¹ We report the heaviest (1.3 kg) and second largest bladder stone (11 cm) in a female patient.¹

BS are normally associated with a positive urinalysis for nitrite, leukocyte esterase, and blood. Diagnosis is usually made via imaging through x-ray, ultrasound, computed tomography (CT) scan or cystoscopy. Surgical intervention includes cystolithotomy or endoscopic cystolithotripsy. Cystolithotomy is generally preferred for large BS.^{4,5} Open cystolithotomy has been suggested to allow for easy and complete

removal of stone burden and reduce the incidence of vesicovaginal fistula in females.^{2,5} Cystolithotripsy entailed the highest complication rate, including bladder perforation and formation of urethral strictures.² However, currently there are no AUA guidelines for the management of large bladder calculi.

Conclusion

BS remain a clinical problem in both developing and developed nations. It is important for clinicians to consider bladder stone in patients with signs of recurrent lower urinary tract symptoms, pyuria, or hematuria. Basic metabolic panel is warranted in these patients to assess renal function for appropriate management. Large BS should preferably be treated with open cystolithotomy as past literature, including this case, has shown favorable results.

Conflicts of interest

The authors declare no conflict of interest.

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