



Massive Bladder Stone in a Rural Secondary Health Facility: A Case Report and Literature Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Background: Giant bladder stones, though relatively uncommon, present significant clinical challenges, particularly in rural healthcare settings. This as well accounts for about 8percent of urolithiasis related deaths.

Objective: objective of this case report is to highlight the clinical presentation and management of giant bladder stones and the challenges which maybe encountered.

Case: In this case report, we describe a 58-year-old man who presented with a 4-year history of lower urinary tract symptoms, including difficulty urinating, urinary frequency, urgency, dysuria, and intermittent hematuria. Despite multiple treatments for urinary tract infection, his symptoms persisted, prompting further investigation. Diagnostic imaging revealed a large bladder stone measuring 4*1.5cm and weighing 102g, underscoring the severity of the condition. The patient

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underwent successful open cystolithotomy under local anesthesia, highlighting the importance of prompt surgical intervention in managing bladder stones.

Conclusion: This case underscores the significance of early recognition and appropriate management of bladder stones, especially in underserved rural areas where access to healthcare resources may be limited. Collaborative efforts among healthcare providers are crucial to improving diagnostic capabilities and ensuring timely interventions, ultimately mitigating the morbidity associated with bladder stone complications in vulnerable populations.

Keywords: Giant bladder stone; open lithocysthtomy; rural community; urinary tract infection.

1. INTRODUCTION

“Urinary tract stones are common with a global prevalence of approximately 14%, varying depending on age, sex and ethnicity” [1]. “Urinary bladder stone make up a small proportion of urolithiasis” [2]. “Bladder stones are generally primary(in children) without any obstruction or infection and are typically seen in endemic areas with low dietary intake of protein and phosphate unlike in adults where stones are usually secondary, associated with urinary stasis or recurrent urinary tract infection secondary to bladder outlet obstruction, intravesical foreign body, urethral stricture, neurogenic bladder or bladder augmentation” [2,3,4,5,6].

“Giant urinary bladder stone(GSB), a rare condition in current practice is defined as a stone more than 100g in weight or measures > 4 cm in its largest dimension” [3,7]. “GSB presents commonly as a solitary stone” [7]. “In adults, bladder stones generally presents in various ways, ranging from entirely asymptomatic to

urgency, frequency, intermittency, poor urinary flow and visible haematuria” [2].

The incidence of bladder stone is estimated to be 1-5% in Asians, 5-10% in Europe, and 13-15% in United States [8]. It has also been shown to be 3 times more common in men (relatively older males) than in women [2,7]. Currently, vesical stones represent about 5 percent of stone disease globally and its incidence has declined significantly due to improvements in nutrition and socioeconomic conditions [9]. It is also responsible for 8% of all urolithiasis-related deaths [10].

We undertook this case report as it is the first at our rural facility and one of the few cases seen in the country highlighting it's clinical presentation and management.

2. CASE PRESENTATION

Index patient is a 58 year old man who resides in a rural community in southwest Nigeria. He has no history of use of alcohol or tobacco and has



Fig. 1. Ultrasound Scan showing an echogenic mass in the urinary bladder



Fig. 2. Post Surgery photograph of the bladder stone showing it's rough edges

access to clean water. Dietary habit could not be ascertained. He presented with a 4 year history of difficulty with urination. He also complained of urinary frequency, urgency, dysuria and occasional hematuria. He has no history of risk factors and does not remember any event of urinary catheterization or instrumentation. He noted being treated multiple times for urinary tract infection. Investigations performed at admission revealed fasting blood sugar of 84.4mg/dl, PSA of 1.24ng/ml and a urine culture showing moderate growth of coagulase negative staph. An abdominal ultrasound scan performed revealed a 4*1.5cm echogenic mass in the urinary bladder with detrusor thickening. An assessment of chronic cystitis with bladder stone was made. His vital signs were stable. Intra op, local anesthesia was utilized after routine draping. Pfannestiel incision was made on the skin and developed till the bladder was reached. An incision was made on the bladder and the stone retrieved after manipulation as it was adherent to bladder mucosa. The bladder was repaired in 2 layers, intervening tissue was repaired and the skin closed. A urethral catheter was retained in the bladder and removed after 10days. The patient was discharged the next day and had no postoperative complications. The retrieved stone had ragged edges on inspection, weighed 102g and measured 4*1.5cm. However, laboratory analysis was not done due to patient's cultural beliefs that it was spiritual.

3. DISCUSSION

In view of pathophysiology, giant bladder calculi can develop from a node of infected material or

single ureteric calculus with a progressive layer-wise accumulation of calcified matrix associated with factors causing urinary stasis such as bladder outlet obstruction [3]. Other causes of secondary bladder stones include neurogenic voiding dysfunction, infection, or foreign bodies [9]. Rarely, these vesicle calculi may reach very large sizes and the largest dimension can sometimes reach 20 centimeters owing to the relatively capacious bladder cavity [7,9].

Factors such as low educational level, low socioeconomic, dry climate, dietary habits, and high exposure to the sun are associated with a high incidence of urinary tract calculi [3,11]. Further, the composition of bladder calculus is influenced by the pH and the degree of saturation of the urine [12]. In low-resource regions such as the rural areas, many sociodemographic factors may have a role in the formation of GSBs [7] Poor diets and water supply are prevalent in these areas and may aggravate the metabolic mechanisms of urolithiasis [7,11] Also, unavailability of proper health facilities may delay the diagnosis and proper management of the underlying causes [7]. It has also been postulated that consumption of excessive alcohol, coffee, meat and testosterone contribute to increased stone formation [13].

The Index patient presented with 4 years history of lower urinary tract symptoms. Hematuria experienced by this patient can be explained by the rough surface of GSB which also seemed to be dependent on the effect of stone size [7]. Though he had a tertiary level of education, he resided in a rural community similar to that from

case report in rural Nepal [4] while there is not a definite cause for his bladder stone, he has been treated multiple times for urinary tract infection which is in keeping with a study that reported recurrent UTIs by a urease-forming organism as it's underlying pathology in 15% of cases of bladder stone [14]. It is not clear if bladder stone caused the recurrent urinary tract infection or if the recurrent urinary tract infection caused the bladder stone, we can only concluded that both conditions propelled a vicious cycle [15]. The only risk factors identified in the index patient is that he resides in a rural area and his age.

The gold standard for diagnosis of urinary stone disease is a non contrast computed tomography scan due to its high sensitivity [16]. The vast majority of bladder calculi are radiopaque and can be identified with a plain radiograph [3]. Other useful radiologic images are ultrasonography, magnetic resonance imaging, and intravenous pyelography [3]. The index patient was diagnosed of urinary calculi following an abdominal ultrasonography after history taking and examination. While we lacked the services of plain radiograph, computed tomography is unavailable and non affordable by the index patient.

“There are several surgical options for bladder stone, including open cystolithotomy, extracorporeal fragmentation, percutaneous endoscopic cystolitholapexy, and cystolitholapexy” [3,17] “Therapeutic management of bladder stones varies depending on symptoms, size, and composition” [11]. “Open cystolithotomy is still the most preferred treatment as it provides satisfactory results for stone removal, which in turn ensures that the obstruction is properly managed and has been recommended as the best treatment option for large bladder calculi” [3,11].

Giant bladder stones can result in significant morbidities, varying from the relatively common irritative lower urinary tract symptoms (iLUTS) to the life-threatening sequels such as malignancy of the urinary bladder [7]. A possible explanation for this complications is delayed presentation including poverty, ignorance, poor health service-seeking and reliance on treatment by over-the-counter medication [7].

4. CONCLUSION

In conclusion, the case of a massive bladder stone in a rural secondary health facility

highlights the challenges of diagnosing and treating such conditions in underserved areas. Despite its rarity, the case underscores the importance of prompt recognition and intervention. The successful surgical intervention in this case demonstrates the effectiveness of open cystolithotomy in managing massive bladder calculi. However, it also emphasizes the need for improved access to diagnostic tools and surgical facilities in rural areas to ensure timely and appropriate management of such conditions. However, Collaborative efforts among healthcare providers and policymakers are crucial to address the burden of bladder stone-related complications in vulnerable populations.

5. RECOMMENDATIONS

This study recommends collaborative efforts between healthcare stakeholders to address bladder stone challenges in rural areas. It advocates for investing in advanced diagnostic technologies and surgical training for healthcare professionals. Public health awareness campaigns are advised to educate rural communities about bladder stone prevention and symptoms. Moreover, fostering referral pathways between rural facilities and tertiary centers can ensure timely access to appropriate care. Overall, these measures aim to enhance diagnosis, treatment, and prevention of bladder stones in underserved rural populations.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT

Written consent was fully obtained from the patient prior to writing this case report.

ETHICAL APPROVAL

Ethical approval was sought from facility and approved.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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