

Unusual Spontaneous Passing Of Large Renal Calculi

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Keywords: *Case report, Urolithiasis, Large, Renal calculi, Renal stones, Calcium oxalate, Spontaneous passing, Ureteric colic, Bladder outlet obstruction, Haematuria, Urinary incontinence*

ABSTRACT

Urolithiasis is among the most common urological diseases encountered in this modern time. This report recounts a case of a 65-year-old Chinese Malaysian gentleman, presenting with left sided flank pain and symptoms suggestive of benign prostatic hyperplasia and recurrent urinary tract infection for 2 years. His pain worsened over the last 2 weeks with a newly developed bladder outlet obstruction. On the 14th day, he passed a stone measuring 10mm x 6mm. Three days later, he passed a second stone measuring 14mm x 9mm x 5mm, followed by haematuria and transient urinary incontinence. Most surgical literature and guidelines draw the cut-off point for spontaneous passing of calculi at 5mm in diameter. This unusual case of spontaneous passage of large urinary calculi serves as another excellent reminder that there are no absolutes in medicine.

INTRODUCTION

Urolithiasis, the presence of a stone or calculus anywhere along the urinary tract, is among the most common urological diseases encountered in this modern time [1,2]. A study done by Yu Liu (2018) revealed that the prevalence of urolithiasis in Asia is between the range of 1% to 19.1% of its entire population [3]. The prevalence in females is approximately 3%-7.1% and nearly double that in males, 8%-19% [4]. In Malaysia, Hussein (2013) reports an incidence of 9.8-27 per 100000 population with a male to female ratio of 4.6 [5]. The financial and clinical burden of urolithiasis on the country's health care system is increasingly worrying.

The formation of urinary calculi is influenced by multiple predisposing factors which can be divided into two categories: intrinsic and extrinsic risk factors [3]. Intrinsic factors are mostly non-modifiable risks like age, gender, ethnicity and familial background whereas extrinsic factors encompass a person's lifestyle, dietary habits, occupation, education level, living environment and climate [3]. Risk factors for recurrence include a young age

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of onset, recurrent urinary tract infections (UTIs), medical diseases like hyperparathyroidism or renal tubular acidosis and a strong familial predisposition for the disease [6].

Stones are an amalgamation of organic and inorganic crystals with proteins [6]. Calcium stones are the most prevalent type. They account for approximately 70%-80% of urinary calculi [6]. Other forms of stone can be uric acid stones (5-10%), cystine stones (1%), struvite and mixed types [6]. Out of these, calcium-based stones, struvite and cystine stones are radio-opaque [6]. Therefore, about 90% of calculi can be easily made out in radiographs.

Urolithiasis may not always manifest with symptoms. Some may remain asymptomatic especially if the size of the calculus is less than 5mm in diameter and deemed insignificant by several guidelines [7,8]. Only 10% to 25% progress to become symptomatic, requiring intervention [7]. Typical clinical presentations are acute renal colic, cramping and intermittent flank pain radiating from loin to groin as the renal calculi make their way down the urinary tract from the kidney to the urinary bladder [9]. The pain is usually associated with nausea, vomiting, and malaise [9]. Fever, chills and rigour may manifest [9]. Microscopic haematuria, detectable by dipstick frequently accompanies pain [9-11]. A thorough physical examination should be performed to rule out other differential diagnoses such as UTIs, ectopic pregnancy in the case of a female in the reproductive age group, testicular torsion, malignancy etc [9, 11-13].

The gold standard for confirming urinary calculi is non-contrast computed tomography (CT) [10]. Aside from diagnosing the presence of calculi, CT imaging can assess the size and position of the calculi while ruling out hydronephrosis [7, 9, 11]. However, ultrasonography remains a preferred first-line imaging technique due to its wide availability and cost-effectiveness, though inferior to a CT scan's sensitivity and specificity [7, 11,14]. Besides, plain radiographs are routinely performed to supplement diagnosis by assessing if the stone(s) are radio-opaque and if they can be used in further follow-ups in patients who are expected to spontaneously pass them. [10]. A urine full examination and microscopic examination (FEME) together with a sample for culture and sensitivity should be done to exclude UTIs [7,9,11].

Depending on the patient's presentation, either emergency or elective, treatment modalities vary. If the stone is less than 5mm in diameter, it may be passed out spontaneously [10]. Medical expulsive therapy, though controversial, may be attempted. For larger stones, non-invasive therapy includes extracorporeal shockwave lithotripsy (ESWL) while invasive intervention involves ureteroscopy, percutaneous nephrolithotomy (PCNL) and/or open stone surgery. This report recounts a case of an elderly Malaysian man spontaneously passing unusually large renal calculi.

CASE PRESENTATION

A 65-year-old Chinese Malaysian gentleman, working as a construction coordinator, with a background of uncontrolled type 2 diabetes mellitus first diagnosed 10 years ago but defaulted follow-up, presented with left sided flank pain for 2 years. Pain was insidious in onset, intermittent, colicky in nature, radiating from the left loin to groin with a severity of 8-9/10. Timing of pain varies, at times lasting from a 2-3 hours to a full day. It is exacerbated by cold beverages, and standing and walking from sitting position. Pain is relieved (2-3/10) by taking over-the-counter (OTC) oral analgesics, naproxen sodium 550mg 2 - 4 tablets a day. Progress worsened over the last 2 years.

He also reports having episodic burning sensation on micturition for the same duration. Each episode lasting 2 - 3 days, every other 2 - 3 weeks.

There was also increase frequency of micturition, nocturia (2 - 3 times a night), weak stream, dribbling, intermittency and sensation of incomplete bladder emptying.

Starting from 14 March 2022, the left flank pain worsened and became continuous throughout the day with excessive sweating, oliguria, incomplete voiding, dribbling, straining on micturition, suprapubic distention and discomfort, and constipation (evacuating bowels once every 3 - 4 days; normal: daily) for 2 weeks. Analgesics provided little to no relief. His activity of daily living was significantly disturbed, being by the toilet almost all day and night. At the end of the 14th day, he described passing out a stone-like mass in his urine, measuring up to about 10mm x 6mm. He crushed it and threw it away.

3 days later, he developed urinary retention and severe suprapubic pain for 24 hours. He felt a hard mass along the length of the penile urethra and milked it proximally until the external urethral orifice. He manually removed the mass using a pair of tweezers (Figure 2). It was later identified as a urinary stone, measuring up to 14mm x 9mm x 5mm (Figure 1). Urine gushed out immediately following the removal of the stone and suprapubic pain was relieved. Haematuria was present following the incident for half a day only and urinary incontinence developed, but is gradually improving.



Figure 1: Second urinary calculus passed spontaneously in urine.



Figure 2: Tweezer used to remove the second urinary calculus at the external urethral orifice.

He sought medical attention for the first time 2 days following the passage of the second stone upon advice of a friend regarding these issues.

There was no history of fever, chills and rigour, loss of appetite or weight, vomiting, epigastric pain/discomfort and jaundice. He takes a westernized diet, mostly high in protein and lipids. He is also taking OTC calcium, fish oil and various other health supplements inconsistently.

DISCUSSION

This case report recounts a 65-year-old Malaysian Chinese man, spontaneously passing, based on gross morphology (Figure 1), what looks to be a calcium oxalate stone in two separate events, 3 days apart, with the dimensions 7mm x 3mm (based on description) and 14mm x 9mm x 5mm (based on observation) respectively. These occurrences, especially the latter, are highly unusual as most surgical literature and guidelines draw the cut-off point for spontaneous passing of calculi during micturition to be about 5mm in diameter [6, 10, 15]. This is because the lumen of the ureters is on average, 3mm in diameter with constrictions at five locations: 1) pelvic-ureteric junction, 2) at the brim of the lesser pelvis, 3) point of crossing of the ductus deferens in male; broad ligaments in female, 4) vesicoureteric junction (VUJ) and 5) its opening at the lateral angle of trigone of bladder [16]. VUJ is the most frequent site of obstruction [15]. Furthermore, the average length of the male urethra is 20cm in length, 8mm in diameter, with the membranous part being the least distensible portion due to the external urethral sphincter and the external urethral orifice being the narrowest part of its entire length [16,17].

This case has clearly shown that both stones, each exceeding the standards of literature, have succeeded in overcoming all the potential sites of obstruction to ultimately present themselves at the external urethral orifice only to be manually extracted by the patient with a pair of tweezers. Under normal circumstances, renal calculi with such dimensions are indicated for surgical intervention. Aggarwal (2017) states that stones less than 4mm are more likely to pass spontaneously and stones more than 8mm are unlikely to pass without providing surgical intervention [15]. Barnela (2012) concurs by adding that 95% of stones larger than 8mm require intervention [6]. For stones larger than 5mm, treatment options include extracorporeal shockwave lithotripsy (ESWL), ureteroscopy, percutaneous nephrolithotomy (PCNL) and/or open stone surgery.

Risks factors identified in this patient for the development of urinary calculi are age, gender, occupation- laborious work and dietary habits. This is in concordance with the risks described by Liu (2018) [3].

Aside from the typical presentation of a loin to groin, ureteric colic that strongly points toward a renal calculus, the patient's history also suggests a high probability of benign prostatic hyperplasia (BPH) with possible recurrent UTIs as evident by the presence of incomplete emptying, frequency, intermittency, weak stream, straining and nocturia, ticking off 6 out of the 7 symptoms screened in the International Prostate Symptom Score (IPSS), overlapped with recurring periods of dysuria.

The worsening of flank pain, increasing suprapubic distention and discomfort and the subsequent development urinary retention over the last 2 weeks would suggest that the renal calculi had travelled down the ureter into the bladder, obstructing the urinary outflow tract. Constipation during this period may be attributed to the distended bladder compressing on the rectum posteriorly. Suppose he were to present as an emergency case at this stage, the first line of treatment would be to catheterize the bladder for immediate relief. Adequate analgesics should be given for pain management before proceeding with further investigations to determine the cause.

The onset of haematuria and transient urinary incontinence after the passing of the second calculus suggest damage along the outflow tract, namely the urethral sphincters and urethral mucosa. Fortunate enough, these complications have either completely resolved or are gradually improving, avoiding the need for further treatment.

A few investigations are warranted to ensure complete expulsion of the stone, diagnose BPH and recurrent UTI and monitor diabetes mellitus. Firstly, a renal function test (RFT) should be done, paying close attention to eGFR, urea and creatinine to rule out renal impairment. High serum calcium and uric acid levels are risk factors. Next, an X-ray of the kidney, ureter and bladder (KUB) should be taken to look for any remaining calculi and their location if present. Ultrasonography or non-contrast CT can be done to assess kidney size, ruling out hydronephrosis and/or remaining stone. Prostate-Specific Antigen (PSA) is used to suggest the diagnosis of BPH. A digital rectal examination must be done to assess the size, consistency and presence of the median groove of the prostate. If further indicated, other modes of confirmation, such as transrectal ultrasonography, uroflowmetry, pressure-flow studies, postvoid residual urine (PVR) measurements and/or urethroscopy can be performed [18]. If the diagnosis of BPH is confirmed, medical or surgical therapeutic options are offered. In addition, a urinalysis and a midstream urine sample for culture and sensitivity testing are done to rule out a UTI. Appropriate antibiotic therapy must be initiated if significant bacterial colony forming units (CFU) is reported. Lastly, a diabetic work-up, including physical examination, should be performed to monitor blood sugar levels and check for macrovascular and microvascular complications of diabetes mellitus.

CONCLUSION

Spontaneous passage of urinary calculi measuring more than the standard cut-off of 5 mm in diameter is rarely reported. This unusual case serves as another excellent reminder that there are no absolutes in medicine. There are always exceptions to the rule.

ACKNOWLEDGEMENT

The authors would like to extend their utmost gratitude to the patient who has given his consent to have relevant information about himself reported and published in a journal for the benefit of the medical fraternity and the general public.

ETHICAL CONSIDERATION

An informed consent form detailing all the important and relevant particulars of the case report was provided to the patient. The patient was given full freedom of choice to volunteer information for this case report. No incentives were given to encourage cooperation, nor was the patient coerced or forced into taking part in this study. Whatever information that was provided by the participants is kept strictly confidential and served only the purpose of this case report. Anonymity and privacy of the patient were ensured.

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