Endourology
Symptomatic multiple prostatic calculi: A case report and literature review

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ABSTRACT

Prostatic calculi are often found incidentally during a clinical and radiological examination. However, in some instances, large or multiple calculi may cause severe lower urinary tract symptoms (LUTS). Its current significance concerning urological diseases and symptoms remains obscure. Minimal awareness regarding the disease among physicians could lead to improper assessment and treatment. In Indonesia, reports regarding prostatic calculi are still limited. We report a 50-year-old male with symptomatic multiple prostatic calculi.

Introduction

Prostatic calculi are stones found in the prostatic gland due to primary or secondary reasons. Primary or endogenous prostatic calculi are formed by accumulating prostatic secretions and corpora amylacea. Prostatic inflammation could also aggravate tube blockage. Secondary causes are caused by the long-term reflux of urine to the prostate. Most cases are believed to be asymptomatic and often found incidentally during a clinical and radiological examination. However, large or multiple calculi may cause severe lower urinary tract symptoms (LUTS). Even though they are considered common and usually found in elderly patients with benign prostatic hyperplasia (BPH) or young patients with prostatitis, the exact prevalence is unclear.\textsuperscript{1} Its current significance concerning urological symptoms remains obscure since even in symptomatic cases, they are often un-specific.\textsuperscript{2} Minimal awareness regarding the disease among physicians could lead to improper assessment and treatment. We report a case of multiple prostatic calculi causing LUTS in a 50-year-old male and a brief literature review regarding prostatic calculi.

Case presentation

A 50-year-old male came to the hospital with chief complaints of acute urinary retention for several hours and voiding difficulties for the past six months. The patient suffered from worsening urinary frequency, urgency, and dysuria symptoms for two months. He did not complain of any urinary stone expulsion, fever, nausea, or vomiting. The patient did not have a history of comorbid diseases or surgical procedures. The patient had not been sexually active since his wife passed away several years ago. Three months prior, the patient came to the emergency room due to acute urinary retention, and a urethral catheterization was performed. However, upon relief, the patient asked to be discharged. We found a symmetrical enlargement of the prostate with a hard consistency based on a digital rectal examination. Laboratory examinations were within normal limits. Prostate-specific antigen (PSA) level was 0.1 ng/ml. Urinary culture resulted in Escherichia coli of more than 10\textsuperscript{5} colony-forming unit (CFU). Kidney-ureter-bladder (KUB) plain X-ray, shown in Fig. 1, showed a radio-opaque shadow in the pelvic cavity suggesting prostatic calculi. However, the possibility of bladder stones or mass could not yet be excluded. Transrectal ultrasonography (TRUS) in Fig. 2 showed multiple calcifications inside the prostate. Urethroscopy to examine the prostate and bladder showed prostatic calculi inside the prostatic duct, as shown in Fig. 3a and Fig. 3b. A urinary catheterization for urinary diversion was performed and a transvesical prostatic calculi extraction was planned. The procedure was carried successfully with minimal blood loss and resulted in multiple prostatic calculi with diameters ranging from 0.5 to 2 cm, as shown in Fig. 3c. The calculi consisted of 67% hydrated calcium oxalate, 30% calcium phosphate, and 3% magnesium ammonium phosphate. The histopathological examination resulted in typical histologic findings for prostatitis. One week after the operation, the patient reported improvements. Uroflowmetry examination showed 25 seconds of voiding time and 13.6 ml/s maximum flow rate (Qmax). At the 4th week follow-up, the patient showed significant clinical improvement. Uroflowmetry examination showed 11 seconds of voiding time and 20.4 ml/s Qmax.
Discussion

The prostate has more than 30 tubular structures forming an independent functional unit, which opens to the prostatic urethra. Numerous prostatic calculi formations occur concurrently all over the prostate in multiple prostatic calculi. Despite the aforementioned etiologies, the exact mechanism of prostatic calculi is still unclear. In this patient, the underlying etiology was possibly related to infection. This is supported by the histopathological examination of the patient’s prostate, indicating prostatitis, prostatic calculi chemical composition, and E. coli from the patient’s urinary culture. Under inflammatory conditions, prostatic secretions precipitation of the corpora amylacea are believed to eventually create prostatic calculi. Corpora amylacea calcification results from prostate fluid deposition and foreign bodies, such as dead leukocytes and bacterial biofilms. Cai et al. proposed a theory explaining prostate calcifications’ etiopathogenesis due to bacterial biofilms in chronic prostatitis. Their findings suggested that bacterial biofilms are heavily involved in prostatic calcifications’ genesis. Intra-prostatic urinary stasis causes precipitation of inorganic salts like calcium oxalate or calcium phosphate. The accumulation of sediments accompanied by inflammation triggers prostatic calculi formation.

Even though the current common belief is that most prostatic calculi are asymptomatic, several studies have reported their correlation to nonspecific LUTS. Prostatic calculi could influence prostatic urethra relaxation, which interferes with urinary stream. However, this phenomenon is more apparent in periurethral calculi compared to dispersed stromal calculi. The effects on LUTS depend on the calculi’s type and location. Severe irritative and voiding symptoms are more apparent.
according to the findings by Park et al. Prostatic calculi could induce prostatitis, causing contraction of the prostate and bladder neck’s smooth muscle. The patient came with a defining presentation of LUTS. Before the patient came to our hospital, the suspicion toward prostatic calculi was not made. The patient’s symptoms may also be related to a prostatic inflammation caused by the calculi. A large or multiple calculi cause ductal dilatation and subsequent intraprostatic urinary reflux, leading to severe symptoms.

Typical symptomatic prostatic calculi usually do not require surgical interventions. However, in cases with severe symptoms, complete elimination is preferred. Several treatment options based on the stones’ location and size, such as endoscopic lithotripsy and open prostatolithotomy, are recommended. Prostatic calculi, which protrude to the urethra causing retention, could be removed transurethrally. Endoscopic removal consists of stone extraction via the resectoscope loop and transurethral resection of the prostatic tissue with the stones. Transurethral removal offers relief, however complete removal of calculi and prevention of new calculus formation may be difficult to achieve. In older patients with multiple large stones or a single large stone, open prostatolithotomy is recommended. An open transvesical prostatic approach was performed in this patient with excellent outcomes.

**Conclusion**

The often-asymptomatic nature of prostatic calculi may lead to misdiagnosis when assessing a patient complaining of LUTS. A thorough understanding of the disease and proper examination, both physical and supportive, would lead to a proper management. Open transvesical prostatolithotomy for calculi removal resulted in excellent outcomes.

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**Conflicting Interest(s)**

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