Urol Res (2011) 39:153–155
DOI 10.1007/s00240-010-0323-0

CASE REPORT

Transurethral lithotripsy with holmium-YAG laser of a large exogenous prostatic calculus

Masanori Hasegawa · Rei Ohara · Kent Kanao · Yosuke Nakajima

Received: 29 January 2010 / Accepted: 1 October 2010 / Published online: 16 October 2010

Abstract Prostatic calculi are classified into two types, endogenous and exogenous calculi, based on their origin. Endogenous calculi are commonly observed in elderly men; however, exogenous prostatic calculi are extremely rare. We report here the case of a 51-year-old man who suffered incontinence and pollakiuria with a giant exogenous prostatic calculus almost completely replacing the prostatic tissue. X-rays and computed tomography demonstrated a large calculus of 65 × 58 mm in the small pelvic cavity. The patient underwent a transurethral lithotripsy with a holmium-YAG laser and a total of 85 g of disintegrated stones was retrieved and chemical stone analysis revealed the presence of magnesium ammonium phosphate. The incontinence improved and the voiding volume increased dramatically, and no stone recurrence in the prostatic fossa occurred at the 2 years follow-up. The etiology of this stone formation seemed to be based on some exogenous pathways combined with urinary stasis and chronic urinary infection due to compression fracture of the lumbar vertebra.

Keywords Prostatic calculus · Exogenous · Holmium-YAG laser · Transurethral lithotripsy

M. Hasegawa (✉)
Department of Urology, Saiseikai Kanagawa-ken Hospital,
6-6, Tomiya-tyo, Kanagawa-ku, Yokohama,
Kanagawa 221-0821, Japan
e-mail: hasem@sky.plala.or.jp

R. Ohara · K. Kanao · Y. Nakajima
Department of Urology, Saiseikai Yokohamashi Tobu Hospital,
3-6-1, Shimosueyoshi, Tsurumi-ku, Yokohama,
Kanagawa 230-0012, Japan

Introduction

Prostatic calculi are commonly observed in elderly men and diagnosed easily by KUB X-ray film, ultrasonography or computed tomography (CT). Generally, prostatic calculi are classified into two types, endogenous and exogenous calculi, based on their origin. Most prostatic calculi are diagnosed as endogenous calculi, which are typically asymptomatic. On the other hand, exogenous prostatic calculi are comparatively rare and often cause urinary disorders. To the best of our knowledge, giant exogenous prostatic calculi are extremely rare and there have been only few previous reports in literature. Herein, we report a case of a giant exogenous prostatic calculus, which occupied most of the prostate area, with lower urinary tract symptoms.

According to previous reports, as treatment for large exogenous calculi with urinary disorders, open surgery has been performed because of their size and adherence to the surrounding tissue. In our case, a total of 85 g of calculi was successfully removed endoscopically using a holmium-YAG laser without complications.

Case report

A 51-year-old man first presented with incontinence and pollakiuria at our OPD. He had a past history of compression fracture of the first lumbar vertebra due to a fall when he was 10 years old. Since the accident, he had lost the desire to void urine and had to strain to urinate any time he experienced lower abdominal discomfort. Physical examinations revealed nothing abnormal, except for a stony hard mass palpable under the mucosa of the anterior rectal wall by digital rectal examination. Although urinalysis showed microscopic hematuria and pyuria, urine culture test results

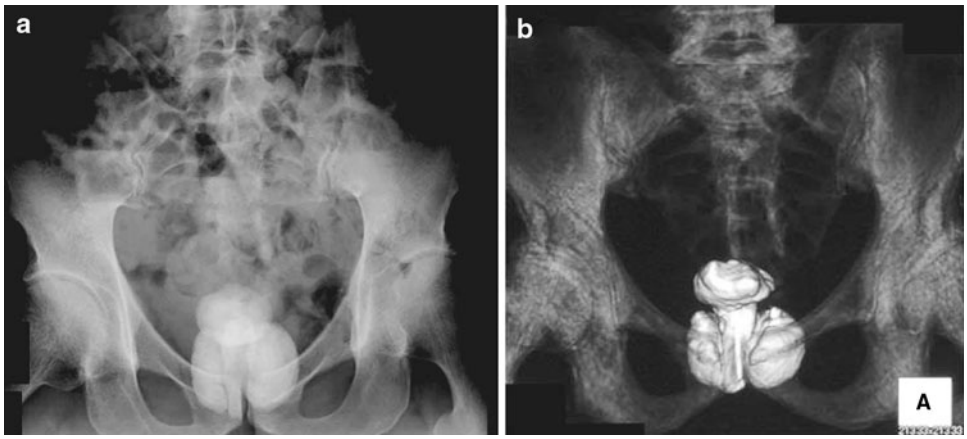

Fig. 1 X-ray (**a**) and three-dimensional CT (**b**) showed a large prostatic calculus (65 × 58 mm) in the small pelvic cavity

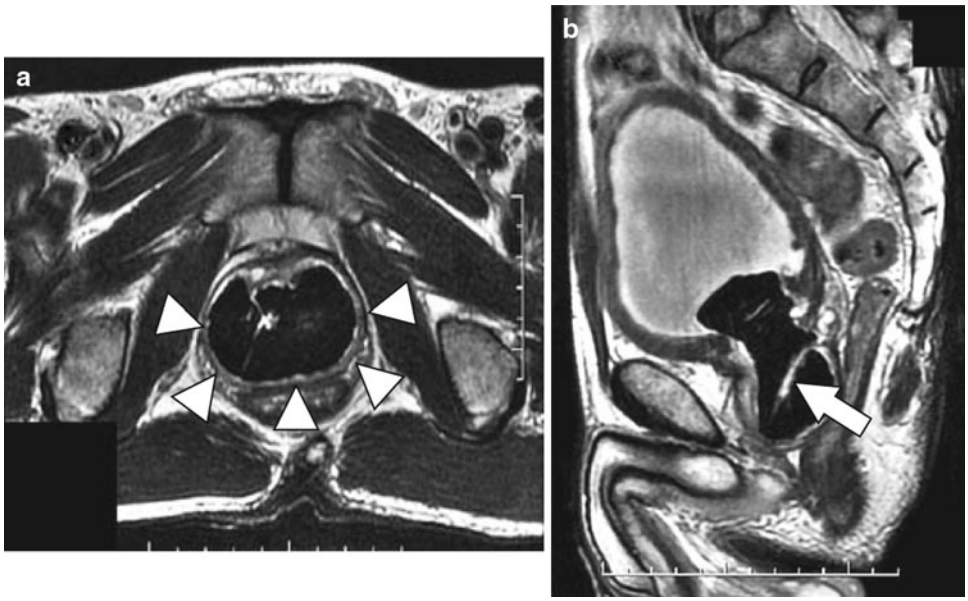

Fig. 2 MRI showed a thin prostatic tissue (*arrowhead*) around the calculus and an ejaculatory duct (*arrow*)

were negative. Blood chemistry tests showed moderate renal dysfunction with creatinine clearance of 44.7 mL/min, but all others were within normal ranges. X-rays (Fig. 1a) and CT (Fig. 1b) demonstrated a large calculus of 65 × 58 mm in the small pelvic cavity. The calculus occupied the area of the prostate and prostatic urethra, and a part of the calculus protruded into the bladder. Intravenous pyelography showed right hydronephrosis and severe trabeculation of the bladder wall. MRI revealed that there were thin prostatic tissues around the calculus (Fig. 2a) and the ejaculatory ducts were situated in the proper area (Fig. 2b). Urethroscopy showed that the calculus existed in the prostatic urethra and was not adherent to the surrounding prostate tissue.

Under general anesthesia, the patient underwent endoscopic transurethral lithotripsy using a holmium-YAG laser. At first, the calculus was fragmented into small particles and then these were pushed into the bladder. The stones in the cavity of the prostate were manipulated by digital rectal palpation to facilitate the procedure. Stone particles were further crushed by a holmium-YAG laser in the bladder, which could be evacuated through the sheath of the scope. A total of 85 g of disintegrated stones was retrieved. Chemical stone analysis revealed the presence of magnesium ammonium phosphate.

After the operation, the incontinence improved dramatically and the volume voided increased compared to before the procedure. No stones have been detected in the prostatic fossa during more than 2 years of follow-up.

Discussion

We treated a rare case of a large prostatic calculus using a transurethral procedure and obtained a good outcome using a holmium-YAG laser.

Prostatic calculi are classified into two groups, endogenous and exogenous calculi [1]. The formation of endogenous

prostatic calculi results from a stasis of prostatic fluid caused by obstruction of the prostatic ducts, followed by the development of corpora amylacea and subsequent deposition of hydroxyapatite [2]. These calculi are mainly composed of calcium phosphate and carbonate [3], and many tiny and different sized stones are usually observed. It is generally agreed that the formation of endogenous prostatic calculi is due to a normal change in prostatic fluids that accompany aging. Lee et al. [4] concluded that endogenous calculi were relatively common because they were detected in 40.7% of men. The majority of cases had no clinical significance, although some cases involved urinary obstruction or bleeding due to calculi projecting into the urethra [5–7] and some intervention was necessary to improve these symptoms [8].

Exogenous prostatic calculi are classified as native urethral calculi. They are formed in association with abnormalities of the prostatic urethra, which cause urinary stasis or infection, and are frequently composed of struvite, calcium phosphate or calcium carbonate. A patient with exogenous prostatic calculi usually has no symptoms at the beginning. However, according to the progression of the calculi, several irritative voiding symptoms such as incontinence and hematuria may develop. Only a few cases of giant exogenous prostatic calculi have been reported in literature [9, 10].

In our case, the calculus was single and stone analysis detected struvite. To the best of our knowledge, this case is the largest prostatic calculus reported thus far. The findings suggested that his bladder neck had become dilated because of a neurogenic bladder due to a compression fracture of the lumbar vertebrae, and that calculus formation was induced in the dilated cavity by urinary stasis and chronic urinary infection. In addition, the patient's ejaculatory ducts were surrounded by the calculus and these ducts were intact. This finding implied that the calculus grew slowly in the dilated cavity of the prostatic urethra and gradually displaced the prostate tissue. Consequently, the calculus in this patient appeared to be exogenous.

Endoscopic transurethral lithotripsy is useful in almost any situation, but cystotomy with bladder neck incision [10] and prostatectomy are preformed only in difficult cases, such as when a stone is extremely large. However, in our case, the calculus was extremely large, but remained completely inside the prostatic capsule on MRI. Therefore, a transurethral approach was selected for this patient. Lithotripsy with a holmium-YAG laser was successfully performed and the entire calculus was removed without any complications or injury, also to the ejaculatory ducts surrounded by the calculus circumferentially.

In this case, we successfully removed the large calculus entirely using a transurethral procedure. This successful removal, together with a good outcome, support the therapeutic utility of a holmium-YAG laser as a noninvasive therapy for treating very large exogenous prostatic calculi.

References

1. Gawande AS (1986) Brushite lithiasis of prostate. Br J Urol 58:230
2. Taylor JS (1998) Gross calcification within the prostate gland. Br J Urol 81:645–646
3. Sutor DJ, Wooley SE (1974) The crystalline composition of prostatic calculi. Br J Urol 46:533–535
4. Lee SE, Ku JH, Park HK, Jeong CK, Kim SH (2003) Prostatic calculi do not influence the level of serum prostate specific antigen in men without clinically detectable prostate cancer or prostatitis. J Urol 170:745–748
5. Kamai T, Toma T, Kano H, Ishiwata D (1999) Urethral obstruction due to protruding prostatic calculi. J Urol 162:163–164
6. Bedir S, Kilciler M, Akay O, Erdemir F, Avci A, Ozgok Y (2005) Endoscopic treatment of multiple prostatic calculi causing urinary retention. Int J Urol 12:693–695
7. Usta MF, Baykara M, Erdogru T, Koksal IT (2005) Idiopathic prostatic giant calculi in a young male patient. Int Urol Nephrol 37:295–297
8. Sondergaard G, Vetner M, Christensen PO (1987) Prostatic calculi. Acta Pathol Microbiol Immunol Scand A 95:141–145
9. Talic RF (1999) Percutaneous suprapubic urethrolitholapaxy of a large native prostatic urethral stone. BJU Int 83:724–725
10. Shah SK, Chau MH, Schnepper GD, Lui PD (2007) Open prostatolithotomy for the management of giant prostatic calculi. Urology 70:1008 e1009-1010