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# Treatment of Prostatic Calculus Causing Urinary Retention in a Dog

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**Abstract :** A cross breed dog (6-year-old, 6 kg, intact male) was referred with hematuria. The dog had been treated for years owing to the urinary bladder calculi. On abdominal radiography, prostatic calculus was demonstrated in the prostatic area. In addition, ultrasonography and computed tomography (CT) scan would confirm that the part of calculus protruded within the prostatic urethra. The patient underwent a prostatolithotomy and traumatic prostatic urethra was carefully sutured and the omentum was filled with the prostate lumen. A crystallographic analysis of the stone showed 80% magnesium ammonium phosphate (struvite) and 20% carbonate apatite. The leakage of the urine was not observed post-operation and the hematuria improved and there was no specific problem at the 6 months follow-up.

**Key words :** hematuria, prostatic calculus, prostatolithotomy, struvite.

## Introduction

Canine prostatic disease is common in male dogs, especially intact male dogs > 6 years old. The most common conditions affecting the canine prostate include benign prostatic hyperplasia, prostatitis, prostatic cysts, and prostatic neoplasia (7). But the incidences of prostatic calculi are very rare in dogs. Lumb (6) reported a case of prostatic calculi about 60 years ago.

To the authors' knowledge, this report is very rare case of prostatic calculus in a dog.

## Case

A 6-year-old, 6 kg, intact male cross breed was referred to evaluation of hematuria. The patient had been treated with c/d$^{TM}$ (Hill's diet) for years owing to the urinary bladder calculi at a local animal hospital.

On clinical examination, the dog was bright and alert. On abdominal palpation and rectal digital examination, the prostate gland was found to be firm and enlarged. Full urine analysis observed struvite crystals. Plain abdominal radiography demonstrated prostatic calculus in the prostatic area (Fig 1). Abdominal ultrasonography revealed prostatic calculus and acoustic shadow in the left prostatic lobe (Fig 2) and various size (3~10 mm) polyp in urinary bladder. In addition, in the ultrasonography, the protrusion of calculus was suspicious within the prostate urethra and a CT scan was performed on the prostate gland. CT scan would confirm that consequently the part of calculus protruded within the prostatic urethra (Fig 3). It was diagnosed that the prostatic calculus and protrusion into the prostatic urethra based on this result.

Under general anesthesia, the patient underwent open prostatolithotomy. A caudal celiotomy extending from the umbilicus to the pubic brim was performed to permit adequate elevation of the prostate gland. Stab incision was made in the lateral aspects of the prostate gland, and calculus was removed (Fig 4A, C). The traumatic prostatic urethra was carefully sutured after a previously placed urethral catheter (Fig 4B). The omentum filled the prostate lumen after the calculus was removed and the outside of the prostate gland was sutured with absorbable mattress. The celiotomy wounds were closed routinely, and castration was performed.

The animal made an uneventful recovery after surgery and the catheter was placed for 10 days post-operation. When the ultrasonography inspected the prostate gland after 2 weeks post-operation, the leakage of the urine was not observed and when inspected monthly for 6 months, there was no specific

**Fig 1.** Radiographic feature of a big stone in the prostatic area.

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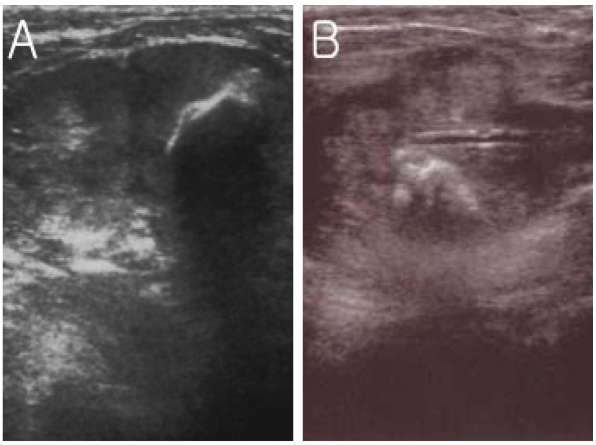


**Fig 2.** Ultrasonographic transeverse features of prostatic calculus and acoustic shadow in the left prostatic lobe (A). The end of the catheter and protruded calculus is contacted within the prostatic urethra (B).


**Fig 3.** CT scan confirm that the part of calculus was protrusion within the prostatic urethra (A). (B) are the enlarged view of boxed area on (A).

problem.

Also, a crystallographic analysis of the stone revealed the presence of 80% magnesium ammonium phosphate (struvite) and 20% carbonate and this stone composition was the same to the struvite crystal confirmed in the results of urine examination.

## Discussion

In human, prostatic calculi are common in males over 50 years of age (5).

But in dogs, the incidences of prostatic calculi are very rare. Lumb (6) reported a case of prostatic calculi in a 6-year-dog.

Prostatic calculi are usually diagnosed easily by X-ray film, ultrasonography or CT scan (3). In our case, we determined stone by abdominal radiography and ultrasonography. Also, The CT scan revealed that the part of prostatic calculus protruded within the prostatic urethra. Kamai *et al.* (4) and Bedir *et al.* (1) reported that prostatic calculi protruded and obstructed the prostatic urethra in humans.

The treament of silent asymptomatic patients with prostatic calculi is no indication in human. Klimas *et al.* (5) and Bedir *et al.* (1) recommend that if there are no complications due to prostatic calculi, periodic follow-up is sufficient. But patients who have intractable infection or prostatic calculi protruding into prostatic urethra causing urinary retention may be treated by surgical removal (1). So, in our case, the prostatic calculus was removed by prostatolithotomy, and after suturing the traumatic urethra, it performed the prostatic omentalization.

Prostatic calculi are generally classified into two types, endogenous and exogenous calculi, based on their origin (3). Endogenous prostatic calculi are formed as a result of calcareous calcium salts on corpora amylacea (2). These calculi are mainly composed of calcium phosphate and carbonate (8).

Exogenous prostatic calculi are formed in association with abnormalities of the prostatic urethra (3). Some studies showed many constituents of prostatic calculi could be found only in urine, not in prostatic secretions (1). These calculi are frequently composed of struvite, calcium phosphate or calcium carbonate (3). In our case, we determined that some part of the prostatic calculus protruded within the urethra and occupied the space on the prostate by CT scan. Bedir *et al.* (1) reported that these cavities suggest prostatic calculus may occur related to intraprostatic reflux in the congenital or acquired diverticulum of the prostatic tissue. In addition, the stone composition of the prostatic calculus was 80% magnesium ammonium phosphate (struvite) and 20% carbonate apatite and this stone composition was the same to the struvite crystal confirmed in the results of urine examination. Consequently, the etiology of this stone formation seemed to be

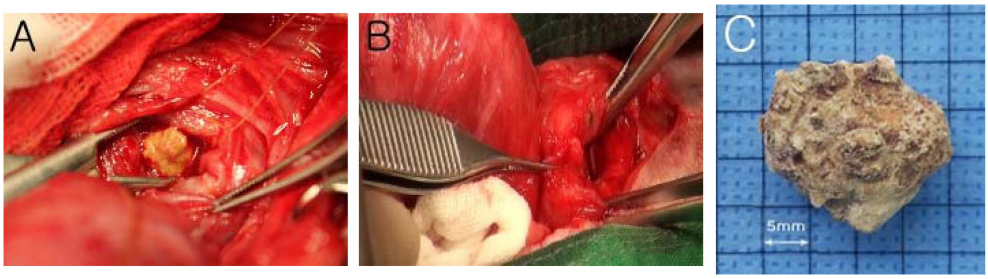


**Fig 4.** Extraction of prostatic calculus via prostatolithotomy (A) and observation of urinary catheter due to prostatic urethral laceration (B). Macroscopic appearance of the prostatic calculus (C, 2 × 1.7 cm).

related to urine intraprostatic reflux and stasis.

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# 개에서 발생한 뇨 저류에 의한 전립선 결석의 치료

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**요 약** : 과거 방광결석으로 진단되어 처방식으로 관리 중인 6살의 잡종견이 혈뇨 증상을 주증으로 전남대학교 동물병원에 내원하였다. 환축은 복부 방사선 검사 결과 전립선 위치에 결석이 확인되었고, 초음파 검사와 CT 검사 결과 전립선 내 결석이 전립선 요도 내강으로 돌출되어 있음을 확인하였다. 환축은 prostatolithotomy를 통해 전립선 내 결석을 제거한 후 찢어진 전립선 요도를 봉합하였고, 결석에 의한 전립선 내강은 omentum을 채워 넣은 후 봉합하였다. 결석의 성분 분석을 위해 crystallographic analysis를 시행한 결과 결석은 magnesium ammonium phosphate (struvite) 80%와 carbonate apatite 20%로 구성되어 있음을 확인하였다. 환축은 수술 후 회복하여 뇨의 누출은 관찰되지 않았고, 혈뇨 증상은 개선되었으며, 수술 후 6개월에도 특별한 임상증상은 없었다

**주요어** : *hematuria, prostatic calculus, prostatolithotomy, struvite.*