

■短報

Total Prostatectomy for Treating a Large Prostatic Abscess in a Dog

巨大な前立腺膿瘍に対して前立腺切除を実施した犬 1 症例

Yuki HOSHINO*, Yuji UZUKA and Masaaki KATAYAMA

星野 有希* 宇塚 雄次 片山 泰章

Division of Companion Animal Surgery, Veterinary Teaching Hospital, Faculty of Agriculture, Iwate University, 3-18-8 Ueda, Morioka, Iwate 020-8550, Japan

Summary: A dog with a large prostatic abscess in the pelvic cavity was treated with total prostatectomy. The prostate was continuous with a large abscess. The abscess, which had adhered to the surrounding tissue in the pelvic cavity, was carefully detached. The caudal part of the urethra was preserved. Postoperative urinary incontinence was mild and gradually improved. Two years after surgery, normal urination was possible, and the abscess had not recurred. Total prostatectomy, which is considered to be associated with many complications, may be useful for the treatment of large prostatic abscesses.

Key words: prostatic abscess, total prostatectomy, urinary incontinence

要約: 骨盤腔内を占拠する巨大な前立腺膿瘍の症例に対し前立腺全切除を実施した。膀胱・尿道と前立腺の境界は明瞭であったためできる限り尿道を温存し、膿瘍は骨盤腔内周囲組織との癒着を剥離し、前立腺と膿瘍を摘出した。術後の尿失禁は軽度で徐々に改善が認められ、術後2年では正常に排尿が可能であり膿瘍の再発は認めていない。合併症が多い前立腺全切除であるが、本症例のように大きな前立腺膿瘍を有する症例の治療選択肢となり得るかもしれない。

キーワード: 巨大前立腺膿瘍、前立腺全切除、尿失禁

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Introduction

Prostatic abscesses are characterized by purulent discharge from the prostatic parenchyma. They may develop subsequent to suppurative prostatitis¹⁴⁾ or secondary infection of prostatic cysts⁴⁾. Surgical intervention and adequate antibiotic therapy are required for their treatment. Antibiotic therapy alone is considered noncurative because ischemia often hinders the penetration of antibiotics into the abscess. Furthermore, most antibiotics show poor diffusion through intact epithelium from the bloodstream into the more acidic prostatic fluid¹⁾. Surgical treatment options for prostatic abscess include omentalization, drain placement, marsupialization, partial prosta-

tectomy, and total prostatectomy¹¹⁾. Omentalization is associated with low complication rates, but the abscess may recur¹⁵⁾. Although the aim of total prostatectomy is to cure the lesion, it is rarely performed because of the possibility of serious complications such as urinary incontinence after surgery^{2, 6)}. We report a case of a dog with a large prostatic abscess in the pelvic cavity in which good results were obtained with total prostatectomy.

Case Description

The patient was an eight-year-old, castrated male, mixed-breed dog weighing 13.3 kg. The dog had a 1-week history of anorexia, was found to have numerous prostatic cysts and a pelvic mass on ultrasonog-

岩手大学農学部附属動物病院 (〒020-8550 岩手県盛岡市上田3-18-8)

*Corresponding author. Yuki HOSHINO, E-mail: yhoshino@iwate-u.ac.jp

raphy at a private hospital, and was referred to Iwate University Animal Hospital for further examination (day 1). The dog had a history of bilateral perineal hernia 1 year back for which the referring veterinarian had performed castration and hernia reduction using a vaginal tunic. On day 1, physical examination revealed a mild fever (body temperature: 39.5°C), mild constipation, right-sided perineal induration, and exudate on the skin at the induration site. Rectal examination revealed a soft mass that compressed the rectum from the right side. A complete blood count was performed, and the results were normal, but a remarkably high C-reactive protein level (16 mg/dl, normal range: <0.5 mg/dl) was observed on serum chemical testing. An increased neutrophil count and signs of bacterial infection were noted on catheter urine sample examination. Abdominal ultrasonography showed prostatic enlargement and multiple cysts with mildly echogenic contents. The cysts seemed to be connected to the prostatic parenchyma and were confirmed to be continuous with the pelvic cavity. *E. coli* was detected from catheter urine culture. Based on the results of urinary bacterial sensitivity testing, enrofloxacin (Baytril®; Bayer Yakuhin, Ltd., Tokyo, Japan) was administered to control the infection. On day 20, contrast-enhanced computed tomography was performed under sedation with butorphanol (Vetorphale®, Meiji Seika Pharma Co. Ltd., Tokyo, Japan), midazolam (Dormicum®, Maruishi Pharmaceutical Co. Ltd, Osaka, Japan), and

medetomidine (Domitor®, Nippon Zenyaku Kogyo Co. Ltd., Fukushima, Japan). A large, tumorous, cystic prostatic lesion was noted. The lesion occupied the pelvic cavity and ran caudally along the right side of the rectum to the perineum (Fig. 1). A catheter was placed in the prostatic urethra to collect prostatic fluid, and gentle aspiration was performed. The fluid was slightly cloudy and red and contained neutrophils. The antibiotic sensitivity test results for this fluid were the same as those for urine. Based on these findings, we diagnosed a prostatic abscess that occupied the pelvic cavity and extended to the perineum. Based on the location and size of the lesion and its tendency to grow, we thought it would be difficult to control with medical treatment alone. After being informed about the possibility of complications such as urinary incontinence, the dog's owner opted for radical resection of the prostate and the abscess.

Surgery was performed on day 21. Anesthesia was induced using propofol (Propofol "Mylan", Mylan N.V., Tokyo, Japan) after pre-administration of midazolam and fentanyl (Fentanyl injection "Daiichi Sankyo", Daiichi Sankyo Co. Ltd., Tokyo, Japan), and it was maintained using oxygen-sevoflurane (Sevoflo®, Zoetis Japan Co. Ltd, Tokyo, Japan) inhalation. Remifentanyl (Ultiva® Intravenous, Janssen Pharmaceutical K.K., Tokyo, Japan) was continuously infused intravenously for intraoperative analgesia. The prostate was approached via a caudal ventral midline celiotomy and pubic and ischial osteotomies



Fig. 1. Contrast enhanced computed tomography showed a large, tumorous, cystic prostatic lesion was noted. The lesion occupied the pelvic cavity and ran caudally along the right side of the rectum to the perineum (Arrowhead: catheter). Left: sagittal plane, Right: transverse plane.

were performed to further expose it. The periprostatic fat was dissected from the ventral side of the prostate. The prostate was enlarged and continuous with the abscess, which occupied the pelvic cavity (Fig. 2). The abscess had adhered to the surrounding tissue. A total of 35 ml of pus was collected from the abscess (Fig. 3). The collected pus was subjected to antibiotic sensitivity testing. To minimize the risk of iatrogenic damage to the neurovascular supply to the urinary bladder and urethra, the prostate and abscess were carefully detached from the surrounding tissue by performing hydrodissection as close to the abscess as possible. Only the urethral branch of the prostatic artery was ligated, and the caudal vesical artery and vein were preserved. The prostate was bluntly dissected from the bladder neck and caudal urethra and pre-prostatic/bladder-neck and post-prostatic urethral transections were performed to achieve total prostatectomy. The prostate and abscess were subjected to pathological examination. A retrograde urinary catheter was placed, and end-to-end anastomosis was performed using a 6-0 monofilament absorbable suture with a simple interrupted pattern (Fig. 4). Light pressure was applied to confirm that there was no leakage from the suture site. After flushing the abdominal cavity, the celiotomy incision was closed in a routine manner. The patient's recovery from anesthesia was smooth. Continuous infusion of remifentanyl and subcutaneous administration of robenacoxib (Onsior®, Elanco Japan K.K., Tokyo, Japan) were performed for postoperative anesthesia.

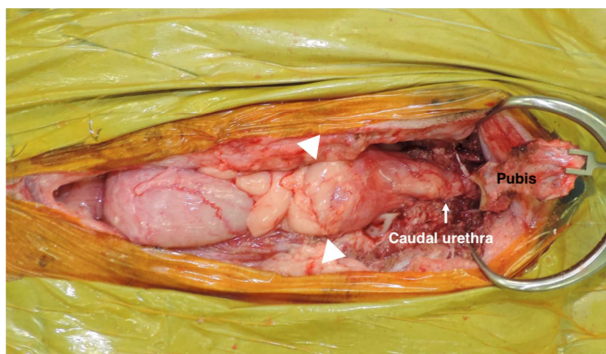


Fig. 2. The prostate (arrowhead) was enlarged and continuous with the abscess.

Antibiotic therapy with enrofloxacin was continued.

The resected tissue was examined, and chronic-active prostatitis with a solitary cyst was diagnosed. The resected specimen contained no suture material or other tissue. The antibiotic sensitivity test results of the collected pus were the same as those of the preoperatively collected urine. The patient's postoperative condition was favorable. The urethral catheter was left in place for 6 days, and slight urine leakage was observed when the catheter was removed. Pain or difficulty in defecation were not observed. The patient was discharged 7 days after surgery (day 28). Fifteen days after surgery (day 43), the urinary status improved, only slight urine leakage was

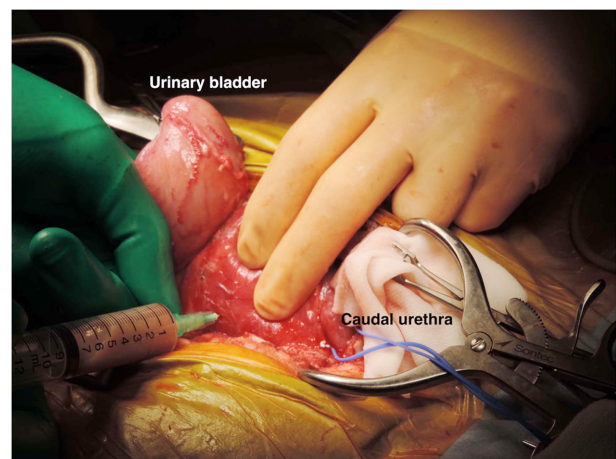


Fig. 3. The abscess had adhered to the surrounding tissue, a total of 35 ml of pus was collected from the abscess.

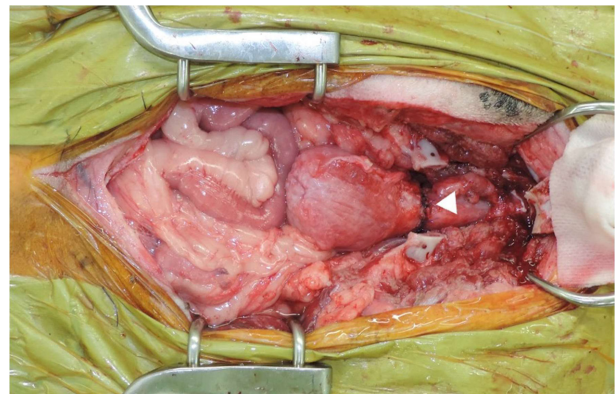


Fig. 4. End-to-end anastomosis was performed (arrowhead) using a 6-0 monofilament absorbable suture with a simple interrupted pattern.

observed during sleep, no neutrophils were found in the catheter urine sample, and antibiotic therapy was discontinued. Computed tomography performed 47 days after surgery (day 90) revealed no recurrence of the abscess. The patient could urinate normally. Two years after surgery, the patient had no urinary incontinence, abscess recurrence, or bladder infection, as evaluated using physical examination, urinalysis, and abdominal ultrasonography.

Discussion

In this patient, imaging revealed an abscess in the prostate itself, in addition to a large abscess continuous with the prostate. Based on the location and size of the lesion and its tendency to grow, we thought it would be difficult to control with medical treatment alone. Omentalization, partial prostatectomy, and total prostatectomy were considered as surgical options. Omentalization is currently the treatment of choice for abscess drainage, and it requires little postoperative care¹⁵). However, the patient's abscess was large and it had spread to the perineum, making it difficult to cover with omentum. Partial prostatectomy was not performed because abnormal prostate could not be discriminated from normal prostate based on the imaging findings. Therefore, total prostatectomy was performed.

Urinary incontinence, a serious complication, has been identified as the most common complication after total prostatectomy. It affects 33%–100% of operated dogs^{2, 3, 9, 10}). The male urethra is divided into the pelvic part, which extends from the internal urethral meatus to the pelvic cavity and includes the prostate, and the spongy part. The muscular layer of the urethra comprises an inner layer of smooth muscle and an outer layer of striated muscle. The urethralis and bulbospongiosus muscles constitute the striated muscle of the pelvic and spongy parts of the urethra, respectively⁷). There is no evidence of a sphincter in the canine bladder, and urination is controlled by passive tension in the elastic fibers of the bladder mucosa and contraction of the urethralis muscle¹²). Therefore, preservation of the pelvic urethra during surgery is important to prevent postopera-

tive urinary incontinence. There was a clear boundary between the prostate and the bladder/urethra of this patient. Therefore, it was possible to preserve the pelvic urethra distal to the prostate. The presence of remaining prostatic tissue may be associated with a risk of abscess recurrence; therefore, the extent of resection should be carefully determined following close examination. The neurovascular supply to the bladder neck and prostatic urethra runs along the dorsal aspect of the prostate, and disruption of this neurovascular supply during total prostatectomy may result in postoperative urinary incontinence^{3, 9}). To minimize nerve damage and subsequent urinary incontinence, cauterization at the dorsal aspect of the prostate should be minimized^{3, 8}). Hydrodissection is a surgical technique in which saline is used to aid dissection⁵). A small incision is made into the plane to be dissected, following which warm saline is injected under pressure into the plane. Once injected, the fluid rapidly dissects along the plane into which it has been injected, achieving a bloodless and safe plane of dissection within a few seconds. In this patient, the dorsal aspect of the prostatic abscess strongly adhered to the surrounding tissue, such as rectal tissue, and the use of hydrodissection made it easier to detach it from this tissue. Visualization of the caudal vesical artery, which supplies blood to the bladder, was also possible.

Basinger reported that total prostatectomy did not cause urinary incontinence in dogs without prostate disease²). In contrast, dogs with prostate disease have an abnormally low external urethral sphincter pressure, which may be exacerbated by total prostatectomy, predisposing them to urinary incontinence. This suggests that the primary prostate disease, rather than the surgical procedure, may be responsible for this complication^{2, 5, 9}). The external urethral sphincter pressure of this patient was not measured. However, there was a case in which a prostatic abscess did not lead to a decrease in urethral pressure, and urinary incontinence had improved at 4 weeks after total prostatectomy²). Similarly, this patient's urinary incontinence was in the form of slight urine leakage at rest, and it improved over the postoperative course.

Dogs with prostatic abscesses may present with difficulty defecating, including tenesmus, constipation, and ribbon-shaped stools⁸⁾. In this patient, mild constipation was observed preoperatively because the rectum was pressed by an abscess in the pelvic cavity. Other than in one report that noted tenesmus with difficulty in defecation after surgery⁶⁾, the defecation status after surgery has not been described. No problem in defecation was observed postoperatively in this patient. Abnormal defecation does not appear to be a major postoperative complication.

The patient had a history of bilateral perineal hernia approximately 1 year previously, and, at that time, reduction using a vaginal tunic had been performed. The abscess had spread to the perineum, and oozing was noted on the right side of the anus. During hernia reduction using a vaginal tunic, the vaginal tunic is guided through the ventral side of the pelvic cavity from the inguinal ring to the perineum¹³⁾. Therefore, the abscess and the vaginal tunic may have coalesced, leading to extension of the abscess to the perineum. Alternatively, the right perineal hernia might have been poorly reduced, and the abscess might have drained into a weak part of the muscle. We could not confirm this based on the intraoperative findings, and no suture materials or tissue other than prostate tissue was detected in the resected specimen. In this case, the perineal hernia was not reduced at the time of total prostatectomy, but the patient did not experience postoperative rectal dilatation or constipation. It is necessary to be vigilant for the recurrence of perineal hernia.

We treated a dog with a large prostatic abscess with total prostatectomy. The postoperative complication that occurred was manageable, and the owner was very satisfied with the outcome. However, we report only one case, and further research is needed to determine the applicability of this method.

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