Drainage of cavities and longitudinal prostatic omentalization under ultrasound control in dogs (10 cases)

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SUMMARY

This study reports another way to perform prostatic cavities drainage throughout longitudinal prostatic omentalization under ultrasound control in 10 dogs and presents clinical outcome and eventual complications. A castration and a caudal median celiotomy were performed and after reclining laterally ventral periprostatic adipose tissue and catheterising urethra for good ultrasonographic visualisation, the prostatic gland was examined with a sectorial transducer to locate cysts or abscesses. Under ultrasound-guided control, a needle centesis, an opening of the cavities and a passage of an omentum leaf through the prostate craniocaudally were performed using forceps. The surgery lasted between 90 and 120 minutes. Thereafter, ultrasonography examinations were performed at least 2 weeks, one and six months postoperatively. No major complication was encountered and the mean hospitalisation time was 1.9 days. Within 6 hours, hematuria resolved in all dogs. Urinary retention occurred in one dog within two days and resolved spontaneously. After 6 months, only 1 dog still had one small cavity without any clinical sign. Long-term resolution of clinical signs was achieved in all dogs, with follow-up periods ranging from 10 to 18 months. Prostatic surgery using longitudinal prostatic omentalization with ultrasound assistance provides a safe and good drainage in dogs presenting marked cavities and also limits recurrences or sepsis complications and avoids urethral injury.

Keywords: Prostate, dog, prostatic cavity, drainage, omentalization, complication.

Introduction

Approximately 80% of male dogs above 10 years old are presenting with prostatic disease [6]. Common pathologies affecting the prostate gland are benign hyperplasia, abscesses and cysts. Clinical signs depend on the size of the prostate or the cavities, the compression of adjacent structures or complications associated with local or systemic bacterial infections [2, 5, 15].

Many procedures have been described in the literature to drain these cavities. These techniques include marsupialisation, drainage by suction or Penrose drains, transverse omentализation or ultrasound-guided percutaneous drainage. All techniques but omentализation are associated with a high rate of complications or recurrence [1, 6-9, 11, 13, 14, 16-18, 20]. On one hand, urethral injuries, recurrence of urinary incontinence, dehiscence, peritonitis secondary to leakage or death are the most frequently encountered problems postoperatively [1, 7, 11, 14, 16-18, 20]. On the other hand, ultrasound-guided percutaneous drainage is associated with a high rate of recurrence and risk of peritonitis [6, 7, 13]. To the author’s knowledge, this is the first report that describes longitudinal omentализation of the prostate or surgical drainage of cavities with ultrasound assistance.

Our aim was to evaluate the feasibility and the long-term outcome of an ultrasound-guided drainage of prostatic abscesses and cysts associated to a longitudinal omentализation of the prostate realised only with a ventral approach. We hypothesized that this technique would allow treatment of each cavity without injuring the urethra and would decrease the rate of recurrence and the postoperative hospitalisation duration in comparison with other published procedures.
Materials and Methods

ANIMALS

Ten dogs diagnosed by ultrasound examination with prostatic retention cysts or abscesses from October 2006 to October 2007 were included in the present study. On admission, an ultrasound examination of the prostate was performed. Dogs showing cavities over 1 cm in diameter were included in the study. When the clinical signs and the animal’s condition allowed it, a medical treatment (Finasterid, 5 mg/kg per day per os / Meloxicam, 0.1 mg/kg per day per os / marbofloxacin, 2 mg/kg per day per os) was administered. After a medical treatment of 4 weeks minimum, a second ultrasound examination was carried out. If the cavity resumption was insufficient (diameter still greater than 1 cm) and/or the dog experienced abdominal discomfort, we opted for a surgical management. In emergency cases or perineal hernia, surgery was immediately performed. A complete blood count and a serum biochemical profile were performed in parallel.

ANAESTHESIA

Dogs were premedicated with morphine (0.2 mg/kg IM) and diazepam (0.25 to 0.5 mg/kg IV) and anaesthesia was induced with propofol (4 mg/kg IV) or thiopental (10 mg/kg IV) according to the patient’s health. Anaesthesia was maintained with a mixture of oxygen and isoflurane delivered via an endotracheal tube. An intravenous infusion of Lactated Ringers solution (10 mL/kg/h) was administered throughout anaesthesia. Meloxicam (0.2 mg/kg IV) and morphine (0.2 mg/kg/2h IV) were given to provide analgesia. Fentanyl patch was used on dogs presenting major abdominal pain on admission. Cephalexin (30 mg/kg IV) was administered at induction and repeated every other hour during surgery.

SURGICAL PROCEDURE

A retrograde urethral catheterization was performed to allow location of the urethra during surgery. Dogs were castrated. A caudal median celiotomy extending from the umbilicus to the pubic brim was performed. A stay suture was placed on the cranial aspect of the bladder to pull the prostate cranially to the pubis. Ventral peri-prostatic fat was dissected medially and reflected laterally allowing good access to the ventral aspect of the prostate. A 7.5 MHz sectorial transducer (LOGIQ e, GE Medical Systems, SCIL, Altorf (67), France, Europe) was placed in a sterile polyethylene arthroscopic sheet and a surgical glove filled with ultrasound gel. The left lobe was first inspected and cavities were located. Using a ventral approach, each cavity was emptied with a 21-gauge needle (0.8x50 mm) connected to a 10 mL syringe under ultrasound-guided control (figure 1). Then a 5 mm incision was made on the cranio-ventral aspect of the prostate allowing the introduction of forceps to open the cavity’s capsule. The same procedure was performed on the right lobe. Prostatic samples were taken for bacteriological culture and microscopic examination to rule neoplastic process out. Two leaves of omentum were prepared. The prostatic capsule was incised with a #11 blade on the cranial aspect of each lobe. Forceps were passed through the first incision, pushed caudocranially through the main cavities and exited by a second incision performed on the cranial aspect of the prostate under ultrasound assistance (figure 2). To facilitate the omentum passage, the incisions were widened by opening the forceps. The leaf of omentum was grasped, gently pulled craniocaudally through the prostatic lobe with forceps and secured at the caudal exit with mattress sutures of 3-0 polydioxanone. Omentalization of each lobe was carried out (figure 3). An abdominal lavage was performed and celiotomy wounds were closed routinely.

POSTOPERATIVE TREATMENT AND FOLLOW UP

Warm Lactated Ringers solution was infused until complete recovery, pain relieving management and antibiotics were
given. Antibiotic therapy was adapted when necessary, based on culture and sensitivity results. The urethral catheter was maintained to collect urine until hematuria was resolved.

Dogs were examined each day until discharge. After two weeks and after one month postoperatively, a complete physical examination was performed, owners were questioned about complications such as urinary incontinence, discomfort or recurrence of clinical signs. Prostatic size and aspect were checked by ultrasound examination. Six months postoperatively, an ultrasound examination was performed; evolution thereafter was monitored by telephone contact with owners.

**Results**

Signalment and clinical signs for the dogs in this study are listed in Table I. Ten dogs, ranging from 6 to 12 years (mean age: 8.7 years, median: 8 years) were included in the current study. All dogs were large-breed dogs and were intact males. In most of the cases, referring veterinarians had administered antibiotics and synthetic progestins for at least one month. Clinical signs onset before surgery ranged from 1 month to 12 months (mean: 4.9 months, median: 3 months). Urinary dysfunction was the most frequently reported clinical sign (60%): dysuria, hematuria and/or incontinence were observed in 6 cases. In 5 cases (50%), dogs presented abdominal pain.

### Table I: Signalment, clinical signs, diagnosis, surgical time and outcome in 10 dogs with prostatic cavities.

<table>
<thead>
<tr>
<th>Case and Signalment</th>
<th>Clinical signs</th>
<th>Diagnosis</th>
<th>Surgery (min)</th>
<th>Postoperative complications</th>
<th>Follow up (months) and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N°1: Beauce sheepdog 12 years old</td>
<td>Abdominal pain</td>
<td>Cyst 1 L / 3 R</td>
<td>120</td>
<td>None</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Dysuria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lethargy</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>N°2: Bull terrier 8 years old</td>
<td>Hematuria</td>
<td>Cyst Numerous L / 2 R</td>
<td>115</td>
<td>None</td>
<td>16</td>
</tr>
<tr>
<td>N°3: Porcelaine 8 years old</td>
<td>Abdominal pain Incontinence</td>
<td></td>
<td>110</td>
<td>None</td>
<td>15. Incontinence resolved 10 days after</td>
</tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>N°4: Crossed 11 years old</td>
<td>Dysuria Incontinence Faecal tenesmus Perineal hernia</td>
<td>Cyst 3 L / 2 R</td>
<td>100</td>
<td>Few drops released after miction (10 days)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>N°5: German Shepherd 6 years old</td>
<td>Incontinence Abdominal pain Perineal hernia Test. Neo.</td>
<td>Cyst 2 L / 1 R</td>
<td>120</td>
<td>Temporary incontinence (faecal and urinary) Abdominal wall suture dehiscence</td>
<td>15. Removal of 1 paraprostatic cyst and a mass (6cm diameter) caudally to the prostate</td>
</tr>
<tr>
<td>N°6: Rottweiler 9 years old</td>
<td>Incontinence Perineal hernia</td>
<td>Cyst 2 L / 1 R</td>
<td>120</td>
<td>Few drops released after miction (20 days)</td>
<td>14. One paraprostatic cyst (Leydigome)</td>
</tr>
<tr>
<td>N°7: Labrador Retriever 8 years old</td>
<td>Abdominal pain</td>
<td>Cyst Numerous L / Numerous R</td>
<td>110</td>
<td>Few drops released after miction (20 days) Two cavities visible (1 month)</td>
<td>14. One cyst located after 8 months without clinical sign</td>
</tr>
<tr>
<td>N°8: Springer Spaniel 7 years old</td>
<td>Faecal tenesmus Perineal hernia</td>
<td>Cyst Numerous L / Numerous R</td>
<td>95</td>
<td>Urinary retention for 48 hours</td>
<td>10. Removal of multiple small paraprostatic cysts</td>
</tr>
<tr>
<td>N°9: Labrador Retriever 11 years old</td>
<td>Abdominal pain Lethargy Cystitis</td>
<td>Cyst 2 L / 2 R</td>
<td>95</td>
<td>None</td>
<td>10. Removal of 1 paraprostatic cyst</td>
</tr>
<tr>
<td>N°10: Weineramen 7 years old</td>
<td>None</td>
<td>Cyst Numerous L / Numerous R</td>
<td>100</td>
<td>One cavity visible in the left lobe (1 month)</td>
<td>10. No cavity (3 months)</td>
</tr>
</tbody>
</table>

1 Nature of the lesions (cysts or abscess); 2 Number and location on the left (L) and right (R) lobes; Test. Neo.: Testicular Neoplasia.
Associated with the prostatic disease, four perineal hernias (40%) were diagnosed on physical examination and faecal tenesmus was reported in 2 cases.

Cavitary lesions ranged from 1 cm to 2 cm in diameter (median: 1.6 cm in diameter). Surgery (celiotomy, cavities drainage and omentalization, wound closure) lasted between 90 and 120 minutes (mean: 108.5 minutes, median: 110 minutes). No peri-operative complication was encountered such as fluid leakage from the cavity into the abdomen or urethral injury. Using the ventral approach, all the cavities were emptied even the dorsal ones. In two cases, the glove covering the ultrasound probe was pierced with the needle without any effect on outcome. In the case n°5, a necrotic mass was located caudally to the prostate and adhesions with descending colon were observed. It was removed by blunt dissection. All the lesions found in prostate were cysts but in four cases, other paraprostatic cysts were also reported and removed during surgery. In 6 cases, bacteriological cultures of prostatic samples were positive and evidenced the presence of Staphylococcus sp in 5 cases, and Escherichia coli in one case. In all the cases, chronic prostatitis was confirmed by histological examination.

All dogs recovered uneventfully from surgery. Hematuria was observed less than 6 hours postoperatively in all cases. Urinary retention developed in dog n°8 during the first 48 hours after surgery and resolved spontaneously. Except this dog which was hospitalized 3 days to manage urinary retention, all dogs were discharged within 48 hours (mean: 1.4 day, median: 1 day). The dog n°5 presented faecal incontinence probably resulting from nervous injury during the removal of the necrotic mass, but this incontinence resolved within 3 months. Three owners reported that their dog was dribbling urine after a normal urine flow, and this minor problem resolved spontaneously within 20 days postoperatively in each case. However, no dog exhibited a real incontinence, such as urine leakage during rest or activity. Moreover, no minor or major postoperative complication occurred in 4 cases (40%). The mean follow-up time was 13.7 months (range: 10 to 18 months, median: 14.5 months). At the ultrasound examination 6 months postoperatively, only one dog (case n°7) presented a small prostatic cavity without any discomfort or clinical sign. No dog treated for abscesses presented recurrence.

**Discussion**

Management of prostatic cysts and abscesses is a subject of controversy. Many procedures have been described to treat prostatic cavities but most of them were associated with a high rate of complications. Some argue that medical treatment associated with ultrasound-guided percutaneous drainage is the treatment of choice, while others consider surgical treatment as the best option. Cavities size could be a decisive criterion. Many studies have been published but little information related to the size has been given. BOLAND et al. [6] treated prostates presenting cavities ranging from 0.5 to 6.5 cm in diameter. Because of the lack of data, dogs were firstly treated with finasteride for at least 4 weeks in the current study. If cavities larger than 1 cm in diameter did not reduce, it was stated that castration could not promote cyst resolution.

The first surgical technique published was prostatectomy. Prostatic disease did not recur but most of the dogs were incontinent after surgery [3, 4, 14, 17]. For the last 30 years, the main surgical procedures performed included marsupialisation [11], prostatic drainage by suction or Penrose drain [9, 16], partial prostatectomy [18] and intra-capsular prostatic omentalization [7, 20]. The major problem is the complication rate associated with the former techniques. Marsupialisation requires postoperative care and is often associated with leakage or drainage occurring for several months, ascending infection and recurrence due to premature closure of the stoma [10]. The prostatic drainage technique presented a number of early postoperative complications, which include sepsis (33%) and death (20%). Long-term complications were recurrence of abscess (20%) and incontinence (25%) [16]. RAWLINGS et al. [18] described another alternative to entire prostatectomy by performing an intracapsular partial prostatectomy with an ultrasonic surgical aspirator. One dog presented cyst recurrence twice within a month due to persistent urethral fistula. Five out of 20 dogs were reported as being intermittent and infrequently urinary incontinent, 3 were considered to urinate normally with some incontinence after micturition when excited and one had nocturnal enuresis. Of the 15 dogs followed after one year, 2 were suspected of having a cyst without any clinical sign and one had a recurrence of prostatic abscess 18 months later [18].

Omentalization of the prostate is the other possibility to treat prostatic cavities. WHITE and WILLIAMS treated 20 dogs with prostatic abscesses by performing bilateral capsulectomy incision and packing omentum after digitally exploring cavities. Nineteen were reported to be clinically normal after one month but no ultrasound examination was performed [20]. The omentum has several useful properties such as enhancement of local immune function, improvement of lymphatic drainage and promotion of angiogenesis [7, 12, 20]. By performing omentalization, drainage of prostatic secretions, vascular supply and immune function against ascending prostatic or urogenital contamination [7] are expected to increase. Furthermore, the prostate possesses a blood-prostate barrier formed by glandular epithelial cells, and this limits penetration of many antibiotics. By increasing vascular supply, their release in the prostatic tissue is improved [19, 21]. A second study was published concerning partial resection and omentalization of prostatic retention cysts [7]. Postoperatively, one dog developed urinary retention during the first 24 hours and 5 dogs showed urinary stress incontinence (1 persisted 2 years after, 1 developed 3 months postoperatively). In that study, no ultrasound examination was carried out. In the present study, short-term complications are similar to those described by RAWLINGS et al. [18], WHITE and WILLIAMS [20] and BRAY et al. [7] with the main difference that no dog presented urethral incontinence. Whereas in the study of White and Williams [20], abscesses were so dilated that the cavities could be digitally explored and the urethra located, ultrasound monitoring was necessary in the present study to empty out and open cavities due to their smaller size and their intra-prostatic location. With ultrasound assistance, prostatic approach was minimized; only the ventral aspect of the prostate was dissected, which
avoided excessive prostatic manipulation. During prostatic manipulation, the prostate turned on itself and the urethra did not stay in the median plane, which increased the risk of urethral injury.

An ultrasound-guided percutaneous drainage has also been described as a useful alternative to surgery [8]. As reported by BOLAND et al. [6], ultrasound examination revealed recurrence in 7 of the 13 treated dogs and all required at least a second drainage. In a second study, they combined ultrasound-guided trans-abdominal drainage with injection of tea tree oil. They reported that a second treatment was necessary in 60% of the cases [13]. BRAY et al. [7] reported one case of infected cyst treated by trans-abdominal aspiration, which developed a localized, low-grade peritonitis due to continuous leakage into the abdomen. Ultrasound-guided drainage represents an interesting technique by providing the opportunity to treat each cavity for the clinician. Using ultrasonography, clinicians are able to locate and empty all the cavities. The surgical technique performed in our study allowed us to open cavities with a forceps and facilitate communication between cysts. This difference could explain the lower rate of recurrence in our cases. In most of the cases, recurrence was observed within the first 4 weeks, but some studies reported recurrence at least one year later [18].

The main drawback of using ultrasonography during surgery is the longer length of its installation. Surgeon needs approximately 5 minutes to place sectorial transducer in a sterile polyethylene arthroscopic sheet and a surgical glove filled with ultrasound gel. Furthermore, 2 surgeons have to collaborate for cavity drainage and omentization: while the one is holding the transducer and emptying cavities or pulling the omentum leaf through the prostate, the other has to limit prostatic mobility. This procedure can be performed alone but with difficulty; we recommend the surgeon to be assisted.

In the present study, longitudinal omentization was performed instead of transversal as WHITE and WILLIAMS described [20]. To the author’s knowledge, this procedure has never been described before. The interest of this technique is to allow prostatic omentization with a lower risk of urethral injury. WHITE and WILLIAMS explored digitally first and then passed omentum through the prostate [20]. In the majority of cases as in our study, the cavities were within the parenchyma and did not allow digital exploration. In these cases, omentum has to be passed blindly through the prostate with forceps without any digital location of the urethra susceptible to increase the risk of injury. By performing bilateral cranio-caudal omentization, omentum leaves are passed parallel to the urethra. It allows a good prostatic drainage of each lobe and avoids urethral injury Ultrasonography was used to assist in the placement of omentum leaves in cysts through the lobe and appeared to be helpful in locating the catheterized urethra.

Currently, hospitalization duration is an important criterion. BRAY et al. [7] reported that most dogs were discharged within 48 hours of surgery and 2 within 24 hours whereas RAWLINGS et al. [18] reported a mean duration of hospitalization of 10.1 days and 3 days for BOLAND et al. [6]. In the current study, 7 dogs were discharged within 24 hours and the mean hospitalization rate was 1.4 days.

As a conclusion, results of this study indicate that cavity drainage and longitudinal omentization of the prostate under ultrasound control is a safe procedure, which allows treatment of abscesses or cysts with a minimal surgical approach and without injuring the urethra. All dogs experienced fast resolution of clinical signs and no urinary incontinence was induced by the surgery. The main advantages of this technique are that it allows each cavity to be treated and limits prostatic manipulation. The complication rate and hospitalization duration are low, which is probably related to a less invasive procedure and a more accurate treatment of cavities.

References


