

Asymptomatic Prostatomegaly in a Young Anatolian Shepherd Dog

Göksen Çeçen^{1*}, Gülsen Goncagül² and Hasan Kurt¹

¹ Uludag University, Veterinary Faculty Department of Surgery, 16059, Bursa, TURKEY

² Uludag University, Mennan Pasinli Vocational School, 16059, Bursa, TURKEY

Received: 11.03.2015; Accepted: 07.04.2015; Published Online: 13.05.2015

ABSTRACT

This case was aimed to report clinical, radiological, ultrasonographical and bacterial culture analysis results of a young dog with prostatomegaly. An 18-month-old age Anatolian shepherd dog undergoing treatment of chronic non-healing pressure wounds in hind leg was presented with a small amount of liquid stool and prolonged straining to defecate. Prostatomegaly was diagnosed radiographically and the other examinations confirmed the pathology. Chronic prostatitis caused by prostatomegaly had developed insidiously without prior bouts of acut prostatitis in this dog. The case was treated successfully.

Keywords: Dog, *Escherichia coli*, Microbial biofilm, Prostatomegaly, Prostatitis, Ultrasonography

Genç Kangal Irkı Bir Köpekte Aseptomatik Prostatomegali

ÖZET

Bu olgu sunumu ile, prostatomegali tanısı konulan genç bir köpekte klinik, radyolojik, ultrasonografik ve bakteriyel kültür analiz sonuçlarının rapor edilmesi amaçlandı. 18 aylık yaştaki Kangal ırkı köpek, arka bacağına iyileşmeyen kronik bası yarasının sağaltımı sırasında, dışkılama süresinde uzama, zorlanarak ve az miktarlarda yumuşak dışkı şikayeti ile sunuldu. Radyografik olarak prostatomegali tespit edildi ve diğer muayene bulguları ile mevcut patoloji doğrulandı. Bu olguda, akut prostatitis nöbetleri olmaksızın sinsice gelişen kronik prostatitis prostatomegali nedeni idi. Olgu başarılı bir şekilde sağaltıldı.

Anahtar Kelimeler: *Escherichia coli*, Köpek, Mikrobiyal biyofilm, Prostatomegaly, Prostatitis, Ultrasonografi

INTRODUCTION

Prostatomegaly is an enlargement of the prostate gland that may shaped symmetrical or asymmetrical, painful or nonpainful (Smith 2008). It can result from the benign hyperplasia, prostatitis, cysts, squamous methaplasia, atrophy and neoplasm. These diseases can cause prostatic volume changes (Paclikova *et al.* 2006).

Prostatitis is the second most common prostatic disorder that it can be acute or chronic. More than 38 per cent of the dogs identified with bacterial prostatitis and older dogs have a greater risk than youngers (Ling *et al.* 1983). Infection of the prostate may be resulted from disease of the urethra, other urinary tract infections, or secondary to a more serious prostatic disease or haematogenous infections (Paclikova *et al.* 2006). The normal prostate gland is inherently resistant to bacterial infection; however, predisposing factors to infection may alter normal defence mechanisms. Gram negative organisms are mostly implicated. Particularly, *Escherichia coli* is the most common pathogen, but *Staphylococcus aureus*, *Klebsiella* spp., *Proteus mirabilis*, *Mycoplasma canis*, *Pseudomonas aeruginosa*, *Enterobacter* spp., *Streptococcus* spp., *Pasteurella* spp. and/or *Haemophilus* spp. can also be encountered (Ling *et al.* 1983).

Prostatomegaly is determined by rectal or abdominal palpation, or by abdominal X-ray or during ultrasound imaging of the prostate. Prostatic rectal palpation is considered to the basic non-invasive method, but the prostate is often barely palpable in giant breed dogs and diagnostic ultrasound may be the only dependable method for evaluation of size and inner structures of the gland (Atalan *et al.* 1999, Paclikova *et al.* 2006).

MATERIALS, METHODS AND RESULTS

An 18-month-old age, vaccines and antelmintic drugs made regularly, un-neutered male Anatolian shepherd dog weighing 50 kg was presented to Uludag University Animal Hospital of Faculty of Veterinary Medicine with a non-healing pressure wounds on right hind leg (Figure 1).

* Corresponding author: goksenc@uludag.edu.tr



Figure 1. The wounds on right hind leg and foot pad.

During treatment period, it was observed that the dog was straining to defecate and only small amounts of stool. The dog was in good condition and physical examination parameters were within normal limits except enlarged popliteal lymph node in right hind limb. Hematologic results were given at table 1.

Table 1. Hematologic finding of Anatolian shepherd dog.

Parameter	Result	Reference interval
RBCs ($\times 10^6/\mu\text{L}$)	7.75	5.5-8.5
Hemoglobin (g/dL)	15.4	12-18
HCT (%)	46.96	37-55
MCV (fL)	61	60-77
MCH (pg)	19.9	19.5-24.5
MCHC (g/dl)	32.8	31-34
WBCs ($\times 10^3/\mu\text{L}$)	12.95	6-17
Neutrophil ($\times 10^3/\mu\text{L}$)	7.58	3-12
Neutrophil (%)	58.5	62-87
Lymphocyte ($\times 10^3/\mu\text{L}$)	3.44	1-4.8
Lymphocyte (%)	26.5	12-30
Monocyte ($\times 10^3/\mu\text{L}$)	0.33	0.2-1.5
Monocyte (%)	2.6	2-4
Eosinophil ($\times 10^3/\mu\text{L}$)	1.41	0-0.8
Eosinophil (%)	10.9	0-8
Basophil ($\times 10^3/\mu\text{L}$)	0.19	0-0.4
Basophil (%)	1.5	0-2
Platelets ($\times 10^3/\mu\text{L}$)	174	200-500

RBCs, red blood cells;HCT, hematocrit; MCV, mean corpuscular volume; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular haemoglobin concentration; WBCs, white blood cells

Abdominal radiographs and ultrasonography identified the mild prostatomegaly (Figure 2, 3).



Figure 2. Radiographic image of the prostate, lateral projection.

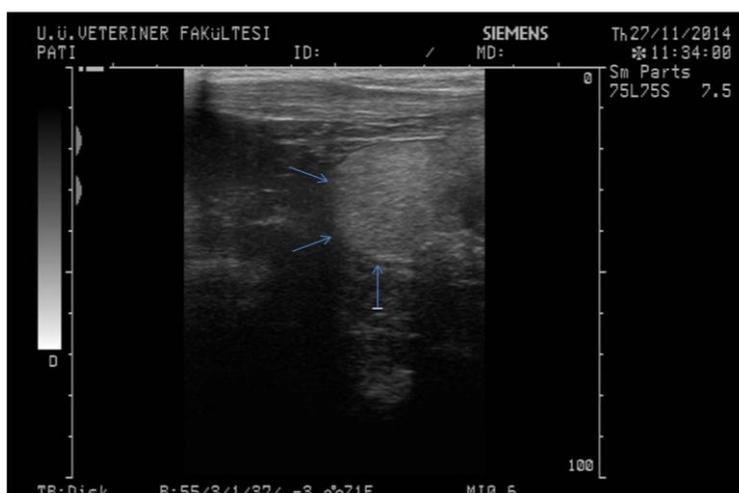


Figure 3. Ultrasonographic image of the prostate.

At ultrasonography, prostatic parenchyma was heterogeneous and prostate gland had asymmetric silhouette. On digital rectal palpation, the prostate gland was painless, moderately smooth and soft in consistency. There was a yellowish purulent discharge from the preputial orifice. Prostatic width, length and depth were measured by transabdominal ultrasound, and the volume was then calculated using a previously reported formula (Kamolpatana *et al.* 2000). Ultrasonographically, the prostatic length, depth, width and volume were 3.26, 4.59, 3.73 and 23.26 cm³ respectively. An ultrasound guided cystocentesis was performed. The cultural examination of urine sample isolated *Escherichia coli* and *Proteus* spp. The urinalysis revealed mild turbid urine and bilirubin (+), slightly protein and 1.015 specific gravity. The microscopic examination of the urine observed a plenty of erythrocytes, moderate leukocytes and mild epithelial cells. The final diagnosis of chronic prostatitis was concluded based on the diagnostic procedures. The dog was treated ciprofloxacin (5 mg/kg/day, PO, for 2 wk, Cipro[®] 500 mg, Biofarma, Istanbul / Turkey) and finasteride (0.1 mg/kg/day, PO, for 16 wk, Proscar[®] 5 mg, Merck Sharp & Dohme, Istanbul / Turkey) successfully. The ultrasonographic measurements were repeated 4 months after treatment and the prostate length, depth, width and volume were measured 3.64, 3.02, 3.15 and 15.11 cm³ respectively.

The wounds on right hind leg and foot pad continued to progress and it were partially epithelialized six months after (Fig. 4a-c).

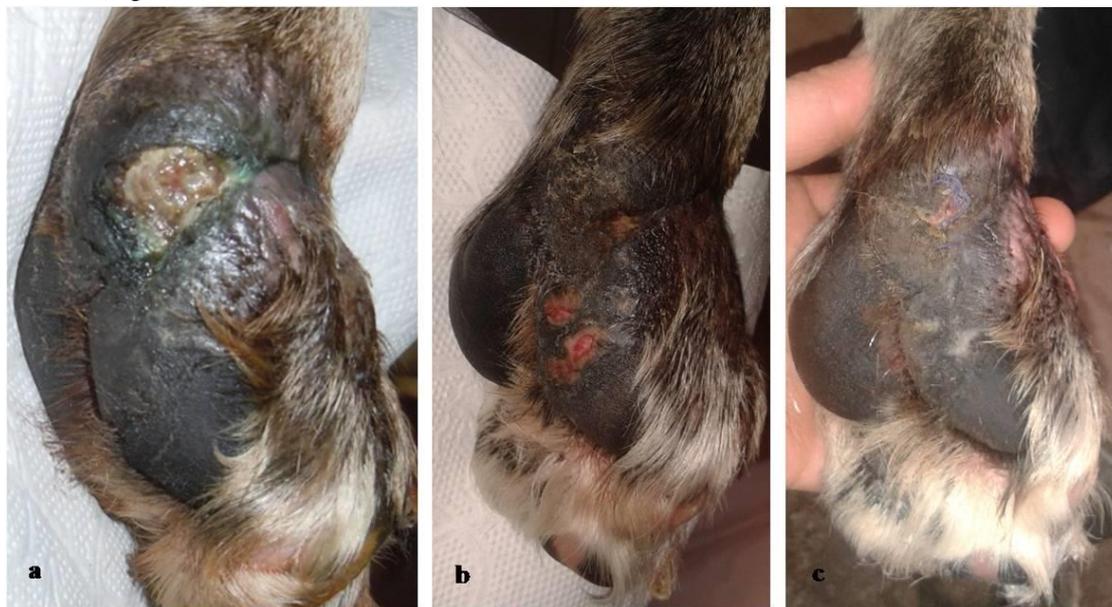


Figure. 4. a-c. The healing process of the wounds on right hind leg and foot pad (a. after 2 months of treatment, b. after 5 months of treatment, c. after 6 months of treatment).

DISCUSSION

Anatolian shepherd dog is in the big and powerful dog breeds. Middle and big size of dog breeds are prone to development prostatic disease. Doberman pinscher and German Shepherd are affected more frequently than the other breeds (Krawiec 1994). Subjective estimation of the prostate gland size is useful to suspect the prostatic disorders and early evaluation of the therapy. To the best of our knowledge, there is no reported reference about the size of the prostate gland in prostate diseases of Anatolian shepherd dog.

Previous studies show that age effects the size of the prostate gland in healthy intact dogs. Atalan *et al.* (1999) reported the size of prostate as 3.5-8.3 cm (mean 5.4 cm), 2.4-7.0 (mean 4.3 cm) a wide variety of breeds, body weight (11.3 to 86 kg) and age (4.0 to 15.0 years) in male dogs. Similarly, Ruel *et al.* (1998) reported the values as 6.35 cm and 5.98 cm in 50 kg dogs. Korodi *et al.* (2010) was reported that the mean volume of the prostate in German Shepherd dogs was 16.2 cm³, 37.7 cm³ and 40.3 cm³ for 2-5 years old, 6-10 years old and for dogs older than 10 years old, respectively. Yayla *et al.* (2012) determined that the average total volume of the prostate in Kars Shepherd dogs was 28.71 cm³. The average age of the dogs included in the study was 6.9 years (range 4-9 years), and average weight was 50.5 kg (range 45-65 kg). Different methods were described to assess the volume of the prostate using the size parameters of the gland. The calculation of prostate volume in a dog was suggested by Kamolpatana *et al.* (2000), and it was considered to be the most precise way for calculation. In our case, the prostate volume value was calculated ultrasonographically and was used to describe the enlarged prostate and evaluate the efficacy of treatment.

Measurements of the prostate gland are used in the clinical evaluation of prostatic disorders such as bacterial prostatitis, prostatic cyst, benign prostatic hyperplasia, prostatic abscesses and prostatic adenocarcinoma, and in monitoring the response to therapy. The inflammatory process of the prostate gland is not an uncommon urologic disorder in older intact male dogs (Krawiec 1994) as lower urinary tract infection generally comes together with prostatic infection (Paclikova *et al.* 2006). We did not find such an information about the enlargement of the prostate gland caused by chronic prostatitis in presented dogs. Human studies reported that the inflammatory pathologies was rather increased in the young males, and according to the recent studies (Bartoletti *et al.* 2007) chronic prostatitis is an emerging problem in young males of fertile age. It has been showed that etiological factors involving the biofilm-forming microorganisms especially *Escherichia coli*

(Kanamaru *et al.* 2006). *Escherichia coli* can remain dominant persistent bacteria and forms biofilms within the ductal system adherent to the epithelium and cause recurrences. The persistence of bacteria in the prostate gland in these focal biofilms leads to persistent immunologic stimulation and subsequent chronic inflammation (Kanamaru *et al.* 2006) .

Urinary tract infections are the most often caused by ascending colonization, possibly hematogenous or lymphatic colonization and invasion of pathogens from neighboring organs. Many chronic infections are thought to be related to biofilms. Chronic wounds are an ideal environment for biofilm formation. The necrotic tissue and debris allow bacterial attachment, and wounds are susceptible to infection due to impaired host immune response (Wolcott *et al.* 2008). The importance of biofilms in chronic wounds has been recently reviewed in detail. Biofilm formation is an important feature related to relapsed urinary tract infection, and possibly plays an important role in prostatitis caused by *Escherichia coli* (Soto *et al.* 2014). Our hypothesis in this case, biofilm-forming microorganisms (*Escherichia coli* and *Proteus* spp.) on a chronic wound in hind leg moves to the urethra and urinary bladder by a haematogenous route. After developing the urinary tract infections reaches the prostate gland.

Dogs with an enlarged prostate usually pass ribbon or tapered stools due to compression of the rectum by the enlarged prostate (Smith 2008). In our case, we observed that the dog was straining to defecate and urine was yellowish to dark color. He had a soft tapered stool. These findings led us to perform clinical, radiological, ultrasonographical and laboratory analysis to detect a urinary tract infection. An enlarged prostate was detected in dog during radiographic and ultrasonographic examinations.

Different methods were described to assess the enlargement of the prostate gland. Abdominal radiographs are commonly used in dogs to evaluate the prostate gland. A radiographically normal prostate gland has been defined as a height less than 70% of the pubic brim–sacral promontory dimension on a lateral view (Feeney *et al.* 1987). As it is known, the radiology plays a role for the basic evaluation of position and general size of the prostate gland (Paclikova *et al.* 2006). However, the ultrasound represents much more sensitive imaging of prostate than radiology. Ultrasonographic prostatic measurements are more accurate and reliable than radiologic ones because the margins of the prostate are better outlined, and because there is no magnification effect, as opposed to radiology (Atalan *et al.* 1999). Prostatic rectal palpation is considered the basic non-invasive method and diagnostic ultrasound may be the only dependable method of evaluation of the size and inner structure of the gland (Paclikova *et al.* 2006). If the enlarged prostate is painful or asymmetrical, further investigations should be carried out. Asymmetrical prostates are more common aspect associated with the prostatic neoplasia or infections (Smith 2008) .

If prostatic disorder is suspected, urinalysis should be performed. Urinalysis reveals haematuria, leucocyturia and bacteriuria in both acute and chronic inflammation. We can also find a low level proteinuria and bilirubinuria. As emphasized previously, diagnosis of the case was made by the evaluation of basic and less invasive procedures. The ultrasound guided fine needle aspiration biopsy is a quick, cheap, easily perform, minimal painy and relatively high reliably, even though it might cause developing haematuria or peritonitis by aspirate, or iatrogenous urethral damage (Paclikova *et al.* 2006). In our dog, the ultrasound guided prostate biopsy is not performed due to side effects.

Bacterial prostatitis is treated with antibiotics with high lipid solubility and the treatment should be long-term. Recent studies confirmed that finasteride can be used to reduce prostatic size in dogs without adversely affecting semen quality or serum testosterone concentration (Sirinarumitr *et al.* 2001). The follow-up evaluation is important in prostatic diseases. We followed the results of treatment by means of ultrasonographic control and the dog treated with medical management.

As a result, it has been considered that prostatomegaly and its results in a young Anatolian shepherd dog can be valuable for the clinic practitioners.

REFERENCES

- Atalan G, Barr FJ, Holt PE (1999). Comparison of ultrasonographic and radiographic measurements of canine prostate dimensions. *Vet Radiol Ultrasound*, 40: 408-412.
- Bartoletti R, Cai T, Mondaini N, Dinelli N, Pinzi N, Pavone C, Gontero P, Gavazzi A, Giubilei G, Prezioso D, Mazzoli S, Boddi V, Naber KG (2007). Prevalence, incidence estimation, risk factors and characterization of chronic prostatitis/chronic pelvic pain syndrome in urological hospital outpatients in Italy: results of a multicenter case-control observational study. *J Urologie*, 178(6): 2411-2415.
- Feeney DA, Johnston GR, Klausner JS, Perman V, Leininger JR, Tomlinson MJ (1987). Canine prostatic disease – comparison of ultrasonographic appearance with morphologic and microbiologic findings: 30 cases (1981-1985). *J Am Vet Med Assoc*, 190:1027-1034.
- Kamolpatana K, Johnston GR, Johnston SD (2000). Determination of canine prostatic volume using transabdominal ultrasonography. *Vet Radiol Ultrasound*, 41: 73-77.
- Kanamaru S, Kurazono H, Terai A, Monden K, Kumon H, Mizunoe Y, Ogawa O, Yamamoto S (2006). Increased biofilm formation in *Escherichia coli* isolated from acute prostatitis. *Int J Antimicrob Ag*, 28 (suppl): 21-25.
- Korodi G, Colibar O, Cernescu H, Ardelean V, Bonca G, Mircu C, Popovici D (2010). Study regarding the evolution with age of ultrasound prostate dimensions in German Shepherd Dogs. *Anim Sci*, 43(1): 182-184.
- Krawiec DR (1994). Canine prostate disease. *J Am Vet Med Assoc*, 204: 1561-1564.
- Ling GV, Branam JE, Ruby AL, Johnson DL (1983). Canine prostatic fluid: Techniques of collection, quantitative bacterial culture, and interpretation of results. *J Am Vet Med Assoc*, 183: 201-206.
- Paclikova K, Kohout P, Vlasin M (2006). Diagnostic possibilities in the management of canine prostatic disorders, *Veterinarni Medicina*, 51(1): 1-13.
- Ruel Y, Barthez PY, Alexandra M, Begon D (1998). Ultrasonographic evaluation of the prostate in healthy intact dogs. *Vet Radiol Ultrasound*, 39: 212-216.
- Sirinarumit K, Johnston S, Kustritz MV, Johnston GR, Sarkar EJ, Memon MA (2001). Effects of finasteride on size of the prostate gland and semen quality in dogs with benign prostatic hypertrophy. *J Am Vet Med Assoc*, 218: 1275-1280.
- Smith J (2008). Canine prostatic disease: A review of anatomy, pathology, diagnosis, and treatment. *Theriogenology*, 70: 375-383.
- Soto SM, Marco F, Guiral E, Vila J (2014). Biofilm Formation in Uropathogenic *Escherichia coli* Strains: Relationship with Urovirulence Factors and Antimicrobial Resistance. <http://www.intechopen.com>. Accessed December 2014.
- Wolcott RD, Rhoads DD, Dowd SE (2008). Biofilms and chronic wound inflammation. *J Wound Care*, 17: 333.
- Yayla S, Öztürk S, Aksoy Ö, Kılıç E, Yıldız S (2012). Normal Ultrasonographic Anatomy of the Prostate in Kars Shepherd Dogs. *Kafkas Univ Vet Fak Derg*, 18(1): 27-30.