

## Case Report

# Scrotal swelling with suppurative and necrotizing epididymitis, and funiculitis in a dog

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## Abstract

An 8-year, intact male dog, was presented with a swollen and painful scrotum. The dog was deemed a valuable part of the client's breeding program and hemicastration was performed in order to preserve fertility. Hemicastration is a viable option and should be considered for preserving fertility in males deemed valuable for breeding. Hemicastration can be performed by general practitioners and the affected testis should be submitted for testing (along with serology from the patient) to rule out *Brucella canis* and to determine the cause for testicular/epididymal pathology.

**Keywords:** Canine, epididymis, funiculitis, enlarged, painful

## Background

Epididymitis and orchitis may occur separately, jointly (orchiepididymitis), or with extension to the vaginal tunic and adhesions to the scrotum (periorchiepididymitis).<sup>1</sup> Those conditions typically occur in young dogs (2-3 years of age) but can range from 11 months to 10 years of age. There is no breed disposition reported; dogs may have acute or chronic disease, with the acute disease process associated with pain, lethargy, scrotal edema, and purulent preputial discharge. Dogs with chronic orchitis/epididymitis have nonpainful enlargement of scrotal contents that can be associated with atrophy of the unaffected testis.<sup>2</sup> Both epididymitis and orchitis can occur independent of an infectious process or secondary to an infectious process.<sup>1</sup>

## Case presentation

An 8-year, 21 kg (48 lb) male Australian Shepherd dog, was examined because of an enlarged scrotum that was extremely painful to the touch. The owner noticed dog's difficulty (straining) to defecate, lethargic appearance and decreased appetite. The dog was used for natural breeding 1 week prior to noticing the clinical signs that were originally attributed to back pain until the owner noticed the swollen scrotum. The patient had been demonstrating clinical signs for ~ 7 days before presentation.

On physical examination the dog appeared in good general health, vitals were within reference limits and had a body

condition score of 4 (on a scale of 1-9). The dog was bright, alert, and afebrile. Digital transrectal examination revealed a bilaterally enlarged prostate that was not painful on palpation, smooth and symmetrical. This was considered an unremarkable finding as the prostatic enlargement was consistent with benign prostatic hyperplasia in an older, intact male dog. Palpation of the scrotum revealed an enlarged, painful scrotum with firm swelling that appeared to originate in the left testis and extended up to the length of the spermatic cord. There were no notable penetrating wounds or injury appreciated to the scrotum on physical examination. The patient was nonpainful on spinal manipulation. All other physical examination findings were within normal limits. The noted clinical signs of straining to defecate and back pain noted by the owner appeared to be related to the enlarged scrotum.

## Diagnosis and treatment

Ultrasonography of the left scrotum and testis revealed marked swelling of the spermatic cord (2 cm diameter) and epididymis. Evaluation of the right scrotum and testis did not indicate remarkable changes nor findings related to those affecting the left scrotum/testis. Left testis measured 2.4 × 2.9 cm and right testis measured 2.2 × 3.1 cm. Echogenicity of each testis was homogeneous. Rapid slide agglutination test (Canine Brucellosis Antibody Test Kit D-tech; Synbiotics Corporation, Kansas City, MO) for canine brucellosis was negative.

The owner elected for hemicastration. As the right testis did not appear to be affected the owner requested this testis remain in hopes of preserving the patient's future fertility. Patient's pain level prevented us to perform a full physical examination or ultrasonography without sedation and a semen collection/analysis. Dog was sedated with intravenous butorphanol (10 mg/ml [0.2 mg/kg] 0.44 ml) and dexmedetomidine (0.5 mg/ml [0.005 mg/kg] 0.22 ml) for ultrasonography. Preoperative complete blood count revealed a stress leukogram. All other laboratory findings were within normal parameters. Dog was transferred to surgery and induced with intravenous propofol (10 mg/ml [6 mg/kg] 12 ml) and maintained on isoflurane and oxygen throughout the procedure.

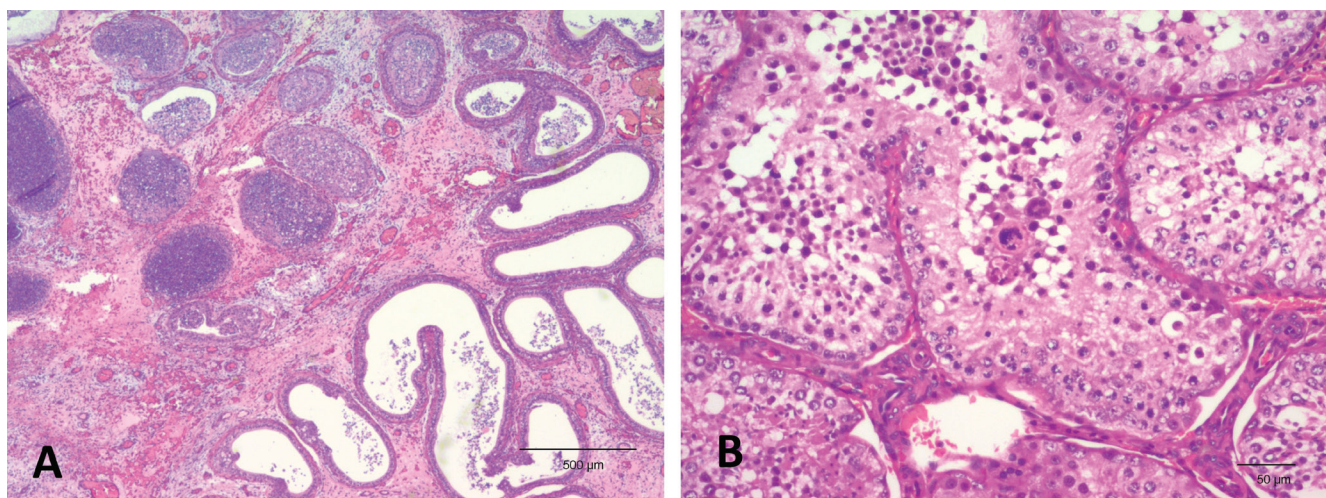
At surgery, torsion of the left testis was not appreciated as the epididymis was in proper orientation, but the left testis vein was grossly distended and there was evidence of pinpoint abscesses in the vas deferens and pampiniform plexus. Adhesions to the tunic had to be broken down before the testis could be exteriorized. The tunic was thickened and irregular. Numerous firm adhesions were noted surrounding the left testis and cord and a rent in the vaginal tunic surrounding the left cord was noted. Small tan to yellow nodules containing liquid contents were scattered within and on the surface of the cord (Figure 1) clinically compatible with small abscesses. Bacterial culture of the cord was obtained through the rent. Open castration was performed and all abnormal tissue was removed as completely as possible. The cord was double ligated with 2 gut suture material. The incision was closed with 2-0 Monocryl subcutaneous and surgical glue. Immediately after surgery, the surgical site was treated with cold compresses for 10 minutes and the dog was placed on NSAIDs (Meloxicam) for pain management for 3-5 days duration.

The culture swab obtained during surgery yielded an abundant and pure growth of *Escherichia coli* (*E. coli*), resistant to amoxicillin/ clavulanic acid but susceptible to marbofloxacin, ciprofloxacin, and enrofloxacin. Amoxicillin/clavulanic acid treatment that was stopped (initiated after surgery due to abscesses) and the dog was placed on oral enrofloxacin (136

mg [6 mg/kg], 1 tablet twice a day for 30 days). The owner was counseled to have a semen culture 1-2 weeks after completion of the antibiotics and a semen evaluation 3 months later.



**Figure 1.** Affected testis after surgical removal; note marked congestion/dilation of spermatic cord with dilated epididymis and pyogranulomatous inflammation of epididymal head.



**Figure 2.** Light microscopic images of epididymis and testis stained with hematoxylin and eosin: A. Epididymal ducts are effaced by necrosis, neutrophils, fibrin, and hemorrhage and are surrounded by fibrosis. Other less affected ducts are dilated and contain cellular debris (bar = 500  $\mu$ m); B. Seminiferous tubules are variably affected, with some loss of spermatocytes and increased numbers of degenerating spermatocytes including multinucleated giant cells within the lumen (bar = 50  $\mu$ m).



Histological evaluation of epididymis and spermatic cord revealed extensive necrosis, hemorrhage, pools of neutrophils and fibrin, and loss of epididymal anatomic detail (Figure 2). Most cross-sections of the head of the epididymis were obliterated by suppurative inflammation, and the surrounding soft tissue had edema, neutrophils, and hemorrhage. Pools of free sperm were also present in the regions of necrosis. Cross-sections near the epididymis tail were less affected. Vasculature in the vaginal tunic was dilated and congested. A few seminiferous tubules appeared within normal limits with abundant spermatogenesis. The vas deferens in the spermatic cord and the adjoining smooth muscle and connective tissue were also largely obliterated by neutrophils and necrosis. The pampiniform plexus was markedly congested and vessels were dilated. The inflammation extended to the proximal margin of the cord. The final diagnosis was severe suppurative and necrotizing epididymitis and funiculitis. The primary pathogen (*E. coli*) was confirmed. The vasodilation in this case suggested that the patient additionally suffered from a spermatic cord torsion of the affected testis.

## Outcome

The patient completed followup evaluations with a local veterinarian. Although the recommended repeat culture was not performed, a semen analysis was performed 3 months after surgery. Dog had limited sperm production but with subjectively low numbers and low motility. Five months after surgery the dog was used for natural breeding resulting in a litter of 6 healthy pups. At 9 months after surgery, semen collection and evaluation were performed at another facility, and the dog had an ejaculate containing  $650 \times 10^6$  total sperm with 98% total motility and 93% normal morphology.

## Discussion

Differential diagnoses for scrotal swelling include epididymitis, orchitis, neoplasia, and testicular torsion. All dogs presenting with an enlarged scrotum should be tested for canine brucellosis, regardless of age or breeding status. Treatment for those disease processes requires removal of affected testes; antibiotic therapy alone is rarely curative.<sup>2</sup>

The pathogenesis of orchitis/epididymitis involves inflammation of the scrotal contents due to infection or autoimmune destruction.<sup>3</sup> Infection can take place either by retrograde movement of organisms from the prostate or lower urinary tract, hematogenous spread, or via direct entry from a bite/penetrating wound.<sup>1</sup> In the case of retrograde infection orchitis/epididymitis the testis and epididymis will swell and form numerous, tiny, intraluminal abscesses. The chronicity of the infection will frequently cause the epididymis to become fibrotic and the testis to degenerate and scar.<sup>2,5</sup> Organisms commonly associated with orchitis/epididymitis are *E. coli* (the most common), *Brucella canis*, *Proteus vulgaris*, *Staphylococcus* spp., *Streptococcus* spp., *Mycoplasma canis*, *Blastomyces dermatitidis*, and canine distemper virus.<sup>2-5</sup> As the preputial cavity and urethra are not sterile, it should be noted many of the above-mentioned bacteria are normal flora in the male reproductive tract.<sup>1,3,5</sup>

Bacterial prostatitis is one of the most prevalent diseases in intact male dogs, secondary to benign prostatic hyperplasia/hypertrophy.<sup>6,7</sup> Many bacteria mentioned above are common in cases of bacterial prostatitis and this particular case stands

to reason that the *E. coli* cultured in this case might have been an ascending infection from the prostate/urinary tract system, spreading to the testis via hematogenous spread.<sup>7</sup> Ultrasonography of the prostate might have been very beneficial in this case to determine if abscessation was apparent in the prostate despite the digital rectal examination findings within normal limits.

In cases of suspected orchitis/epididymitis, ultrasonography can be useful for diagnosing acute versus chronic conditions. Acute cases of orchitis on ultrasonography may have irregular, poorly defined anechoic areas with possible diffuse hypoechoic patterns and focal abscessations. There is typically enlargement of the testis and epididymis with fluid between the visceral and parietal tunics within the scrotum.<sup>8</sup> In cases of chronic orchitis there may be less obvious features noted on ultrasonography with hyperechoic or mixed echogenic parenchyma and reduced testis size. Abscesses were observed with chronic orchitis, featured as irregular, hyperechoic walls filled with anechoic/hypoechoic contents.<sup>8</sup>

Testicular torsion, more correctly termed torsion of the spermatic cord, varies from a loose 360° torsion to several tight revolutions. Dogs with cryptorchid testicular torsion usually have signs of acute onset of abdominal pain, vomiting, abdominal distension, lethargy, anorexia, stiff gait, dysuria, hematuria, and pyrexia.<sup>7,9,10</sup> If testicular torsion involves a scrotal testis, swelling of the scrotum may or may not be painful. Torsion is also more commonly reported in cryptorchid testes than with scrotal testes.<sup>7,9,10</sup> Intraabdominal testes are thought to be more prone to torsion due to greater mobility of the testis within the abdominal cavity.<sup>7,9,10</sup> Histologic descriptions of nonneoplastic testicular torsion have ischemic necrosis, intratesticular hemorrhage, and epididymal edema.<sup>9,10</sup>

Regardless of etiology, valuable breeding dogs with only 1 affected testis are good candidates to undergo a unilateral orchiectomy as soon as possible to prevent atrophy of the contralateral testis due to heat, compression, extension of an infection, or hormonal suppression from certain tumors. Semen quality should return to normal 62 days after therapy.<sup>1,2</sup> Compensatory hypertrophy of the remaining testis may be evident as early as 3 months after surgery.<sup>2</sup> Prognosis is better if neither atrophy nor fibrosis is noted in the remaining testis.<sup>2</sup> It is noted in stallions that orchidopexy of the remaining scrotal testis is recommended at surgery.<sup>9</sup> In dogs, torsion is more common in the undescended (cryptorchid) testis and often both descended and undescended testes are removed.<sup>9</sup> Orchidopexy is not routinely performed in dogs nor in this case.

## Learning points

- Testing for brucellosis in all breeding dogs is strongly recommended, especially if they have possible clinical signs for the disease
- Hemicastration is a viable option (can be performed by general practitioners) to preserve breeding potential for clients valuable breeding dogs
- It is important to perform semen analysis at 2-3 months after hemicastration to determine successful preservation of fertility
- Submitting samples for histopathology is ideal for ruling out infectious disease processes that may require systemic treatment

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## Conflict of interest

Authors have nothing to declare.

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