

Reduced Fertility & Epididymitis in a Dog

Cheryl Lopate, MS, DVM, DACT

Reproductive Revolutions & Wilsonville Veterinary Clinic
Wilsonville, Oregon

A 4.5-year-old intact male Parson Russell terrier was presented for an infertility evaluation. He had been bred to multiple bitches over the last 2.5 years.

History

In the first year of his breeding career, he had excellent fertility, with all bitches being bred naturally and conceiving with normal-sized litters of 4 to 8 puppies each. At the start of the second year of his breeding career, his fertility was normal. However, in the previous 6 months, he had been bred to 4 bitches (2 from his own kennel, 2 from outside kennels), none of which whelped any puppies. One aborted her litter on day 52 of pregnancy.

Examination

Physical examination revealed a temperature of 100.4° F, pulse at 120 bpm, respiration at 16 breaths/min, pink mucous membranes, and capillary refill time <2 seconds. There was mild retropharyngeal and submandibular lymphadenopathy. Auscultation of the heart and lungs was normal. Abdominal palpation was unremarkable. There was prominent scrotal dermatitis, and mild-to-moderate unilateral epididymal enlargement of the right epididymal head, body, and tail with concurrent thickening of the distal spermatic cord (**Figure 1**, next page). Both testes were slightly softer than expected but of normal size.

Table 1. Semen Evaluation

Volume	3 mL fractions 1 & 2 combined
Total motility	40%
Progressive motility	25%, velocity 3/5; mild head-head agglutination
Total sperm/ejaculate	453 million
Morphology	12% normal; 16% knobbed or detached acrosomes; 23% thickened midpieces; 14% proximal protoplasmic droplets; 8% distal midpiece reflexes; 14% bent tails; 13% detached heads
Cytology of pellet sediment	A moderate number of round cells noted on wet mount evaluation and a WBC count via hemocytometer revealed a WBC count of 22,000/μL. Stained cytology (Wright's stain) revealed a round cell population comprised of both neutrophils and macrophages.

WBC = white blood cell



Ask Yourself



1. What are the differentials for epididymitis in this dog?
2. What methods of bacterial isolation are available for diagnosis of brucellosis?
3. What additional diagnostics can be used to identify brucellosis infection?
4. What modalities are available to treat *B. canis* infection?
5. What concerns are there about interspecies or zoonotic transmission?

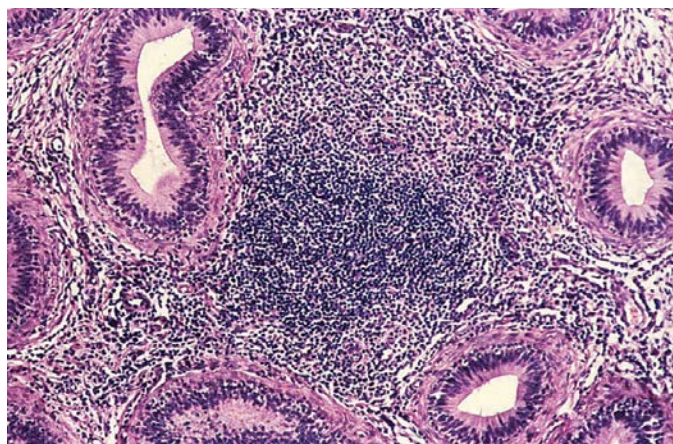
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Diagnostic Results

Results of the semen evaluation, collected via manual stimulation, are provided in **Table 1** (previous page). There was no apparent pain associated with ejaculation.



1 Chronic epididymitis with the head, body, and tail of the epididymis as well as the distal spermatic cord (enlarged and irregular) postcastration; the testicle is smaller and flatter than normal because of chronic infection.



2 Prominent, diffuse lymphocytic inflammation commonly associated with *B. canis* epididymitis.

Images courtesy of Cornell Pathology Laboratory

Further Diagnostic Testing

Enzyme-linked immunosorbent assay (ELISA) revealed a positive brucellosis status (*Brucella canis* infection), which was confirmed with agar gel immunodiffusion (AGID) testing. Qualitative semen culture was performed, and numerous *B. canis* organisms were isolated along with moderate numbers of beta-hemolytic streptococci. The presence of white blood cells in semen cytology suggested a diagnosis of epididymitis. Histopathology demonstrates diffuse lymphocytic inflammation (**Figure 2**).

Diagnosis

Canine brucellosis

Treatment & Outcome

The state veterinarian was notified because brucellosis is a reportable disease in most states. The dog was castrated and quarantined for 8 months and was treated with tetracycline and streptomycin for 8 weeks. Serologic testing was performed on the remaining animals in the kennel. Seventy-five percent of the animals in the original kennel (21/28) were positive for *B. canis*. In the kennels in which outside bitches had been bred, 100% of the animals in 1 kennel and 50% in another (3 and 4 animals, respectively) were infected. All positive animals were neutered and treated with tetracycline (22-50 mg/kg) or were euthanized if the owner did not want to quarantine and treat.

Prevention

Serologic testing should be performed on all new arrivals to a breeding kennel, followed by 8 weeks of quarantine and retesting. Animals that are negative at this stage are considered safe to enter the general population and for breeding. Because brucellosis is a zoonotic disease, the importance of testing all new arrivals and other animals that are on the premises or that may have been exposed directly or indirectly cannot be overstated.

Table 2. Commonly Used Serologic & Diagnostic Tests for Brucellosis

Test	Antigen	Sensitivity & Specificity	Positive Predictive Value	Negative Predictive Value
RSAT + 2ME-RSAT	Cell wall	Very sensitive, low specificity	Low	High
TAT	Cell wall	High sensitivity, low specificity	Low	High
AGID	Cell wall	High sensitivity, good specificity	Moderate	High
PCR	DNA	Very sensitive, very specific	High	High

AGID = agar gel immunodiffusion, ELISA = enzyme-linked immunosorbent assay, PCR = polymerase chain reaction, TAT = tube agglutination test



1. Differentials for epididymitis include aerobic bacterial or fungal infection; *Brucella canis* infection; infection via hematogenous or descending routes; sperm granuloma; trauma; or varicocele.
2. The ideal bacterial diagnostic isolation method for brucellosis is blood culture. Bacteremia occurs between 2 and 4 weeks post infection and lasts for approximately 6 months, becoming more intermittently isolated as 1 year post infection is reached. In some individuals, bacteria may be isolated for up to 5 years. Bacteria may also be isolated from semen, prostatic fluid, or urine. Following castration, the organism can be isolated from the testes; at the time of necropsy, the organism can be isolated from lymph nodes, spleen, liver, prostate, or bone marrow. Culture should only be performed in specialized laboratories because *Brucella* spp culture is associated with increased laboratory safety risks. Culture should never be performed in veterinary clinics if *Brucella* spp are potentially present.
3. Additional serologic testing can be performed using a variety of screening tests, including rapid slide macro- and microagglutination tests, tube agglutination test (TAT), ELISA, indirect immunofluorescence tests, complement fixation, counter-immunoelectrophoresis, or polymerase chain reaction (PCR) test (**Table 2**). AGID is considered the gold standard of testing and should be carried out when any of the other diagnostic tests are positive. Seroconversion will take a minimum of 6–8 weeks post infection, so any animal with a negative screening test but suspicious clinical signs should be isolated and retested in 2 months for confirmation.
4. Treatment is difficult because *B canis* is an intracellular organism; therefore, it can be difficult to achieve adequate concentrations of antibiotics to kill the organism. No antibiotic, alone or in combination, is 100% effective at eradication of the bacterium. Antibiotics that have been most effective include tetracycline or minocycline in combination with streptomycin or enrofloxacin. Gonadectomy is a requisite part of treatment. One should consider all animals that have been positive at any time as potentially infective later. Removal and strict isolation or euthanasia are ideal solutions and highly recommended for kennels.
5. Transmission may occur via aerosol contact with infected secretions or contaminated urine. Disinfection with

quaternary ammonium compounds and iodides will treat the environment; the organism does not live long outside the host unless organic material is present. The organism spreads rapidly in a kennel situation because of close contact between animals. Zoonotic transmission to humans is possible, resulting in presentations such as indolent fever and lymphadenopathy, pharyngitis, joint pain, and weight loss. ■ **cb**

Suggested Reading

- Glynn MK, Lynn TV. Brucellosis. *JAVMA*. 2008;233(6):900-908.
 Hollett RB. Update on canine brucellosis. *Clin Theriogenology*. 2009;1:287-295.
 Root-Kustritz MV. Evaluation of clinical usefulness of tests for canine brucellosis by calculation of predictive value. *Clin Theriogenology*. 2009;1:343-346.
 Wanke MM. Canine brucellosis. *Anim Reprod Sci*. 2004;82-83:195-207.



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