

Septic orchitis in an alpaca

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Abstract — An adult, intact male alpaca was presented with an acute onset of unilateral scrotal swelling. Following complete physical and ultrasonographic examination, the most likely differential diagnoses were orchitis, hematoma, and testicular torsion. The animal was castrated and histopathologic evaluation revealed unilateral orchitis. *Streptococcus equi* subsp. *zooepidemicus* was cultured.

Résumé — Une orchite septique chez un alpaca. Un alpaca mâle entier a été présenté pour un œdème scrotal unilatéral aigu. Après un examen clinique et échographique, les diagnostics différentiels les plus probables étaient une orchite, un hématome ou une torsion testiculaire. L'animal a été castré et une évaluation histologique a révélé une orchite unilatérale. *Streptococcus equi* subsp. *zooepidemicus* a été isolé.

(Traduit par les auteurs)

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An 8-year-old, intact male alpaca was referred to the Veterinary Teaching Hospital of Washington State University because of acute unilateral scrotal swelling. The animal was kept in a pen with another intact male alpaca, and both animals were fed a pelleted llama ration and timothy hay. The referring veterinarian examined the alpaca and found it to be recumbent and anorexic. At the time of presentation, the alpaca was depressed but able to stand. Initial examination revealed hyperthermia (rectal temperature 36.6°C; reference range, 37.5 °C to 38.9°C) and enlargement of the right testicle and surrounding scrotum (7 cm × 3.5 cm as opposed to 3 cm × 2.5 cm for the left side). On palpation, the right testis was firm, warm, and painful. In addition, it was not easy to identify normal structures or move the testicle within the scrotum. No other abnormalities were identified. Ultrasonographic examination revealed thickened hypochoic tissue, suggestive of edema, in the structures proximal to the testicle. No free fluid was seen within the tunica vaginalis, ruling out a hydrocele. The external inguinal rings were visualized and there was no evidence of intestinal herniation into the scrotal tunic. Doppler color-flow ultrasonic examination indicated

minimal circulation within the testicular parenchyma, but an increased blood flow in the surrounding tissues. Clinicopathologic abnormalities included the following: neutrophilia ($21.4 \times 10^9/L$; reference range, 4.2 to $15.0 \times 10^9/L$) with an increased number of band neutrophils ($1.07 \times 10^9/L$; reference range, 0 to $0.13 \times 10^9/L$) and lymphopenia ($0.21 \times 10^9/L$; reference range, 0.9 to $7.6 \times 10^9/L$). Hyperglycemia (16.15 mmol/L; reference range, 4.55 to 8.88 mmol/L) was also noted and attributed to stress. The most likely differential diagnoses were orchitis, periorchitis, and testicular torsion.

Due to the obvious discomfort of the alpaca and the marked enlargement of the right scrotum and testis, surgery was elected. Anesthesia was induced with guaifenesin (Guaifenesin Injection, Phoenix, St. Joseph, Missouri, USA), 2 mL/kg body weight (BW) of a 5% solution, IV, and ketamine hydrochloride (Ketaset, Fort Dodge, Fort Dodge, Iowa, USA), 2.2 mg/kg BW, IV. Isoflurane (Isoflo, Abbott, Chicago, Illinois, USA) vaporized in oxygen was used for maintenance of anesthesia, along with assisted positive pressure ventilation. Fluid therapy with lactated Ringer's solution was administered during surgery at a rate of 5 mL/kg BW/h. A 5-cm longitudinal skin incision was made over the right testicle, approximately 1 cm lateral to the median raphe. The tunica dartos and scrotal fascia were extremely edematous and diffusely adhered to the tunica vaginalis. The adhesions were broken down manually and the tunica vaginalis parietalis was incised to expose the testicle. The ligament of the tail of the epididymis was bluntly disrupted to free the testis and allow evaluation of the epididymis and spermatic cord. The tail of the epididymis was swollen, whereas the spermatic cord appeared normal. A routine open castration was performed, after which the testis was bisected and an impression smear was made. The left testicle was

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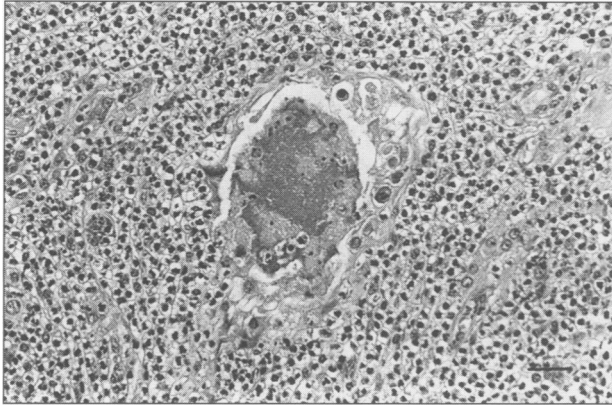


Figure 1. Photomicrograph of the right testicle showing severe suppurative orchitis. The seminiferous tubule and the surrounding interstitium have dense neutrophilic infiltrates. The tubular lumen contains sloughed epithelial cells and large bacterial colonies. Hematoxylin and eosin. Bar = 45.9 μ m.

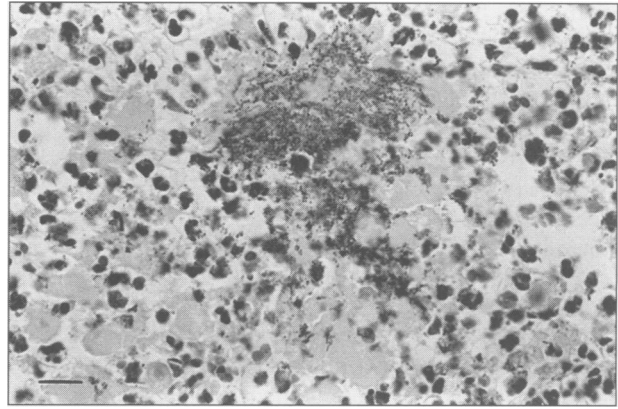


Figure 2. Photomicrograph of the right testicle showing cocci arranged in chains within the suppurative exudate and cellular debris in the lumen of a seminiferous tubule. Cocci stain gram-positive. Brown and Hopps Gram stain. Bar = 18 μ m.

removed using a standard closed castration technique. Prior to completion of the surgery, microscopic evaluation of the impression smear revealed a high number of neutrophils, as well as numerous gram-positive cocci. Incisions were closed in a continuous subcuticular suture pattern by using 2-0 polyglecaprone 25 (Monocryl, Ethicon, Somerville, New Jersey, USA). Both testes were submitted for bacteriological evaluation and histological examination.

Following surgery, antibiotic therapy was instituted with procaine penicillin G (Pfi-Pen G, Pfizer, Exton, Pennsylvania, USA), 25 000 U/kg BW, q12h, SC, while awaiting results of the culture. The alpaca also received flunixin meglumine (Banamine, Schering-Plough, Union, New Jersey, USA) 1.1 mg/kg BW, q8h, IV. The 2nd day following surgery, the catheter site was noted to be swollen and painful. The catheter was removed and flunixin meglumine was administered, IM. For 2 d following surgery, the alpaca seemed depressed, was not eating, and had decreased forestomach motility. Two liters of fresh rumen liquor from a donor cow were inoculated into the 1st gastric compartment (1). The next day, a blood sample was obtained and submitted for a complete blood cell count and chemistry panel. Numbers of band and segmented neutrophils were slightly elevated ($0.18 \times 10^9/L$ and $15.09 \times 10^9/L$, respectively) but decreased from the presurgical value, and hyperfibrinogenemia (6 g/L; reference range, 1 to 4 g/L) was present. Flunixin meglumine was discontinued; results of an aerobic culture showed heavy growth of *Streptococcus equi* subsp. *zooepidemicus*. The diagnostic laboratory did not routinely perform antimicrobial sensitivity testing for streptococcal species; however, the organism was assumed to be sensitive to penicillin. Following 4 d of anorexia, abdominal ultrasonography showed no free peritoneal fluid or any other significant abnormalities. A 2nd inoculation with 2 L of fresh ruminal fluid was administered in an attempt to stimulate appetite and gastrointestinal motility. The next day, the alpaca appeared brighter and his appetite returned to normal. He was discharged 6 d postsurgery and the clients were instructed to con-

tinue penicillin therapy for a further 8 d. A blood sample submitted for analysis prior to discharge revealed a stress leukogram. The fibrinogen had returned to a normal value (3 g/L).

Upon histological examination, severe, multifocal to coalescing, suppurative, unilateral orchitis and epididymitis with intralesional gram-positive cocci was diagnosed. Most seminiferous tubules were obliterated by dense aggregates of partially degenerate neutrophils and cell fragments (Figure 1). Occasionally, affected seminiferous tubules contained colonies of gram-positive cocci arranged in chains (Figure 2). The neutrophilic infiltrate extended multifocally into the testicular and epididymal interstitium, the tunica albuginea, and the cremaster muscle and was often associated with hemorrhage and edema. Many epididymal ductules had dense, luminal aggregates of neutrophils and a few sloughed epithelial cells. There was mild neutrophilic transmigration through the epithelium of efferent ducts, with small aggregates of neutrophils in ductular lumina. In sections of the unaffected testicle, the germinal epithelium of a few seminiferous tubules was mildly decreased in thickness.

To the authors' knowledge, septic orchitis has not been reported in alpacas. In cattle and dogs, it is usually associated with brucellosis (2,3). Although uncommon in horses, septic orchitis and periorchitis may occur in association with trauma, or occasionally from a hematogenous origin (4,5). *Streptococcus* species are commonly implicated in the disease, while other causative agents include *Salmonella abortus equi*, *Pseudomonas mallei*, and *Klebsiella pneumoniae*. Migration of *Strongylus edentatus* has been reported as a cause of equine orchitis and epididymitis (6), and viral agents or autoimmune diseases may also be involved (7). Since there was no history or evidence of trauma to the alpaca in this case, the most likely origin of the orchitis and epididymitis was a hematogenous route.

Differential diagnoses for apparent testicular enlargement in camelids include hydrocele, pyocele, orchitis, hematoma, neoplasia, testicular torsion, and scrotal

hernia (8). In this alpaca, the information obtained from ultrasonography permitted elimination of several differential diagnoses, and the inflammatory leukogram strongly suggested a septic process, such as orchitis. *Streptococcus* species are considered to be part of the normal flora of mucous membranes in South American alpacas (9). *Streptococcus equi* subsp. *zooepidemicus* is recognized as a cause of "alpaca fever" in Peru (9) and there is evidence that it is an important primary pathogen of camelids in North America (10). Alpaca fever may occur in acute, subacute, or chronic forms, with anorexia, depression, and high fever usually present in the acute and subacute forms. The infection becomes systemic following ingestion of the organism, and death may occur from 4 to 8 d following the onset of clinical signs. The lungs, as well as the serosa of the thoracic and abdominal cavities, are usually affected. In the chronic form of the disease, abscesses or focal infections are seen, and the authors believe that orchitis could be a chronic manifestation of this syndrome. As superficial infections can become generalized, it would be advisable to use systemic antibiotics, in addition to drainage of local lesions, to treat the chronic form of the disease. As more and more South American camelids are seen in veterinary hospitals in North America, it is expected that the alpaca fever syndrome will be diagnosed with increasing frequency. The organism has already been isolated

from blood, milk, uterine discharges, abscesses, wounds, and pleural and peritoneal fluids from camelids in North America (10). *Streptococcus equi* subsp. *zooepidemicus* orchitis should be considered in the differential diagnoses for testicular enlargement in alpacas. CVJ

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