

Three Interesting Cases and Small Ruminant Tips

Jerry R. Roberson, DVM, PhD, DACVIM

Department of Large Animal Clinical Sciences, University of Tennessee, Knoxville, TN 37996

Abstract

More and more people have goats as pets, and goat production is on the increase. Owners are often willing to invest in more extensive medical and surgical procedures. Three interesting cases are discussed below. Although the clinical signs are common (anemia, neurologic deficits, and an enlarged abdomen), the actual diagnoses are relatively rare.

Résumé

De plus en plus de personnes ont des chèvres de compagnie et l'élevage de chèvres est en hausse. Les propriétaires sont souvent plus enclins à investir dans des procédures médicales et chirurgicales plus extensives. Trois cas intéressants sont l'objet d'une discussion ci-dessous. Bien que les signes cliniques soient communs (anémie, déficit neurologique et abdomen élargi), les diagnostics sont en fait relativement rares.

Case Reports

Case 1: "The obviously parasitized goat that wasn't"

As a general rule, any small ruminant that enters the door of the farm animal clinic at the University of Tennessee is considered to have internal parasites until proven otherwise, especially if the clinical signs of diarrhea, anemia, and hypoproteinemia are present. When something is quacking like a duck, you expect it to be a duck....when, in fact, this time it WAS a zebra.

This was the only goat on the farm, and had not been exposed to other goats since two weeks of age. The goat was pastured with horses. The seven-month-old female Nubian cross was first presented to UT field service personnel in September 2007. At that time, it had a history of diarrhea that had begun at three months of age. The referring veterinarian had found some coccidia and had treated with amprolium, metronidazole, and ponazuril with no significant improvement. Field service staff treated the goat with sulfadimethoxine and recommended continuing treatment for a total of six days (Table 1). The result of a fecal examination was negative for parasites. Subsequent fecal floatations conducted by the referring veterinarian in the fall of 2007 were negative for parasites; a Johnes test conducted during November 2007 was negative. The goat was next presented to the farm animal clinic in January 2008. A fecal examination was repeated and again found to be completely negative. The most remarkable finding

in the blood work was an eosinophilia of $5.98 \times 10^3/\mu\text{l}$ absolute count and 26% of total white cells (normal range $0.05\text{-}0.65 \times 10^3/\mu\text{l}$ and 1-3%, respectively). Eosinophilia is most likely an indication of parasitism, but because of the history of negative fecal results, inflammatory bowel disease and food allergies were also considered. The goat had also been on medication (metronidazole and sulfadimethoxine). The first recommendation was to eliminate all treatments and evaluate the response, and then limit feedstuffs and view the response. If these procedures failed to result in an improvement, then surgical biopsies would be needed. One month later, the eosinophilia was gone ($0.48 \times 10^3/\mu\text{l}$ absolute count and 2.5% of total white cells). The elimination of all treatment did not result in improvement of clinical signs. At this time, the goat was to be confined and fed only goat feed and grass hay to determine if signs would improve. After two months on this diet, clinical signs did not improve and surgical biopsies were performed.

Biopsy results demonstrated marked blunting of villi of the jejunum. The lamina propria was diffusely expanded by infiltrates of eosinophils, lymphocytes, plasma cells and histiocytes. Gut-associated lymphoid tissue (GALT) was densely populated with lymphocytes with formation of follicles containing pale germinal centers, and there was a focal prolapse of crypts into the GALT. The ileum, cecum, and large intestine were affected similarly. The inflammation was consistent with chronic hypersensitivity or parasitism. The loss of small intestinal villi greatly reduced surface area and was consistent with the chronic diarrhea. Coccidia or metazoan parasites were not present; no infectious organisms were identified. The final diagnosis was eosinophilic, lymphocytic, histiocytic inflammatory bowel disease. The goat was given a poor prognosis and discharged on dexamethasone on April 25, 2008. Idiopathic eosinophilic enteritis has been reported in cattle, and two of these were successfully treated with corticosteroids.¹ Similar disease has been reported in horses as well.⁵ The etiology of these diseases is unknown, although allergic or immunologic dysfunctions are considered most likely. This may be the first reported case of inflammatory bowel disease reported in a small ruminant.

Case 2: "The stumbling, bumbling, champion Boer buck"

A five-year-old Boer buck was presented with a two-week history of a wide-based stance, anorexia, and being easily knocked over. Prior to admission, he had been treated with ivermectin, florfenicol, penicillin, dexamethasone, and thiamine. Initial physical examination

Table 1. Some lab findings and anti-parasite treatments.

Test date	Fecal flotation	PCV	Total protein	Anti-parasite drugs
Pre-Sept 2007	Coccidia			amprolium, metronidazole, ponazuril, sulfadimethoxine
9/11/07	Negative			
Fall 2007				metronidazole, amprolium, sulfadimethoxine, ponazuril
1/16/08	Negative	24	5.6	
2/21/08	Negative	10 (transfused)	3	moxidectin
2/29/08	Negative	22	4.4	
4/2/08		12 (transfused)	4	
4/8/08	< 50 epg	29	5.1	fenbendazole and moxidectin
4/16/08		15	4	
4/25/08		33	5.7	

revealed normal cranial nerves; normal symmetry of head, neck, and body; no tremors; decreased proprioception of all four limbs but worse on the rear; and a generalized weakness. These findings, along with a previous seizure, led to a differential list of listeriosis, aberrant parasite migration (meningeal worm), polioencephalomalacia, idiopathic seizures, CNS tumor or abscess, trauma or a toxicity. The initial CBC revealed a mature neutrophilia (24,700 cells/ μ l) and anemia (PCV 19.8). Blood chemistry values were unremarkable. Listeriosis was not considered high because of normal cranial nerve function, and polioencephalomalacia was not considered high on the list because of lack of blindness. The evening of the first day of admission, the following observation was noted: "Began grinding teeth, then turned head hard to the left while somewhat looking down, then fell forward onto his head, then clumsily regained his feet, appeared dazed and continued to grind his teeth for another five minutes." The following day, the buck appeared to be normal (bright and alert, eating, and drinking). Radiographs and a CT scan were conducted to help determine if trauma, neoplasia, or abscess were likely. Radiographs did not reveal any abnormal findings of the head or cervical spine. The CT scan did not reveal any evidence of an abscess or neoplasia. The buck was treated with antibiotics, anti-inflammatory drugs, dewormers, and thiamine. A CSF tap was attempted but was not successful. The buck improved in strength and appetite, although periodically depressed, and was sent home without a definitive diagnosis.

The buck returned three days later because of decreased appetite and increased lethargy. Repeated blood work was unremarkable. He was presumed to have pain associated with the previous CSF lumbosacral tap. The buck was still on an antibiotic, and after a few more days of antibiotics and anti-inflammatory drugs, he improved and was sent home.

The buck was re-admitted as an emergency to the clinic 1.5 months later due to seizures. Apparent at the time was a head tilt to the right, nystagmus and

a bilateral absence of the pupillary light reflex, ataxia, and star-gazing. Diazepam was administered IV to help control periodic seizures, which were frequent (up to one per hour). A few days later, seizure activity was controlled with phenobarbital which coincided with an increased appetite. Other symptomatic treatments were administered. Because the owner found a tractor battery on his property, lead toxicosis was considered a possibility and treatment with calcium EDTA was administered. Subsequent laboratory results indicated that lead levels were not elevated. The owner declined another attempt at a CSF tap and a repeat CT scan. The buck improved and was sent home on phenobarbital, but still had neurologic deficits with no definitive etiology.

The animal returned to the clinic about three weeks later with anorexia, seizures, and circling to the left. A CSF tap revealed 21 nucleated cells/ μ l and a protein of 135 mg/dl. Nucleated cells were predominantly small mature lymphocytes which would be consistent with a non-suppurative inflammation most consistent with a viral infection. Because of this finding, West Nile virus was considered a possibility, but the test result was negative. The CT scan was repeated and findings indicated fluid or soft tissue within the right tympanic bulla compatible with otitis media with evidence of bone lysis. The lesion was most suggestive of a granulomatous abscess but a neoplasia could not be ruled out. The animal had improved somewhat and because of the poor prognosis was sent home. The buck was to have semen collected.

Three weeks later, the buck arrived as a "dead on arrival". Necropsy revealed a caseous abscess on the right aspect of the brainstem and cerebellum that cultured *Corynebacterium pseudotuberculosis*. A similar case has been reported in a six-year-old Creole goat in which the infection was thought to transverse the auditory tube to the middle ear and then progress to the inner ear, meninges, and brain.³ Interestingly, the buck's lymph nodes showed no evidence of caseous lymphadenitis.

Case 3: The pigmy doe with the abnormally large belly????

An eight-year-old pigmy doe was presented for an enlarging abdomen of one year's duration and decreased activity. The doe had a normal appetite and was pastured with other goats and a few horses. The owner did not believe that the doe had or could have been bred. Physical examination revealed only an enlarged abdomen that appeared to be fluid-filled. Ultrasonography revealed substantial free abdominal fluid and no obvious signs of pregnancy (fetus/cotyledons). An abdominocentesis was performed and showed a modified transudate with high protein (4.8 g/dl), predominate macrophages, low numbers of neutrophils and rare lymphocytes (nucleated cells 1,120 cells/ μ l). The cytologic interpretation was consistent with a lesion impairing venous or lymphatic return. An abdominal exploratory was recommended but was declined by the owner. Because pseudopregnancy was considered a possibility, the doe was treated with PGF 2α . A little over one month later, the doe was presented for necropsy. Intestinal adenocarcinoma with abdominal carcinomatosis was diagnosed. The gross and histological findings in this case confirmed a diagnosis of carcinomatosis as a result of transcoelomic metastatic spread of an adenocarcinoma of presumptive intestinal origin. Although the origin of the tumor was not located, the extent of mucin production by the tumor cells suggests intestinal origin. Intestinal adenocarcinoma has previously been diagnosed in goats but is considered more common in sheep. Progressive abdominal distention is the consistent sign. Although not seen in this case, an annular tumor involving a portion of the small intestine was identified in two other caprine cases.^{2,4}

Practice Tips for Small Ruminants

Rumen Tap

When performing a physical examination on a small ruminant that has been off-feed or one that has a possibility of engorging on grain, analysis of rumen contents is necessary. Because analysis can be performed with just a few drops of rumen fluid, one can use a 1.5 inch, 18-gauge needle attached to a 6-12 mL syringe. The tap should be done just above the middle of the paralumbar fossa. A small amount of the fluid can be used to assess the pH, and the rest can be viewed under the microscope to observe for active protozoa.

Dehorning

Dehorning older sheep or goats during fly season can lead to myiasis and or sinusitis. Attempting cosmetic dehorning and covering the dehorning sites with stockenette provides a bandage that stays in place and protects against flies. Holes are cut into the stockenette for eyes and ears.

Castration (older males)

The Calicrate bander allows for bloodless castration during fly season. The method is quick, easy, and relatively inexpensive. Blocking the testicular cords with lidocaine prior to banding will lessen the stress of castration. The scrotum and residual testicles typically fall off within three weeks. Candidates for castration should have previously been vaccinated against tetanus.

Cesarean

The use of a blocking stand can allow the veterinarian to perform the cesarean via a flank laparotomy. Usually much of the uterine horn can be brought through the flank incision, allowing easy removal of the feti and easy suturing. It is also easier on the surgeon's back.

Uterine Prolapse

Prolapse of the uterus is considered an emergency. Prolapses tend to occur due to hypocalcemia and/or a prolonged and difficult dystocia. Caudal epidural anesthesia should be performed to ease replacement and subsequent suturing of the vulva. The uterus should be cleaned as well as possible. Having an assistant flip the ewe or doe on her back and holding the rear legs elevated will greatly facilitate replacement of the uterus. Care should be taken to make sure that the uterus is completely everted. Calcium, anti-inflammatory drugs, and antibiotics may be administered if considered necessary. Uterine prolapses do not typically affect subsequent fertility nor do they tend to recur in subsequent parturitions.

Conclusions

While it is more important to be well-versed in the common diseases and problems of small ruminants, it is important to realize that unusual and previously unreported diseases and conditions (inflammatory bowel disease, brain abscess, intestinal adenocarcinoma) do occur. Publishing case findings of rare diseases and conditions provides current and future veterinarians a greater database providing for quicker diagnoses and better case management.

References

1. Cebra ML, Cebra CK, Garry FB, Gould DH: Idiopathic eosinophilic enteritis in four cattle. *J Am Vet Med Assoc* 212:258-261, 1998.
2. Haibel GK: Intestinal adenocarcinoma in a goat. *J Am Vet Med Assoc* 196:326-328, 1990.
3. Morris WE, Uzal FA, Cipolla AL: Pyogranulomatous meningoencephalitis in a goat due to *Corynebacterium ulcerans*. *Vet Rec* 156:317-318, 2005.
4. Pérez V, Corpa JM, García Marín JF: Adenocarcinoma of the small intestine in a goat. *J Comp Pathol* 119:311-316, 1998.
5. Schumacher J, Edwards JF, Cohen ND: Chronic idiopathic inflammatory bowel diseases of the horse. *J Vet Intern Med* 14:258-265, 2000.