

Common health challenges for small-scale sheep and goat herds

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Abstract

A frequent complaint of small-scale sheep and goat producers is the difficulty of finding a veterinarian who is experienced in working with small ruminants. Bovine veterinarians may fill this void because of their extensive experience in nutrition, livestock management practices, routine surgical procedures, and disease control programs. Some of the more common sheep and goat health challenges occurring on small properties include failure to thrive, neonatal contracted tendons, neonatal limb fractures, enterotoxemia, peracute *Mannheimia* pneumonia, coccidiosis, urolithiasis, pregnancy toxemia, and dystocia. Approaches to treatment of these conditions in sheep and goats that are different from routine treatment in cattle are described.

Key words: sheep, goats, health management, disease

Résumé

Une plainte fréquente des petits producteurs de chèvres et de moutons se rapporte à la difficulté de trouver un vétérinaire ayant de l'expérience de travail avec des petits ruminants. Les vétérinaires bovins peuvent combler ce manque en raison de leur grande expertise en nutrition, dans les pratiques de gestion d'élevage, dans les procédures chirurgicales de routine et dans les programmes de contrôle des maladies. Parmi les défis souvent rencontrés au niveau de la santé chez les chèvres et les moutons en petite production on note le retard de croissance, la contraction néonatale des tendons, les fractures néonatales des membres, l'entérotaxémie, la pneumonie suraiguë à *Mannheimia*, la coccidiose, l'urolithiase, la toxémie de gestation et la dystocie. Les approches pour le traitement de ces conditions chez les chèvres et les moutons qui diffèrent des traitements de routine utilisés chez les bovins sont explorées.

Introduction

Many small-scale sheep and goat producers first contact a veterinarian for immediate treatment of small ruminant life-threatening emergencies such as enterotoxemia, dystocia, severe trauma or urolithiasis. Often these problems occur due to the producer's lack of knowledge about livestock production, ruminant nutrition,

parasite prevention, and biosecurity or disease prevention strategies. Because of their experience with similar cases in cattle, bovine practitioners are uniquely qualified to diagnose and treat these small ruminant cases as well as assist sheep and goat producers through improving nutrition, management practices, and biosecurity.

Failure to Thrive

There is nothing cuter than newborn baby lambs or kids, so many small-scale producers get their first sheep or goat as a neonate and have no knowledge of how to care for it. The new owner does not know the questions to ask about whether or not the animal received colostrum, was the dam vaccinated against tetanus and *Clostridium perfringens* types C and D and what is it eating or how much and how often. Instead, they bring the little soft and fluffy neonate home and are unprepared with either food or devices to feed it appropriately. Newborn lambs and kids are poikilotherms that quickly take on the temperature of their environment. Once they utilize their neonatal brown fat, they quickly become hypothermic and hypoglycemic and will succumb quickly without prompt treatment.

While some veterinarians advocate stomach-tubing limp little babies with warm milk or colostrum, warming the neonate quickly in an incubator, clothes dryer full of hot towels or on a heating pad before feeding it will allow better digestion and absorption of nutrients. Once the neonate is warm, it will readily suckle colostrum or milk from the dam or a bottle with a Pritchard Teat or flexible latex lamb nipple. Most lambs and kids will consume an ounce per pound body weight of very warm (102°F; 38.8°C) heat-treated colostrum or milk, and will thrive when fed 3 times per day from birth. While many publications advocate feeding neonates more frequently, it takes 6 hours to completely digest milk and neonates fed less frequently exhibit fewer cases of digestive upset or diarrhea. Heat-treating colostrum to 135°F (57.2°C) and maintaining it at that temperature with periodic agitation for 1 hour will prevent transmission of several infectious diseases that might be present in the adult herd, such as caprine arthritis-encephalitis, ovine progressive pneumonia, mycoplasma, or Johnes disease. Heat-treated colostrum can be frozen for future use in either ice cube trays or in packets sized for 1 feeding.

If the lamb or kid is to be hand-raised, feeding milk or milk replacer 3 times daily for 8 weeks along with free-choice access to hay and grain will allow the ruminant digestive tract to grow and develop. Commercial sheep and goat dairies wean young stock as early as 8 weeks of age, while those transitioned more slowly by feeding milk or replacer twice daily until 12 weeks of age are larger and more productive at 1 year of age.

Neonatal Contracted Tendons and Fractures

Neonatal contracted tendons and joints that bend the wrong direction are not uncommon in lambs and kids, and respond well to benign neglect. While it is tempting to apply splints to correct contracted tendons in neonatal lambs and kids, most neonates will self-correct quite rapidly if placed in an environment that allows them to push their feet against a rough surface so that they can stand and exercise their limbs. Placement of the kid or lamb in a cardboard box that is the same length as its chest to hind legs, and is slightly wider than its body, allows the neonate to push against the corners of the box to stand. Most nursing dams will tolerate having their offspring in a box for a few hours each day, and most affected lambs and kids will self-correct by a few days of age.

The stifles and hocks on kids and lambs from large litters often bend the wrong direction at birth, and it is speculated that the lax tendons and ligaments in the joints result from lack of movement in the over-crowded pregnant abdomen. When neonates are dam-raised, confinement of the dam and neonates to a small pen allows the neonates to exercise while remaining near the dam for nursing. Bottle-raised offspring can be housed in a small box as described above for a few days until the tendons and ligaments tighten and the animal walks normally.

Unfortunately, dams accidentally step on neonates and bad goat babies jump from ridiculous heights, so long bone fractures are not uncommon in either species. Plastic mason metasplints or wooden paint stirrers padded with roll cotton and applied with roll stretch gauze and waterproof tape make excellent casts for neonates, but should be changed every 2 weeks as the young stock grow. PCV pipe cut in half longitudinally can be used for larger lambs and kids, and most simple fractures will heal within 4 weeks with one cast change.

Enterotoxemia

The most common cause of unnatural death in goats of all ages is probably enterotoxemia caused by toxin production from *Clostridium perfringens* types C and D, which are considered part of the normal intestinal flora. Experienced small ruminant producers vaccinate

pregnant females 30 days prior to parturition to protect the does as well as the neonates when they consume high levels of colostrum just after birth. Breeding males should be vaccinated annually 30 days prior to introduction into the female population, and non-reproducing sheep and goats should be vaccinated at least annually. Many small ruminant veterinarians recommend vaccinating against enterotoxemia twice yearly because a few controlled trials indicate that the antibodies against these bacteria may only last 4 to 6 months.

Clinical signs of enterotoxemia vary greatly but are often described as peracute, acute and chronic depending on how rapidly signs develop. Animals with the peracute form may be found dead or may exhibit sudden loss of appetite, severe depression, abdominal distension, vocalization, weakness, recumbency, coma and death. Neonates may demonstrate subnormal temperature, rapid pulse, injected sclera, a cold clammy mouth and lateral recumbency within 1 or 2 days of birth, and die within a few hours. Older sheep and goats that become acutely ill develop symptoms more slowly, may exhibit diarrhea with associated dehydration and acidosis, and often have a history of feed changes or environmental stress. Occasionally, adult animals in herds that have a history of peracute or acute cases exhibit a more chronic form characterized by repeated bouts of inappetence, listlessness, pasty feces, and decreased milk production if lactating.

Diagnosis of enterotoxemia is based on history, recognition of classic clinical signs and response to treatment. Currently no antemortem tests exist to confirm the diagnosis in live animals, so most animals are treated based on clinical signs. Antibiotics such as parenteral procaine penicillin G or tetracycline kill the bacteria and stop production of gas and toxin. Commercially available type C and D antitoxins may be administered intravenously in peracute cases or subcutaneously in acute or chronic cases, using a loading dose of 20 ml that may be repeated every 4 to 6 hours until the animal stabilizes. Administration of non-steroidal anti-inflammatory drugs, such as flunixin, is recommended to counteract the toxins, as well as relieve the intense pain associated with gaseous distension of the intestinal tract. Animals that fail to respond to therapy should be necropsied to confirm the diagnosis, and other animals housed in the same environment should be re-vaccinated when enterotoxemia occurs.

Peracute *Mannheimia* Pneumonia

Sudden, but subtle onset of anorexia, rapid respiration, and fever of 105 to 106°F (40.5 to 41.1°C) with high mortality rate is not uncommon in the transitional months of fall and spring, when there is a wide swing in extremes of daily environmental temperature between

day and night. Young stock and stressed males are particularly susceptible to peracute pneumonia due to *Mannheimia haemolytica*, and the length of time between the observation of ill health and death may only be a matter of a few hours. There are no efficacious vaccines in this country for sheep and goats against any species of *Mannheimia sp.*, and anecdotal use of available bovine vaccines by producers and veterinarians support this statement. Clients should be encouraged to monitor feed intake, activity level, and respiratory rates in breeding males and young stock, and they should seek veterinary assistance in affected animals as soon as the first clinical signs appear. Aggressive therapy with ceftiofur administered once daily intramuscularly at the label rate of 1mg/lb (0.45 mg/kg) for 5 to 7 days, combined with administration of flunixin, has been successful in treating peracute pneumonia when recognized early in the course of the disease.

Coccidiosis

Many small ruminant producers do not realize that healthy sheep and goats normally have coccidia present in their feces, and may not understand that environment and management choices determine whether coccidiosis will occur in lambs or kids. Because the prepatent period for pathogenic strains of coccidia in sheep and goats ranges from 2 to 3 weeks, young stock do not usually develop clinical symptoms of coccidiosis until 3 weeks of age. The severity of clinical signs demonstrated correlates with age of the animal at onset, the amount of intestinal compromise, and the level of immunity to that particular species of coccidia.

The most common signs of coccidiosis in young sheep and goats would be the appearance of pasty feces followed by liquid diarrhea associated with decreased appetite, listlessness, weakness, abdominal pain, and dehydration. Occasionally, severely affected kids or lambs may be found dead with blood-filled intestines that may be difficult to differentiate from enterotoxemia. Younger animals may suffer more severe disease and may die within a few days, while older animals may recover spontaneously after a few weeks. Survivors may exhibit poor growth rates, ill-thrift, poor hair coat and a stunted, pot-belly appearance.

Coccidiosis is a major health problem for all sheep flocks and goat herds, and many producers do not recognize the losses to this common parasite. All herds, whether on pasture or in confinement, should have a coccidiosis prevention program. Addition of decoquinate to the creep feed or starter ration will help reduce coccidial replication, but its efficacy is dependent on adequate consumption by young stock not yet eating significant amounts of solid feed. Lasalocid is also approved for use in lambs, while monensin is approved for use in goats.

Decoquinate can also be added to the loose salt offered to pregnant dams prior to parturition to decrease environmental contamination before the birthing period.

Under the Animal Medical Drug Use Clarification Act (AMDUCA) and the Minor Use and Minor Species Animal Health Act (MUMS Act), veterinarians may prescribe extra-label use of sulfadimethoxine to young stock in order to decrease coccidial replication and aid in development of acquired immunity. An easy way to administer sulfadimethoxine in small herds is to use the 12.5% sulfadimethoxine drinking water solution and administer 1mL/10 lb (1 mL/4.5 kg) body weight either in the milk or by dose syringe once daily for 7 days at 4, 8, and 12 weeks of age. At 4 weeks of age, the rumen, reticulum, and omasum have developed but the young animals are still transitioning from monogastric to ruminant digestion. By 8 weeks of age, most young ruminants are consuming the majority of their feed intake as vegetation, but the majority of their water consumption may still come from milk. Most young sheep and goats are being weaned by 12 weeks of age and are stressed as they lose their previous water source, change feeds, and often moved into a different environment. The timing of administration of sulfadimethoxine in the milk can be altered to occur prior to the age at which the producer has observed clinical signs in previous years.

As with cattle, good management practices are essential to decreasing the incidence of coccidiosis in young lambs and goats. Keeping the environment clean, dry, and free of manure is extremely important, as is providing feed and water in such a manner that the young stock cannot contaminate it with feces. Good drainage, frequent cleaning, reduction of stress, and separation of different age groups all reduce the incidence of coccidiosis in sheep and goats.

Urolithiasis

The first question every veterinarian should ask the producer who calls about a sick sheep or goat is whether the animal in question is a male or female. If the producer replies that the ill animal is a male, then the second question should always be “can he urinate?” Urolithiasis in sheep or goats is a true emergency and whole sessions have been devoted to its diagnosis, treatment, prevention, and long-term management.

Daily oral administration of ammonium chloride to acidify the urine is frequently recommended as part of the treatment for urolithiasis in sheep and goats, but presents a significant challenge for the producer due to the unpalatable taste of NH₄Cl. Dr. Andrea Mongini shared a recipe for making “Jello Jigglers” laced with ammonium chloride that sheep and goats will consume willingly. The daily dose of ammonium chloride necessary to acidify the urine is 140 mg/lb (300 mg/kg).

Calculate the daily dose for the animal in question based on body weight, and divide that number by 2 for the amount of ammonium chloride that should be in each Jello Jiggler. Count the number of partitions in 2 standard ice cube trays, and multiply the dose that should be in each Jiggler by that amount. For example, if the standard ice cube tray contains 12 sections, then 2 trays would hold 24 sections and the amount of ammonium chloride needed would be 24 times the one-half daily dose. Measure that amount of ammonium chloride and add it to 4, 3-ounce boxes of Jello powder. Add 2.5 cups of boiling water and stir until dissolved. Pour the liquid Jello into the 2 ice cube trays and place the trays into the refrigerator to jell. Feed the affected animal 1 Jiggler twice daily for 12 to 14 days.

Pregnancy Toxemia

Pregnancy toxemia most commonly occurs in the last 2 weeks of gestation when the doe or ewe cannot consume adequate nutrients to provide for her maintenance, growth of multiple fetuses, and development of the mammary system prior to parturition. Sheep and goat producers often lack the nutritional background necessary to correctly feed young growing yearlings or older thin adults, and they may underestimate the nutrient density or volume of feed offered. Even correctly conditioned females with multiple fetuses need 80% more nutrients for each additional fetus. Severe environmental stress due to transport, unexpected exercise or change in weather or diet may lead to an outbreak of ketosis. Sheep and goat dairies commonly leave pregnant, non-lactating animals in pens with lactating females on high-energy rations, which leads to overly conditioned females with hepatic lipidosis who are predisposed to ketosis. With grazing animals, individual cases of ketosis may occur when an animal has poor teeth or cannot ambulate to acquire adequate feed, such as might occur with lameness or sudden illness unrelated to pregnancy.

Early cases of pregnancy toxemia may not be detected due to the subtlety of clinical signs such as dullness, decreased appetite, separation from the herd, and mild soft tissue swelling above the coronary band. If the diet is not modified, further clinical signs develop including weakness, anorexia, teeth grinding, recumbency, and neurologic symptoms such as star-gazing, nystagmus, apparent blindness, ataxia and tremors. If aggressive treatment is not undertaken, the fetuses die and are followed shortly thereafter by the doe or ewe. Diagnosis is commonly based on history, clinical signs and examination of urine, plasma or serum for the presence of elevated ketone bodies using ketostix or human hand-held meters that measure beta-hydroxybutyrate. Necropsy may reveal presence of multiple fetuses in the

uterus, poor body condition, dehydration, enlarged pale liver that floats when placed in water, and concentrated urine in the bladder that is strongly positive for ketone bodies.

Treatment of pregnancy toxemia is based on the severity of clinical signs. The nutritional plane of animals with mild anorexia and swollen feet should be corrected by increasing the protein and energy content of the diet. Animals in sternal recumbency may benefit from oral administration of 2 ounces of propylene glycol twice daily to stimulate glucose metabolism and boluses of concentrated rumen flora or transfaunation. Daily administration of 1 gram of niacin by mouth or injection stimulates glucose metabolism. A recent report from Australia indicates that survival rates improve following administration of flunixin. If the doe or ewe is within 7 to 10 days of her due date, administration of 10mg prostaglandin F₂ alpha to a doe or 20 mg dexamethasone to a ewe may stimulate parturition. Transabdominal ultrasound may be used to determine if the fetuses are alive, and Caesarian section is recommended if parturition does not commence within 24 hours after induction. The prognosis for survival of the dam and offspring is guarded once the animal becomes recumbent.

Pregnancy toxemia is a nutritional problem that should be prevented through proper nutrition and provision of adequate exercise to stimulate appetite and muscle strength. The producer should body condition score females in advance of breeding season, and correct the diet prior to breeding so that the does or ewes are in proper condition before being bred. The diet should be adequate in nutrients and volume for the type and number of animals present. Growing doelings or ewe lambs require a higher plane of nutrition than adults, and pregnant yearlings should be kept separate from the adult females until after their first offspring are weaned. Pregnant non-lactating females should be housed and fed separately from lactating females. Based on research in dairy cattle nutrition, provision of oral niacin in the concentrate ration at the rate of 1 gram per head per day appears to reduce the incidence of pregnancy toxemia in sheep and goats.

Dystocia

Bovine veterinarians are extremely experienced in relieving cattle dystocia and performing Caesarian section when manipulation alone is unsuccessful. Because many sheep and goat producers do not have a background in livestock production, taking the time to educate new clients about the different stages of parturition and normal progression of the birthing process is worth the time and effort. Manual removal of multiple tangled neonates is very successful when clients observe their animals for signs of impending parturition and call

for help early, when neonates are not delivered quickly but the uterus is still distended with large volumes of amniotic fluid. Ewes and does are more easily repositioned during manual extraction and it is much easier to replace fetal parts back inside the dam than with cattle. The most challenging malpresentation is probably lateral deviation of the head and neck, and this correction is more easily accomplished when the legs are placed back inside the doe and the head is delivered first followed by 1 foreleg. One should keep checking for more fetuses until the last 1 has been delivered and the uterus is empty. Postpartum metritis is less common in small ruminants than in cattle, and goats normally discharge reddish brown lochia for 3 to 4 weeks postpartum.

Small ruminant practitioners have developed 2 helpful rules for teaching clients about parturition and postpartum care. The “30-30-30-30 Rule” applies once the pregnant doe or ewe is in the second stage of labor and the cervix is open. After each 30-minute interval listed, the dam should be examined if the progression described has not occurred. Within 30 minutes after the start of abdominal press, the amnion should be visible at the vulva. Within 30 minutes of the amnion being present at the vulva, fetal parts should be visible in the yellow amniotic sac. Within 30 minutes of the fetal parts becoming visible, the neonate should be born. If there is another fetus present, then it should be born within 30 minutes after the first. After the last neonate has been born, the fluid in the sac presented at the vulva should be red instead of yellow. Passage of the placental

membranes usually follows within 6 to 8 hours following birth of the last neonate, and failure of the membranes to be delivered may indicate a retained fetus. Another handy rule to teach clients about neonatal care is “tip, strip, sip, clip and dip”. “Tip” refers to setting the postparturient ewe up on her rump in a shearing position to improve the lamb’s access to the mammary glands. “Strip” signifies removing the thick plug from the orifice of each teat so that full streams of colostrum appear, and “sip” means to encourage the neonate to nurse. If the umbilicus is very long and tangles on the legs of the neonate, the producer can “clip” the umbilicus to a shorter 2-inch (5 cm) length, and then “dip” the umbilicus in 7% iodine. “Tip, strip, sip, clip, and dip” help prevent umbilical infections in the neonate and ensure early consumption of colostrum to provide high levels of antibodies against microbial agents specific to that premise. Goats are not commonly tipped on their rear quarters, but strip, sip, clip, and dip are good management practices for improving neonatal survival in any ruminant species.

Conclusion

Bovine veterinarians are extremely well qualified to assist small-scale sheep and goat producers with sudden health emergencies, as well as educating them about better livestock production practices, nutrition and disease control.

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For years, the industry has relied on cross protection from commonly used combination vaccines that include bovine viral diarrhea (BVD) virus 1a and 2 to protect against 1b. Yet, at the same time, 1b has increased in predominance from 41% to 61% among BVD-positive calves and the incidence of BVD has not been reduced¹.

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¹Ridpath, J. F., G. Lovell, J. D. Neill, T. B. Hairgrove, B. Velayudhan, and R. Mock. 2011. Change in predominance of bovine viral diarrhea virus subgenotypes among samples submitted to a diagnostic laboratory over a 20-year time span. *J. Vet. Diagn. Invest.* 23:185-193.

BVD 1b — Emerging profit-robbing strain

Carl Guthrie, D.V.M. and director of Elanco beef technical consultants, answers questions about BVD and the emerging predominance of subtype 1b

Q. What impact does bovine viral diarrhea (BVD) have on the beef industry?

A. “BVD is often referred to as the most costly viral disease in cattle because it causes a highly complex disease that affects multiple animal body systems, decreases the immune system’s ability to fight infections, and is closely associated with bovine respiratory disease (BRD).¹ In fact, BVD is the most commonly identified virus in BRD outbreaks,² which is significant when you consider that 75 percent of feedlot morbidity and 50 to 75 percent of mortality is attributed to BRD.^{3,4,5} Not to mention that there can be unseen, subclinical impacts from BRD as well.”⁶

Q. How does BVD spread?

A. “BVD can spread calf-to-calf or through contaminated surfaces, such as feed, water tanks and equipment. PI (persistently infected) calves also have a big impact on the prevalence of the disease, as they shed BVD their entire lives. Just one PI calf can create an exponential spread of BVD, leading to clinical disease and costly losses.”

Q. How can BVD be managed?

A. “To effectively control BVD, we have to understand what the most common BVD viral strains infecting your cattle are, and then identify how the predominance of those strains has changed over time. We also know that the more similar a vaccine is to the disease-causing organism, the better the immune system responds to the

vaccine.⁷ So, specifically targeting the most predominant strains with a vaccine is essential to adequate protection.”

Q. What is the most prevalent strain of BVD?

A. “We know that the major BVD viral strains in the United States are 1a, 2 and 1b.⁸ Traditionally, 1a has been identified as the most predominant strain. However, a 20-year study of diagnostic samples showed that while the predominance of 1a decreased, the incidence of BVD stayed the same.⁸ During the same period, we saw the incidence of 1b rise from 41 to 61 percent.⁸ Multiple studies also indicate that almost 78 percent of PI calves are infected with 1b.”^{9,10}

Q. How can BVD 1b be addressed?

A. “The fact that the prevalence of BVD has not gone down — even though the industry has been using vaccination programs with 1a and 2 — points to the need for a vaccine with targeted protection against 1b. To address this need, Elanco introduced Viralign™ 6, the first combination modified-live virus (MLV) vaccine to provide targeted protection against BVD 1b. This makes Viralign 6 an important health tool when it comes to targeting the most predominant type of BVD — 1b — and helping to reduce the costly impact of both BVD and BRD.”

Viralign 6 is the first commercially approved MLV vaccine that provides targeted protection against BVD virus 1b — the most predominant BVD virus subtype in the United States.¹ Viralign 6 also protects against BVD viral strains 1a and 2, bovine respiratory syncytial virus (BRSV), infectious bovine rhinotracheitis (IBR) virus and parainfluenza₃ (PI₃) virus and is labeled for low-volume, subcutaneous administration in cattle five months of age and older.

The label contains complete use information, including cautions and warnings. Always read, understand and follow the label and use directions.

Precautions: Do not vaccinate pregnant cows or calves nursing pregnant cows since abortions may occur. Do not vaccinate within 21 days of slaughter.

For vaccination of healthy cattle five months of age or older. Dose: 2 mL subcutaneous in the side of neck. See insert for full instructions.

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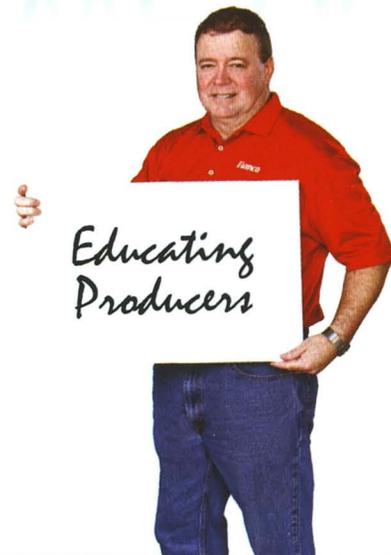
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¹⁰Elanco Study No. BIOUS120010.

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