

# Management of common small ruminant medical and surgical diseases<sup>a</sup>

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## Introduction

Every practitioner develops his or her own unique and efficient ways of doing things, and the author has collected a few of these tricks from personal experience, the veterinary literature, and veterinary technicians and practitioners. This seminar will include a variety of useful tips for a variety of commonly used procedures for South American camelids (SACs), sheep, and goats in a field setting.

**Key words:** sheep, goats, anesthesia, surgery

## Résumé

Chaque praticien développe ses propres et des moyens efficaces de faire les choses, et l'auteur a recueilli un peu de ces astuces d'expérience personnelle, la littérature vétérinaire, et techniciens vétérinaires et des praticiens. Ce séminaire comprendra une variété de conseils utiles pour une variété de procédures couramment utilisées pour les camélidés d'Amérique du Sud (sacs), les moutons et les chèvres dans un paramètre de champ.

## Procedures Involving the Jugular Vein

Finding the jugular vein in heavily-wooled sheep and SACs can be challenging, particularly in males with heavily-muscled necks. The following set of landmarks has been used by the author for instruction of laypersons and veterinary students. The upper one-third of the right side of the neck is visualized for injection / catheterization of the right jugular vein. The trachea in the upper third of the neck is first located with the right hand, and the right index finger is placed on the ventral midline of the neck, directly over the midline of the trachea. With the left hand, and at the same level of the neck that the right hand is located, the lateral aspect of the neck is palpated until the bony protuberances that mark the transverse process of the 3rd or 4th cervical vertebra are felt. The left index finger is placed on 1 of the palpable transverse processes. An imaginary line is then drawn between the 2 fingers. At the halfway point along this line, the jugular furrow is found.

If an intravenous catheter is to be placed in the jugular vein of a SAC, it is generally recommended that a skin incision be placed over the vein to minimize the drag created by the thick neck skin.<sup>2</sup> The overlying skin is clipped and

swabbed with an antiseptic, and 1 to 2 mL of 2% lidocaine is injected subcutaneously over the catheter placement site. The neck skin of young SACs is sufficiently pliant to enable the clinician to pinch the skin into a "tent," so that a #15 scalpel blade can be used to safely incise the skin over the jugular vein. For older SACs, however, the tautness of the neck skin can limit the clinician's ability to tent the skin away from the underlying vein. What often results is an incision that does not penetrate the full thickness of skin, leading to a difficult catheter placement. To ensure a complete stab incision is made, a pair of penetrating towel forceps can be used to tent the skin at the site of lidocaine injection; alternatively, the author has used an 18-gauge 1.5-inch needle, bent at the mid-shaft into a 90° angle, to lift the numbed skin from the underlying vein. The tip of the bent needle is inserted into the skin 2 to 3 mm ventral to the intended point of insertion of the #15 blade. The hub of the needle is then lifted with a prying motion to elevate the skin from the underlying vein, and the #15 blade is then used to make an incision through the full thickness of the neck skin.

Maintaining hands-free venous distension is occasionally desirable when performing venipuncture or inserting a catheter. For sheep and goats, a ~12 inch (~30 cm) length of cut bicycle inner tube can be applied at the thoracic inlet as a tourniquet to induce distension of the jugular veins. The tubing is then pulled tight—very tight—on the animal's neck, and a pair of forceps can be used to hold the clamp the free ends of the tubing on the dorsum of the neck. Alternatively, 1 end of the tubing can be tucked underneath the other to maintain tension on the tubing. In the author's experience, this is tolerated very well, with no evidence of compromise of carotid flow in adult small ruminants after hundreds of applications.

In a pinch, one's stethoscope can be wrapped around the small ruminant's neck, with the tubing placed beneath the neck and pulled upwards to occlude both jugular veins, with the chestpiece (bell) and ear tubes held positioned at the withers (Figure 1). In lambs and kids, one can simply use a cut length of heavy rubber band for this purpose.

## Obstetrical Procedures

Administration of spinal or epidural anesthesia at the lumbosacral space (described elsewhere in these proceedings) greatly facilitates manual correction of fetal malpresentation, as does copious application of obstetrical lubricant

into the vagina and uterus. A disposable, porcine artificial insemination pipette (available from multiple vendors) can be used as a tube through which obstetrical lubricant can be pumped or injected into the uterine lumen of small ruminants and SACs. Porcine AI pipettes are preferred for their flexibility and the presence of a padded tip that limits injury to the female reproductive tract. Equine uterine infusion pipettes can also be used, although these are more rigid than porcine AI pipettes and lack the padding of the porcine version.

Repulsion of a fetus may be necessary in certain cases of dystocia in small ruminants, particularly for breech presentations, retention of a fetal limb or head, and co-presentation of twins in the pelvic canal. Repulsion of the fetus can be facilitated by elevating the dam's hindquarters and spine into a vertical position while the dam's head and forelimbs are restrained on the ground. With this position, gravity aids in moving the fetus(es) cranially from the vagina or pelvic inlet into the roomier uterine horn. Once the malpresentation is successfully corrected, the dam can be returned to sternal or lateral recumbency for assisted delivery.

When a dead, emphysematous fetus is encountered in anterior presentation, decapitation is considered to be the first step in bovine fetotomy.<sup>5</sup> To accomplish fetotomy in a small ruminant, the author has used a handmade fetotome from equine uterine infusion pipettes. Two pipettes are taped together to form a double-tubed fetotome; obstetrical wire is then introduced to create a fully-threaded fetotome (Figure 2). If multiple cuts are needed to deliver the fetus, more than 1 of these disposable fetotomes may be needed, as the cutting process is expected to fray the plastic ends. This device also can be used as a fetal head snare.

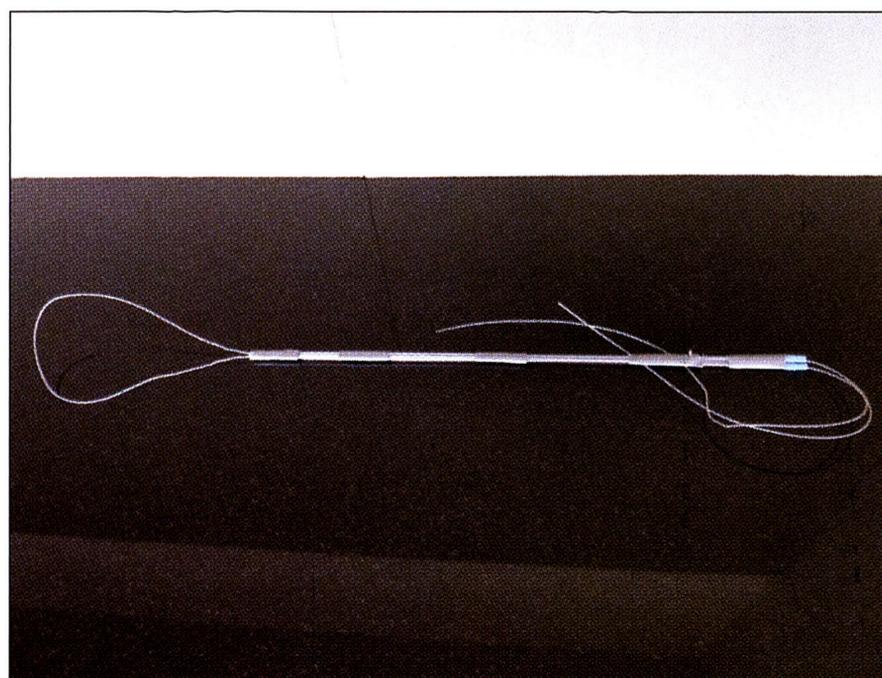
### Uterine Prolapse Wrap

The affected dam should be placed in sternal recumbency. To limit straining by the dam, epidural or spinal

anesthesia can be induced at the lumbosacral space, as described elsewhere in these proceedings. The author places the prolapsed uterus into a disposable plastic trash bag and then adds warm water and povidone-iodine to the bag. The neck of the plastic bag can be tied or clamped to the tail, and gentle massage through the bag can aid in loosening dirt or bedding from the surface of the uterus. Once cleaned, the uterus is removed from the bag and placed on a towel or tray. Table sugar, Epsom salts, or a similar osmotic agent can be applied to the surface of the uterus to aid in reducing edema. The author then uses 3 to 4 rolls of 4" brown gauze to enclose the uterus in a wrap – beginning at the apex (most exterior end) of the prolapse, the gauze is wrapped circumferentially with ~ 50% overlap to the base of the prolapse at the level of the vulva. Once the uterus is completely enclosed in 1 layer of wrap – this typically requires 2 rolls of gauze – the next 2 rolls are applied tightly over the initial layer. The wrapped prolapse is then elevated above the vulva and manually squeezed with the palms of the hand for ~ 5 minutes (Figure 3). The wrap limits the potential for tearing of the prolapsed uterus by the veterinarian's fingers; for similar reasons, Miesner and Anderson recommend that the veterinarian wears oven mitts to perform uterine massage.<sup>4</sup> Reduction in the volume of the prolapse apparently occurs as a result of elevation, pressure, and drawing of fluid from the uterus by the osmotic agent. The wrap is then removed and the prolapsed uterus is rinsed with clean water or sterile saline. The animal's hindquarters are elevated, either by draping them over a straw bale or by simply having 2 assistants join hands in front of the dam's udder and lift the animal off the ground. By positioning the animal thusly, gravity aids in reduction of the prolapse. The prolapse is then replaced manually. Uterine lavage aids in complete repositioning of the inverted uterine horns. Administration of oxytocin should follow to enhance uterine tone. Temporary suturing of the vulva with a Buhner's stitch



**Figure 1.** Use of a stethoscope as a tourniquet to induce distension of the jugular vein.



**Figure 2.** A fetotome fashioned from equine uterine infusion pipettes.

or similar method can be performed at the veterinarian's discretion. Broad-spectrum systemic antibiotic therapy is typically indicated, as is administration of analgesics and anti-inflammatory medication.

### Medical Management of Pregnancy Toxemia

The course of medical management of pregnancy toxemia is dictated in large degree by the owner's priorities. Is the primary goal of case management to save the dam's life or to deliver live offspring, or both? If the primary goal is saving the dam, termination of pregnancy by cesarean section is the most expedient means of removing the primary metabolic drain imparted by the fetal glucose demand. In many cases, however, saving the offspring or the offspring and the dam is the primary goal. In such instances, unless meticulous breeding records are kept, the veterinarian is often challenged by not knowing the dam's expected due date. Typically, these cases are managed medically until parturition begins or is judged to be near. At that time, the dam's status can be assessed to determine whether induction

of parturition should be considered, as well as the preferred method of delivery (vaginal versus cesarean section). In an ambulatory practice setting, such a course of action requires ongoing communication with the owner. Importantly, the clinical course of prolonged medical management of pregnancy toxemia is often difficult to predict – something the owner must clearly understand before medical treatment is enacted. Hospitalization or referral is a consideration for valuable cases wherein the owner requests longterm medical management of the ewe or doe for salvage of the offspring.

For treatment of pregnancy toxemia, appropriate treatment of any concurrent disease process or injury is of paramount importance. To address the issue of negative energy balance in the pregnant dam, affected ewes and does can be offered small amounts of novel, palatable feeds in multiple feedings over a day; corn, alfalfa hay, grass, and breakfast cereals can be used. Propylene glycol (30 mL PO q 12 h) can be administered orally, either as a drench or by orogastric tube, to serve as a glucose precursor for gluconeogenesis in the liver. If propylene glycol is prescribed for continued administration, owners should take caution to not overdose, owing to the potential for CNS depression caused by this alcohol compound. Dextrose can be administered intravenously as a bolus or administered via a catheter as a component of daily intravenous fluid therapy; however, the latter option can be difficult to employ in ambulatory practice.

Buswell and colleagues described successful treatment of ovine pregnancy toxemia with the use of oral electrolyte solutions that contained glucose and were administered by drench.<sup>1</sup> Using a non-pregnant ewe as a model, drenching with glucose-enriched electrolyte solution increased blood glucose concentration within an hour after administration, and the rise in blood glucose was far more rapid and greater in magnitude than what was achieved with oral propylene glycol solution.<sup>1</sup> It has been hypothesized that the salinity and/or pH of such drench solutions induce closure of the esophageal groove, thereby directing the dextrose-rich solution into the abomasum. In the duodenum, the dextrose is digested and absorbed as glucose. One must drench the solution to allow contact with the oropharynx in order to trigger the esophageal groove reflex; administration of such solutions via stomach tube will result in passage of the dextrose into the rumen, and the increase in blood glucose will likely be far more gradual. To create a concentrated oral rehydration solution that approximates what was administered by Buswell and colleagues,<sup>1</sup> the author typically mixes a conventional calf electrolyte replacer (the author uses a product that contains dextrose and bicarbonate) according to label directions, and then adds enough 50% dextrose solution to bring the final concentration of glucose to approximately 45 grams of dextrose/150 mL of solution. These 150 mL aliquots of dextrosesupplemented oral electrolytes can be administered by drench by the owner every 4 to 8 hours as a component of ongoing medical management of the dam.<sup>1</sup> Proper drenching technique should be demonstrated to the owner.



**Figure 3.** A prolapsed uterus in a sheep, wrapped in moistened brown gauze for manual compression and massage. Note the clipped area for placement of lumbosacral spinal anesthesia.

## Urethral Process Amputation for Treatment of Urolithiasis

The urethral process (vermiforme appendage) is a common site for urethral obstruction in rams, bucks, and wethers. Exteriorization of the penis and examination of the urethral process is an essential component of the examination of affected animals; if calculi are visible or palpable within the lumen of the urethral process, the veterinarian can use surgical scissors to amputate the process at its junction with the glans penis.

Positioning of the animal is critical for successful exteriorization of the penis. The author advocates positioning the animal on its rump for this procedure, as has been described by others.<sup>3</sup> However, when restraining the animal on its rump, it is critical to ensure that the affected animal's vertebral column is maintained in a strict vertical position, perpendicular to the floor. This simple positioning principle appears to enhance the pressure of the floor on the perineum and sigmoid flexure of the penis, which greatly facilitates exteriorization of the penis. On many occasions, the person performing restraint makes the mistake of letting the animal lean backwards while propped on its rump, which shifts pressure to the tail base – thereby providing no helpful pressure on the sigmoid flexure.

To exteriorize the penis, the veterinarian should locate the penis caudal to the prepuce at the level of the rudimentary teats. Deep palpation at this site will enable the veterinarian to grasp the penis at the level of the distal sigmoid flexure. The penis is forcefully advanced toward the preputial orifice

with one hand, while the prepuce is retracted caudally with the other hand. A gauze sponge should be kept within reach to help secure the exteriorized penis for examination.

If animals struggle excessively in this position and the penis cannot be exteriorized as described, sedation with diazepam (0.1 mg/kg IV) and butorphanol (0.05 to 0.1 mg/kg) may help. Sacrococcygeal or lumbosacral epidural anesthesia may be required for very large or fractious small ruminants.

### Endnote

<sup>a</sup>Parts of this manuscript were previously published in *Proceedings, 42nd Annual Conference, American Association of Bovine Practitioners, 2009*; 116-119.

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