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Routine Camelid Procedures – Part 1: Castration of Alpacas and Llamas

Small Ruminants

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PROCEEDINGS:

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Castration of llamas and alpacas may be chosen to allow commingling of pet or fiber producing males and females, to restrict the available genetic pool, to lessen aggressive behavior, and to create gelding males to be sold as pets or show animals. Timing of castration is controversial in llamas and alpacas. Barrington et al¹ cautioned that abnormalities of conformation have been observed in llamas castrated at a young age (e.g., <1 year old). Llamas continue to grow until long bone growth reaches a plateau at approximately 18 to 24 months old.² Male hormones influence physeal closure and early castration may alter this influence. Thus, early castration may cause a prolonged period of long bone growth and result in a “post-legged” conformation (joint hyperextension) which may predispose the llama to early onset osteoarthritis or patellar luxation. Thus, some authors advocate delay of castration until the male is 18 to 24 months old.⁴

Most castration methods that have been used in livestock, horses, or pet animals may be used in llamas and alpacas. However, two methods have become standards of practice: scrotal castration³ and pre-scrotal castration.^{2,4,5}

Preoperative Preparation:

Tetanus toxoid vaccination and procaine penicillin G (22,000 U/kg) are administered to each animal before surgery is done. All food, but not water, should be withheld for 12 hours prior to castration if heavy sedation or general anesthesia will be used. Castration may be performed after sedation and local anesthesia or after induction of general anesthesia (Table 1).

Scrotal castration can be done with the animal standing or recumbent. For standing castration, the camelid is sedated (e.g., xylazine 0.2 mg/kg body weight, intramuscularly [IM] and butorphanol 0.1 mg/kg, IM) and local anesthesia is infiltrated along the median raphe and spermatic cords (2 mL, 2% lidocaine HCl each site). For general anesthesia, xylazine (0.3 mg/kg, IM), butorphanol (0.03 mg/kg, IM), and ketamine (3 mg/kg, IM) may be used. The scrotum is prepared for aseptic surgery using an antiseptic surgical scrub. A 2-cm incision is made on either side and parallel to the median raphe along the cranial and ventral most aspect of the scrotum. Each testicle is removed after transfixation ligation of the spermatic cord (e.g., No 0 chromic gut, No 2-0 polyglactin 910). Emasculation of the spermatic cord may be performed but is not recommended because of its small size. Topical antiseptic and fly spray may be applied.

Pre-scrotal castration with skin closure should be done after induction of general anesthesia. Strict aseptic technique is critical to ensure that infection of the castration site does not develop. A 2-cm incision is made on ventral midline immediately cranial to the ventral base of the scrotum. Each testicle is removed through this incision and excised after transfixation ligation of the spermatic cord. After hemostasis has been achieved, the skin incision is closed using a subcuticular or subcutaneous suture pattern (e.g., No 3-0 poliglecaprone; No. 2-0 polydioxanone).

Postoperative Monitoring:

Confinement is not required after castration, but daily examination of the surgical site is recommended during the healing of the wounds. The complication rate in camelids appears to be low (<1%), but hematoma formation, hemorrhage, and infections have been observed.

Table 1.

Drugs Used to Provide Anesthesia or Analgesia in Camelids



IV = intravenous; IM = intramuscular; SC = subcutaneous; OTT = orotracheal tube; NTT = nasotracheal tube · Caution: Acute death has been observed after rapid IV administration of tolazoline at high dosages. Adapted from Sarno et al 1996, and Waldrige et al, 1997.

RESEARCH ON CASTRATION OF LLAMAS AND ALPACAS

The wide variations in preoperative, intraoperative, and postoperative recommendations creates confusion among lay people and veterinarians regarding the “appropriate” methods to castrate camelids. We hypothesized that multiple techniques of veterinary castration, when performed according to surgical standards of asepsis, tissue handling, and patient care, are suitable for

camelids. The goal of this study was to compare, in a field setting, various methods of castration and describe surgeon observations and animal responses during the peri-operative period. The specific objectives were to compare A) two surgical techniques: 1) ligation versus 2) emasculature, and B) two anesthesia techniques: 1) sedation with infiltration of local anesthesia versus 2) injectable general anesthesia, and C) the use of nonsteroidal anti-inflammatory drugs (NSAIDs) at the time of surgery.

Alpacas were held without feed for a period of 12 to 18 hours prior to castration. Then, alpacas were divided into 8 groups, assigned randomly by convenience based on order of being caught. After each capture, the alpaca was weighed and drug administration performed according to the assigned group and dosage. The groups were:

- A - Standing sedation + lidocaine + ligate + NSAID
- B - SSL + ligate – No NSAID
- C - SSL + emasculate + NSAID
- D - SSL + emasculate – No NSAID
- E - BKK + ligate + NSAID
- F - BKK + ligate – No NSAID
- G - BKK + emasculate + NSAID
- H - BKK + emasculate – No NSAID

General anesthesia:

Those alpacas assigned to the general anesthesia groups (E, F, G, and H) received a combination of butorphenol, xylazine, and ketamine by intramuscular injection (referred to as BKK cocktail). The BKK cocktail was made by adding 1 mL (100 mg/mL) xylazine + 1 mL (10 mg/mL) butorphanol + 10 mL (100 mg/mL) ketamine and administered at a dosage rate of 1 mL per 18 kg (40 lbs) body weight.

Sedation and local anesthesia:

Those alpacas assigned to the sedation groups (A, B, C, and D) received xylazine by intramuscular administration. The xylazine was given at 0.2 mg/kg using the same concentration of xylazine as in the BKK cocktail (100 mg/mL). Once sedated, each alpaca had 1 to 1.5 mL of 2% lidocaine HCl infiltrated along the median raphe of the scrotum and 2 to 3 mL infiltrated into each spermatic cord.

NSAID:

Those alpacas assigned to the NSAID groups (A, C, E, and G) received flunixin meglumine intravenously at a dosage rate of 2 mg/kg body weight immediately prior to the injection of the sedation or general anesthesia drugs.

Peri-operative assessment:

Observations were recorded for preoperative, intraoperative, and postoperative events including complications (e.g., hemorrhage, inadequate anesthesia, level of difficulty, ease of performance), indications of pain (e.g., response to stimuli, vocalization, abnormal movement or behavior). All alpacas were re-examined 2 to 4 weeks after surgery to evaluate postoperative complications and assess well-being.

Discussion of Results

Based on this study and clinical experience, the authors prefer to use short acting injectable anesthesia for castration of alpacas. Castration of alpacas can be completed with the animal standing in a camelid chute after sedation with xylazine, but the procedure is less aesthetic and more challenging to complete the procedure without intraoperative complication. Alpacas often laid down, required more sedation, and were unpredictable between animals.

Based on the results of this study and clinical experience, the authors prefer suture ligation of the spermatic cords rather than use of an emasculatome. Emasculatome of the spermatic cords was faster compared with that of suture ligation, but intraoperative and postoperative hemorrhage were common after emasculatome. Hemorrhage was only clinically significant in one alpaca. In that alpaca, hemorrhage continued for several hours after the castration and the alpaca appeared to be depressed. Hemorrhage was controlled with local injection of epinephrine and application of pressure.

No clinically apparent effect was present with the use of flunixin meglumine in these alpacas. The pre-operative administration of flunixin had no effect on the need for additional sedation or anesthesia and there were no apparent differences in appetite, attitude, and activity following surgery.

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