

vulva to reproduce the effect of the vestibular sphincter muscle. Placement of the sutures too superficially will result in severe tearing of the vulva.

Although Buhner suture and other methods of fixation give temporary relief from vaginal prolapse, chronic vaginal prolapse requires more invasive techniques to stabilize the vagina. The Johnson button or Minchev techniques have been used in alpacas and llamas but are not recommended because the devices may result in vaginal tears extending into the abdomen if chronic straining occurs. Vaginoplasty is extremely effective in the elimination of vaginal prolapse but prevents the animal from being used in nature service matings or normal parturition. This technique is done with the animal in a cushed position and after epidural anesthesia. A triangular segment of the dorsolateral vaginal wall is resected on both sides, with the triangles based on the dorsal midline. Then the sides are sutured closed together. The vaginal wall resection should only leave enough room for unobstructed urination. The patient should be rested for 30 days after surgery. If the affected animal is to be kept as a pet, OHX is recommended to minimize the risk of persistent problems.

Male

Surgical treatment of diseases and injuries of male reproductive structures is rarely needed. Castration is a common surgical procedure, but injuries of the penis, prepuce, accessory glands, scrotum, and inguinal rings are rare.

Castration

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. The timing of castration is controversial in llamas and alpacas. Abnormalities of conformation have been observed in llamas castrated at a young age (e.g., <1 year old).²³ Llamas continue to grow until long bone growth reaches a plateau at approximately 18 to 24 months. Male hormones influence physical 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.²⁴

Most castration methods that have been used in livestock, horses, or pet animals may be used in llamas and alpacas. However, the most common methods used are scrotal castration and prescrotal castration.²⁴⁻²⁷

As preoperative preparation, tetanus toxoid vaccination and procaine penicillin G (22,000 units per kilogram [units/kg]) are administered to each animal before surgery is performed. 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. Scrotal castration may be done with the animal in the standing or recumbent position. Local anesthesia is infiltrated along the median raphe and spermatic cords (2 to 3 mL, 2% lidocaine

hydrochloride [HCl] per site). 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 PG-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, if desired.

Prescrotal 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. The animal is placed in dorsal recumbency and a 2-cm incision is made on the 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 by using a subcuticular or subcutaneous suture pattern (e.g., No. 2-0 poliglecaprone; No. 3-0 PDS).

During postoperative monitoring, confinement is not required, but daily examination of the surgical site is recommended during the healing of the wounds. Clinically serious complications appear to be uncommon in camelids (<1%), but hematoma formation, hemorrhage, and infections have been observed.

Cryptorchidism

Cryptorchidism is uncommon, but not rare, in camelids. In normal males, the testicles should be present in the scrotum at the time of birthing. At this time, the testicles are quite small and may not be easily detected. Often, males are evaluated at weaning and at age 4 to 6 months and can readily be classified as cryptorchid at that time. Although ectopic testicles occur, cryptorchidism is the most common anomaly of the testicles.

Occasionally, gelded males demonstrate aggressive behavior and are presented for assessment. Diagnosis of inapparent cryptorchidism is usually made by behavioral signs and baseline testosterone hormone concentration. Baseline testosterone concentrations of greater than 200 picogram per microliter (pg/ μ L) of serum suggest cryptorchidism. Hormonal stimulation tests using either gonadotropin-releasing hormone (GnRH) or human chorionic gonadotropin (hCG) may be used to identify a marked increase in testosterone within 24 hours after injection and thus confirm the diagnosis.

Data regarding the incidence or type of cryptorchidism occurring in llamas and alpacas is limited, but most retained testicles are located within the abdomen. However, the position of the testicle is far less predictable than in other species. The retained testicle is expected to be located near the cranio-medial aspect of the internal inguinal ring, but may be found anywhere along the pathway of descent between the kidney and the inguinal ring (Figure 62-11). The variable location of the testicle has led to the use of laparoscopy as a tool for diagnosis and treatment of cryptorchidism. Laparoscopic cryptorchidectomy is most easily performed with the patient under general anesthesia, in dorsal recumbency, and placed in the Trendelenburg position.²⁸ If a laparotomy is performed, this is done as a parainguinal incision.²⁹