Theriogenology Question of the Month

**History**

Two sexually intact male calves were admitted for evaluation and castration after the respective owners observed that each calf had only 1 scrotal testis. One calf was a 6-month-old Shorthorn male, and the other calf was a 4-month-old crossbred male. Each calf weighed approximately 180 kg (400 lb). No attempts had been made to castrate the calves prior to their referral to our facility.

Examination of the Shorthorn calf revealed that the right testis was in a normal, descended position in the scrotum and was of expected size and consistency. No other abnormalities were detected on physical examination. Deep inguinal palpation on the left side was performed with the calf in a standing position and again with the calf in right lateral recumbency on a tilt table. No testicular tissue was palpable in the inguinal region, and no ectopic testis was evident in the subcutis along the prepuce or ventral abdomen.

Epidural administration of 60 mg of mepivacaine hydrochloride facilitated per rectal palpation of the left internal inguinal ring, which revealed that the vas deferens did not enter the left internal inguinal ring.

The crossbred male calf was examined in a manner similar to that for the first calf, except the second calf was too small to allow palpation per rectum. Examination of the second calf revealed that the left testis was in a normal, descended position within the scrotum and was of expected size and consistency. The calf lacked a palpable testis in the right inguinal region.

**Question?**

What is the condition affecting each of these calves? Please turn the page.
Answer

Unilateral abdominal cryptorchidism.

Results

Standing laparoscopic cryptorchidectomy was selected as a treatment option for both calves. Food was withheld from each calf for 48 hours in preparation for surgery. Each calf was restrained in stocks in a standing position.

For the Shorthorn calf, the area of the left flank was prepared aseptically for surgery. Epidural administration of lidocaine hydrochloride (40 mg) was performed, and additional lidocaine (160 to 240 mg) was also administered as local infiltration at each insertion site for the laparoscope and laparoscopic instruments. A 2-cm vertical skin incision was made in the dorsal aspect of the left paralumbar fossa at a point approximately 12 cm caudal to the last rib and 10 cm ventral to the transverse processes of the lumbar vertebra. A 10-mm cannula was inserted into the abdominal cavity through this incision, and a 30-cm-long, 0° laparoscope was inserted through the cannula. The abdomen was insufflated with carbon dioxide gas via the laparoscopic cannula. The left testis was identified dorsocaudal to the rumen and in close proximity to the left kidney.

The optimal site for the instrument portal was determined after external compression of the flank over the region of the retained testis with simultaneous observation of the peritoneum by use of the laparoscope. A 2-cm incision was made 2 cm caudal and 4 cm ventral to the incision used for the laparoscope. A trochar and cannula were inserted through this incision. The trochar was removed, and rotatable laparoscopic claw forceps (10 mm X 43 cm) were inserted through the cannula to grasp the testis.

After the testis was grasped, the skin incision was enlarged to approximately 6 cm. The abdomen was deflated, and the muscle layers and peritoneum were bluntly dissected to facilitate removal of the testis. The flank was pushed inward to assist in exteriorizing the testis. The spermatic cord was transfixed and ligated outside the abdomen with size 0 polydioxanone. The cord was then transected, and the stump was examined for evidence of hemorrhage. The peritoneum, muscles, and skin were closed in a routine manner. A closed castration was then performed on the right testis of the calf.

For the second calf, epidural administration of lidocaine was not performed. Lidocaine was administered in an inverted L-block pattern in the right paralumbar fossa. An approach via the right flank was used for insertion of the laparoscope, similar to the procedures described for the first calf. The laparoscope was advanced past the omental curtain, and the abdomen was explored, but neither the right testis nor right inguinal ring was observed by use of the 0° laparoscope.

To further evaluate the right inguinal ring and adjacent area, the left paralumbar fossa was prepared aseptically. A surgical approach similar to that for the right paralumbar fossa was used. By use of the 0° laparoscope, the right testis was identified dorsal to the colon, adjacent to the right inguinal ring (Figure 1). An incision for the instrument portal was made in the right flank at a point ventral to the first laparoscope portal. The optimum site for the instrument portal was determined in a manner similar to that described for the first calf.

Laparoscopic claw forceps were used to grasp the right testis and retract it toward the right abdominal wall (Figure 2). The incision in the right flank was enlarged to 6 cm, and the testis was exteriorized. The spermatic cord was ligated and transected, and the testis was removed. A closed castration was then performed on the left testis.

Discussion

Laparoscopic surgery for removal of a cryptorchid testis has been described in standing horses, but to our knowledge, similar procedures have not been described for cattle. The benefits of this procedure in cattle are similar to those in horses and include a decreased risk of incisional complications, avoiding risks associated with general anesthesia, positive identification of the testis, a decreased risk of inguinal herniation, and minimized skin scarring.

It may be difficult to exteriorize the testis in some horses because of the caudal epididymal ligament. A
short mesorchium could also prevent exteriorization of the testis, which would require intra-abdominal ligation of the spermatic cord. Comparatively, the mesorchium is longer in ruminants, thus, tension on the mesorchium during ligation or emasculation and hemorrhage of the stump were not issues in the 2 calves described here. In both instances, we were able to completely exteriorize the cryptorchid testis through a small incision in the flank. It was then easy to perform extracorporeal ligation of the spermatic cord and ensure that no complications developed with regard to postoperative hemorrhage from the spermatic cord. We did not have problems locating the intra-abdominal testis, and incisions healed without complications in both calves.

In our facility, laparoscopy in a standing position is less expensive, compared with costs for traditional methods of cryptorchidectomy in cattle under general anesthesia. We believe that laparoscopic examination of the abdomen provides a better and more thorough exploration than through an incision made for conventional abdominal cryptorchidectomy. Both calves stood quietly throughout the procedure, and no signs of discomfort were evident. They were restrained in stocks, and we relied primarily on local anesthesia; however, the procedure could have been performed with the calves restrained in a squeeze chute, provided there would be sufficient room to enable access to the flank. Also, sedatives or epidural administration of an anesthetic could be used when warranted by an animal’s temperament.

Cryptorchidism is a condition in which the testis fails to descend to its normal position in the scrotum. The retained testis can be found at any location along the fetal migration path from the caudal pole of the kidney to the inguinal ring. When the testis does not pass through the internal inguinal ring, the animal is considered to be an abdominal cryptorchid. An animal is considered to be an inguinal cryptorchid when the testis has passed through the internal inguinal ring but has not descended into the scrotum. An animal may be affected unilaterally or bilaterally.

In 1 study of cryptorchidism in which 35 cattle were affected unilaterally, the left testis was involved in 24 (69%) bulls and the right testis was involved in 11 (31%) bulls. In that same study, 12 of 35 (34%) retained testes were intra-abdominal. Cryptorchidism in cattle is probably more common than reported because the descended scrotal testis is surgically removed in many cryptorchid calves (ie, unilateral castration), and calves with the retained intra-abdominal testis are then fed until they reach market weight.

When examining bulls with a unilateral scrotal testis, it is important to palpate the inguinal region as well as the prepuce and ventral abdominal wall. The prevalence of ectopic testes is much greater than the prevalence of cryptorchidism in ruminants. When the cryptorchid testis is not found in these ectopic locations, it is most frequently located in the abdominal cavity. In contrast to findings in other species, abdominal testes in cattle are often located adjacent to the ipsilateral kidney or, in some instances, adjacent to the rumen when located on the left side. Therefore, when there is an intra-abdominal testis, invasive surgical techniques (typically laparotomy via an incision in the paralumbar fossa) in cattle that are in a standing position or anesthetized and recumbent may be required to remove the retained testis.

Laparoscopy via an incision in the flank in standing cattle has several advantages over laparotomy via an incision in the flank, including superior visibility of the internal reproductive organs and precise localization of the retained abdominal testis. Localization of the testis prior to removal minimizes morbidity associated with open abdominal exploration and testicular removal.

The 2 calves described here were originally intended to be used as show steers after surgery. However, an ethical question arises as to whether a cryptorchid animal should be used for show purposes after castration. The steers of this report obviously could not be used for breeding, but their success in the show ring could potentially be used to promote their sires and dams. It has been suggested that there is a genetic component to the condition in horses; however, there is little supporting evidence. Although it has not been definitively proven that cryptorchidism is a heritable trait in cattle, there is a clinical perception that it may be. We are not aware of any information detailing the hereditability of cryptorchidism in cattle.

The laparoscopic technique described here was provided as a means of minimizing morbidity following cryptorchidectomy. Although laparoscopy requires more expensive surgical equipment than correction by use of a typical laparotomy via an incision in the paralumbar fossa, the minimization of postoperative morbidity and decreased risk for complications are advantageous. As more veterinarians begin to use laparoscopy for other procedures, such as abomasopexies of left displaced abomasums and umbilical surgeries, laparoscopic correction of cryptorchid cattle may become a cost-effective option for owners.

Outcome
Both calves recovered without complications and were discharged to the respective owners. A dose of procaine penicillin G (22,000 U/kg [10,000 U/lb], IM) was administered to each call before and after surgery. Concerns about the use of these calves as show cattle were discussed with the owners.

References

Clickline, Karl Storz Endoscopy-America Inc, Culver City, Calif.