Recurrence of renosplenic entrapment after renosplenic space ablation in a seven-year-old stallion

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Case Description—A 7-year-old mixed-breed stallion was admitted because of colic.

Clinical Findings—Entrapment of the left colon in the renosplenic space was diagnosed via rectal palpation and ultrasonographic examination, despite a renosplenic space ablation 6.5 years earlier.

Treatment and Outcome—The renosplenic entrapment was corrected with a combination of phenylephrine administration, rolling, and ballottement of the horse’s abdomen during general anesthesia. The following week, left flank laparoscopic renosplenic space ablation was performed with the horse standing. On examination of the previous surgical site, only 4 bands of fibrous adhesion remained of the original space ablation. The renosplenic space was again closed by suturing the perirenal fascia and renosplenic ligament to the splenic capsule. The horse was discharged from the hospital and recovered at home. No complications or recurrence of entrapment was reported following the procedure.

Clinical Relevance—There have been no previous reports of recurrence of renosplenic entrapment following procedures to permanently ablate the renosplenic space. Recurrence in this patient may be attributed to the horse’s young age at the time of initial surgery or inadequate size or spacing of the sutures through the perirenal fascia and splenic capsule. (J Am Vet Med Assoc 2011;239:504–507)

In October 2002, a 7-month-old (279.5-kg [615.0-lb]) mixed-breed colt was admitted to the Colorado State University Veterinary Teaching Hospital with a history of signs of abdominal pain, which were unresponsive to analgesics. An exploratory laparotomy was performed via a 20-cm ventral midline incision and revealed that the pelvic flexure and dorsal and ventral large colon were in the right dorsal quadrant. Furthermore, the dorsal and ventral large colon were found to be entrapped within the renosplenic space and contained impacted fecal material. The entrapment was reduced, and 3 L of polyionic fluids were introduced into the dorsal colon through an 18-gauge needle to soften the ingesta. The remainder of the exploratory laparotomy findings were unremarkable. The linea alba was closed with No. 3 polyglactin 910 in a simple continuous pattern, and 2-0 polyglyconate was used to close the subcutaneous tissue. Stainless steel staples were used to close the skin incision. Feed was withheld for an additional 48 hours, and potassium penicillin (22,000 U/kg [10,000 U/lb], q 6 h, IV for 1 day) and gentamicin sulfate (6.6 mg/kg [3 mg/lb], IV, once) were administered. Polyionic fluids were administered IV for 48 hours following surgery, and the horse also received ranitidine (5 mg/kg [2.3 mg/lb], q 6 h, IV for 2 days) and omeprazole (2 mg/kg [0.9 mg/lb], PO, q 24 h for 3 days) for ulcer prevention. Flunixin meglumine (0.5 mg/kg [0.23 mg/lb], IV, q 8 h) was administered to control pain and inflammation for an additional 3 days following surgery.

Because of the young age of the horse, the owners and treating clinicians felt that it might be predisposed to recurrent renosplenic entrapment. Therefore, the owners elected to have a renosplenic space ablation performed the following month to permanently prevent recurrence. The weanling was admitted to the Veterinary Teaching Hospital; food was withheld for 12 hours before surgery, and the horse was administered a preoperative dose of flunixin meglumine (1.1 mg/kg [0.5 mg/lb], IV) and procaine penicillin G (20,000 U/kg [9,090.90 U/lb], IM). Restraint during the procedure was accomplished by use of standing stocks, and detomidine hydrochloride (40 µg/kg [18.2 µg/lb] in sterile saline [0.9% NaCl] solution; total volume, 8 mL) was administered for epidural analgesia. Laparoscopy was performed according to the technique described in 2002 by Mariën. The left paralumbar fossa was clipped of hair and aseptically prepped and draped. Each of 2 small portal sites were infiltrated with 10 mL of 2% lidocaine hydrochloride, and a third, larger portal site was infiltrated with 20 mL of 2% lidocaine hydrochloride. A 10-mm portal was created in the 17th intercostal space level with the dorsal aspect of the tuber coxae and served as the laparoscope portal (portal 1). A 25-mm portal was made in the paralumbar fossa midway between the 18th rib and the tuber coxae and was used for a large-bore cannula (portal 2). A third portal approximately 10 mm in size was made 5 cm ventral to the second opening (portal 3). It served as the portal for instrumentation. An electronic insufflator was used to create an abdominal insufflation of 12 mm Hg for the placement of the 2 smaller cannulas and the large-bore cannula. Once the cannulas were placed and the
Skin was closed with 2-0 nylon monofilament suture in a continuous pattern. The ablation site was evaluated prior to closure. The muscle layers were closed in the large cannula incision with 0 polyglyconate in 2 layers of simple continuous sutures. The skin was closed with 2-0 nylon monofilament suture in a cruciate pattern for the small portal sites; a continuous pattern was used for the large portal site. Following the procedure, the horse was administered flunixin meglumine (1.1 mg/kg, IV, once). It was discharged, and the owners were instructed to administer phenylbutazone tablets (1.8 mg/kg [0.8 mg/lb], PO) every 12 hours for 5 days with a recommendation to keep the horse confined in a box stall until suture removal. The horse was reported to recover well at home.

Nearly 7 years after the renosplenic space ablation, in October of 2009, the horse was now 7 years of age with a body weight of 554.5 kg (1,220.0 lb) and was again referred to the veterinary teaching hospital with signs of colic including inappetence, decreased defecation, and attempting to roll. The referring veterinarian performed rectal palpation of the horse and diagnosed a renosplenic entrapment of the left colon. The horse was administered flunixin meglumine (1.1 mg/kg, IV), butacopan (0.17 mg/kg [0.077 mg/lb], IV), sedatives (xylazine, 0.3 mg/kg [0.14 mg/lb], IV; butorphanol tartrate, 0.01 mg/kg [0.005 mg/lb], IV; and acepromazine maleate, 0.2 mg/kg [0.09 mg/lb], IV), and ephedrine (20 mg in 60 mL of saline [0.9% NaCl] solution, over 5 minutes IV), but the displacement did not resolve. The horse was referred to the Veterinary Teaching Hospital and, upon admission, was sweating and shaking and appeared uncomfortable. Abdominal ultrasound by use of a 22-MHz transducer and smooth fibrous adhesion (large arrow) joining the spleen (asterisk) and perirenal fascia. The renosplenic ligament is denoted by the small arrow.

Figure 1—Necropsy photograph of a horse that had undergone a renosplenic space ablation 3 years previously. Note the complete and smooth fibrous adhesion (large arrow) joining the spleen (asterisk) and perirenal fascia. The renosplenic ligament is denoted by the small arrow.
bands between the splenic capsule and the visceral peritoneum of the kidney (Figure 2). The renosplenic space ablation was repeated by use of size 0 polyglyconate in a simple continuous pattern, incorporating the bands of fibrous tissue from the first surgery into the closure. The external abdominal oblique muscle in the enlarged portal was closed with size 0 polyglyconate in a simple continuous pattern. The skin in all 3 portals was closed with size 2-0 nylon monofilament in a cruciate pattern in the continuous pattern. The skin was closed with size 0 polyglyconate in a simple continuous pattern, incorporating the bands of fibrous tissue from the first surgery into the closure. The external abdominal oblique muscle in the enlarged portal was closed with size 0 polyglyconate in a simple continuous pattern. The skin in all 3 portals was closed with size 2-0 nylon monofilament in a cruciate pattern in the small portal sites and a simple continuous pattern in the large portal site. Following the procedure, the horse was discharged from the hospital; the owners were instructed to administer phenylbutazone (1.8 mg/kg, PO) every 12 hours for 2 days. The owners were instructed to gradually reintroduce feed and to limit the horse to stall rest until suture removal 3 weeks following surgery, at which time they could begin slowly increasing its exercise. Follow-up approximately 5 months after the surgery indicated that the horse recovered well. However, in October 2010, the horse was again examined for colic. Exploratory laparotomy revealed cecal displacement, and a large colon resection and anastomosis was performed. One week later, the horse once again showed signs of pain and was taken back to surgery. The serosa of the large colon was hemorrhagic, and an adhesion was forming at the previous anastomotic site. Within the large colon at the anastomotic site, there was also a palpable abscess. Serosanguinous abdominal fluid was encountered within the abdomen, indicating peritonitis. On the basis of the surgical findings, difficulty in performing another large colon resection, and the frequent recurrent bouts of colic in this horse, the owner elected to have the horse euthanatized while it was still anesthetized. Postmortem examination was not performed.

Discussion

The diagnosis of renosplenic entrapment is often made solely on the basis of combined findings on rectal palpation and abdominal ultrasound. Although rectal palpation is a somewhat nonspecific diagnostic tool and confirmation of renosplenic entrapment could have been made via laparoscopy or exploratory laparotomy, the authors were confident that entrapment was the most likely cause of the initial recurrent episode of colic in this patient. Renosplenic entrapments have been reported to comprise between 2.5% and 6% of cases of colic in horses, and the incidence of recurrence has been found to be between 3.2% and 21%.

It is suspected that the shape and depth of the renosplenic space vary among horses, with deep clefts predisposing some to recurrent entrapments and narrow shelves reducing this likelihood. It has been reported that the morphology of the renosplenic space may change as an animal ages. The horse in the present report was 7 months old at the time of the initial ablation surgery, and it is of note that renosplenic ablations are not commonly performed on animals of such a young age. In this case, the treating clinicians thought that renosplenic entrapment at such a young age might have indicated a predisposition to future entrapments and thus elected, with the owner’s consent, to perform the ablation on the weanling. It is unknown whether the young age of this colt may have contributed to the failure of the ablation. Previous studies have only included horses ≥ 3 years of age. It is possible that as this colt continued to grow, the ablation became stretched or the shape of the renosplenic space changed naturally with growth, either of which may have created space for potential entrapment. Further research may be warranted to determine whether suture closure of the renosplenic space should be postponed in young, growing horses.

Previous reports detailing necessary size requirements and spacing for suture bites through the splenic capsule and perirenal fascia are limited. Mariën et al suggested bite sizes of at least 1.5 cm narrowly spaced 1 to 2 cm apart to reduce tension across the suture line and prevent tearing of the splenic capsule. In the patient in the present report, it is possible that the bite sizes used in the initial procedure in 2002 were too small in depth, spaced too far apart, or a combination of both, resulting in failure of most of the suture line over time.

Recently, Epstein and Parente described the laparoscopic placement of a nonabsorbable mesh to obliterate the renosplenic space. These can be accomplished either laparoscopically through the left flank in standing animals (with or without hand assistance) or through a celiotomy with the horse in right lateral recumbency under general anesthesia. Each technique presents its own unique advantages and disadvantages, but all serve to create permanent ablation of the renosplenic space, preventing recurrence. To our knowledge, this is the first documented instance of renosplenic entrapment following surgery to obliterate the renosplenic space.
erate the renosplenic space, an alternative to the previously described suture closure.1,2,9 The authors postulated that advantages may include less requirement for surgical expertise and less potential for tearing of the splenic capsule under tension of the sutures. In that study,8 5 horses underwent 2 laparoscopic procedures: the first to place the mesh and the second, 4 weeks later, to determine healing and evaluate the renosplenic space. All horses were subsequently euthanatized, and measurements of the implants and renosplenic space were taken at necropsy. It was found that although the procedure subjectively took a longer amount of time to complete than would a traditional laparoscopic suture closure method, closure of the renosplenic space with fibrous tissue was complete in all 5 horses. Problems encountered8 included difficulty introducing larger-sized pieces of mesh for horses with large spaces, and in 1 horse, a mesenteric adhesion to the mesh was noted. Although the finding of an adhesion is disconcerting, problems encountered8 included difficulty introducing larger-sized pieces of mesh for horses with large spaces, and in 1 horse, a mesenteric adhesion to the mesh was noted. Although the finding of an adhesion is disconcerting, few animals that have undergone laparoscopic renosplenic space ablation have had documented reevaluation,8,9 making it possible that adhesions have gone undetected with traditional suture closure methods. Polypropylene mesh may serve as a larger scaffold for fibrous tissue and offers more complete coverage of the renosplenic space than the traditional suture closure method. It may be more useful in younger animals, as larger pieces of mesh could be used to offset potential growth of the animal and widening of the space.

Until now, laparoscopic renosplenic space ablation was thought to be 1 method of permanently preventing entrapment of the large colon. However, the horse in this report has shown that this procedure may not always provide a lasting solution. Laparoscopic ablation is an efficient, minimally invasive procedure with decreased risk during anesthesia to the patient, reduced cost to the owner, and quick recovery times, compared with celiotomy performed in dorsal recumbency. However, placing sutures more closely together or use of a mesh may be necessary to prevent gapping and inadequate renosplenic space ablation in a young horse.

References