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 3 days following surgery.

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.

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exploratory surgery performed, the abdomen was de-
sulfated. The splenic capsule was sutured to the vis-
ceral peritoneum overlying the left kidney by use of 0
polyglyconate in a continuous pattern. The ablation
site was evaluated prior to closure. The muscle layers
were closed in the large cannula incision with 0 poly-
glyconate 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 continu-
ous pattern was used for the large portal site. Follow-
ing the procedure, the horse was administered fluimixin
giegumline (1.1 mg/kg, IV, once). It was discharged,
and the owners were instructed to administer phenyl-
butazone 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 defeca-
tion, 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),
bucspan (0.17 mg/kg [0.077 mg/lb], IV), sedatives (xy-
lazine, 0.3 mg/kg [0.14 mg/lb], IV; butorphanol tar-
tate, 0.01 mg/kg [0.005 mg/lb], IV; and acepromazine ma-
late, 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 ap-
ppeared uncomfortable. Abdominal ultrasound by use of
a 3.75-MHz probe revealed a ventrally deviated spleen
with rounded edges and a lack of visualization of the left
kidney. On rectal palpation, the large colon was identi-
fied as lying dorsolateral to the spleen and the presence
of an impacted right dorsal colon was detected. The left
kidney and renosplenic ligament could not be palpated.
Abdominocentesis was performed, and the sample was
of normal color with total protein concentration < 2 mg/
dl. (reference range, 0.0 to 2.5 g/dL). On the basis of
rectal palpation and ultrasound findings, a diagnosis of
renosplenic entrapment was made. The horse was initial-
ly administered a 3-L bolus of polyionic electrolyte lu-
ids IV followed by 5 mg of phenylephrine (0.009 mg/kg
[0.004 mg/lb]) in 1 L of a polyionic electrolyte solution
via a jugular catheter. It was moved into an induction
stall; the horse was premedicated with xylazine (0.8 mg/
kg [0.36 mg/lb]), and general anesthesia was induced by
use of ketamine (2.2 mg/kg [1 mg/lb]) and diazepam
(0.1 mg/kg [0.05 mg/lb]). General anesthesia was main-
tained with 1 g of ketamine and 500 mg of xylazine in
1 L of 5% guaifenesin administered IV to effect. Follow-
ing induction of anesthesia, the horse was placed in right
lateral recumbency and hobbles were applied to its hind
limbs. A hoist was used to raise the horse’s hind end off
the ground and position the horse in dorsal recumbency.
The abdomen was then ballotted in an attempt to dis-
lodge the left dorsal colon from the renosplenic space.
After ballottment was complete, the horse was rolled

another 90° and positioned in left lateral recumbency for
recovery. Once the horse had recovered from anesthesia,
the left abdominal and retroperitoneal regions were re-
examined via ultrasound and a rectal examination was
again performed. On the basis of the examination find-
ings, the entrapment was believed to have been resolved
and the horse was returned to its stall at the Veterinary
Teaching Hospital. A polyionic electrolyte solution con-
taining 400 mg of magnesium sulfate/L and 20 mEq of
potassium chloride/L was then administered IV via the
jugular catheter. Additionally, the horse was adminis-
tered 4 L of mineral oil through a nasogastric tube. The
tube was left in place, and 5 L of oral fluids with elec-
trolytes was given every 2 hours for a total of 15 L. The
horse passed multiple piles of normal feces overnight,
and on rectal palpation the following morning, the right
colon impaction was no longer palpable. The horse
was subsequently discharged and recovered uneventfully
at home.

Approximately 2.5 weeks later, the owners elected
to have the abdomen explored laparoscopically and the
renosplenic space ablation repeated as necessary. The
stallion was readmitted to the hospital, and food was
withheld for 24 hours prior to the surgery. A jugular vein
catheter was placed, and the horse was administered
gentamicin (6.6 mg/kg, IV) and procaine penicillin G
(22,000 U/kg, IM) prior to surgery. The horse was placed
in stocks, sedated with 5 mg of detomidine hydrochlor-ide and 5 mg of butorphanol IV, and administered 1-L
of saline solution containing 20 mg of detomidine as a
continuous infusion IV to maintain a desired state of
sedation. Laparoscopy was performed as described by
Farstvedt and Hendrickson and differed from the first
ablation procedure in that portal 3 served as the large
bore cannula site and portals 1 and 2 were used as the
laparoscope and instrument portals. On examination
with the laparoscope, adhesions between the splenic
capsule and the perirenal fascia were observed to be in-
complete. Rather than the sheet of adhesion expected
(Figure 1), all that remained of the fibrous tissue were 4

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 (as-
terisk) 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 0 polyglyconate® in a simple continuous pattern, incorporating the bands of adhesion remain.

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%-9 of cases of colic in horses, and the incidence of recurrence has been found to be between 3.2% and 21%.4-6 Survival rates after left dorsal displacement of the colon are reported6 to be as high as 93%, but for horses with a history of recurrence, the cost of repeated correction, the lost training time, and the potential for complications following surgery can be considerable obstacles for many owners. Thus, surgical intervention may be a viable option for management of patients with recurrence. Several techniques exist to permanently prevent renosplenic entrapment, including colopexy, colon resection, and ablation of the renosplenic space. These can be accomplished either laparoscopically through the left flank in standing animals (with or without hand assistance7) 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.

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.1 Additionally, it has been reported that the morphology of the renosplenic space may change as an animal ages.7 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 studies2,4,8,9 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 Parente8 described the laparoscopic placement of a nonabsorbable mesh to oblit-
erate the renosplenic space, an alternative to the previously described suture closure. 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, 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 encountered 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, 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

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