Case File: A Challenging Colic Case

Signalment and History
- “Johnny” is a 14-year-old Paint gelding used for barrel racing.
- The horse presented with a history of mild colic, reduced fecal output, and an intermittent fever of 36 hours duration.
- Treatment by the rDVM with mineral oil, IV fluids, flunixin meglumine, and procaine penicillin G did not resolve clinical signs.
- The horse had prior colic episodes that were milder and always responsive to flunixin meglumine.

Initial Examination
Johnny showed mild signs of colic at presentation with a heart rate of 48 bpm. All other physical parameters were within normal limits.
Ultrasound examination of the abdomen revealed colonic vessels along the right abdominal wall consistent with a right dorsal displacement.
CBC and serum biochemistry revealed a mild neutrophilia with slight toxicity, low serum electrolyte concentrations, elevated muscle enzyme concentrations, and a mild elevation in SDH.

Treatment
A tentative diagnosis of right dorsal colonic displacement was made and treatment consisted of oral and IV fluids and electrolytes, analgesics, and walking.
After 10 hours of therapy, Johnny became acutely and severely colicky. Follow-up examination revealed an “empty” abdomen on rectal palpation, 3 L of gastric reflux, and some free fluid in the ventral thorax on ultrasound. Abdominocentesis revealed a normal transudate with a lactate of 1.0. Surgical exploration was performed based on non-responsiveness to repeated analgesic therapy. Perioperative medications included flunixin meglumine (1 mg/kg IV), potassium penicillin (22,000 IU/kg IV), and gentamicin (6.6 mg/kg IV).

Surgical Findings
Ventral midline celiotomy revealed an extensive diaphragmatic hernia of the right crus extending approximately 25 cm from proximal to distal. Intermittent positive pressure ventilation was maintained throughout.

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anesthesia. The majority of the liver and cecum were contained within the thoracic cavity, with some degree of vascular compromise of the cecum. The viscera was extracted from the thorax and as repair was not possible at that time due to the extensive nature of the hernia and extension into the dorsal-most aspect of the diaphragm, Johnny was recovered from surgery with the intent to repair the hernia later through an alternative approach. His recovery from surgery #1 was uneventful and herniorrhaphy was scheduled to take place two days postoperatively. The plan was to attempt a minimally invasive thoracoscopic repair, with possible selective intubation of the left lung lobe for ventilation, and preparation for alternative abdominal and thoracotomy incisions if needed.

Two days later, Johnny was anesthetized and placed in left lateral recumbency (see Fig. 1). A laparoscopic cannula followed by a 10 mm diameter laparoscope was inserted into the thorax at the level of the 14th intercostal space. Complete visualization of the diaphragmatic defect was impaired due to the extensive length and width of the defect and the presence of cecum, liver, and small intestine in the thoracic cavity (see Fig. 2 and Fig. 3).

A right flank laparotomy was performed with the goal of manually extracting the viscera from the thoracic cavity and possibly facilitating closure of the defect. The majority of the cecum was again contained within the thorax. A reverse Trendelenburg position (head up/tail down) was adopted to aid in keeping viscera within the abdominal cavity. Brief attempts were made to close the defect via flank laparotomy using thoracoscopic guidance with limited success. A 15th rib resection was then performed to allow complete surgical access to the right crus of the diaphragm. The defect was closed using a broken continuous pattern with #2 PDS and a polypropylene mesh was applied over the closed diaphragmatic rent and was sutured in place to reinforce the closure. Routine closure of the thoracic wall was performed and excess air was aspirated from the thoracic cavity. Intraoperative pain management included a Ketamine CRI and placement of bupivacaine local anesthesia around intercostal nerves of the 15th rib after closure.

Post-Operative Care
Postoperative care included continuation of antimicrobial and fluid therapy, firocoxib (2.7 mg/kg loading dose IV followed by 0.9 mg/kg IV q24), lidocaine CRI (50 ug/kg/min IV), and fentanyl patches (20 mg) placed on the dorsolateral thorax. Johnny had developed a painful, intermittent cough postoperatively that was treated with inhaled albuterol and beclomethasone (see Fig. 4).
After an additional week of hospitalization, Johnny was sent home on 3 months of stall rest. He is 4.5 months out from surgery and his owners report that he is doing fantastic and has returned to full work barrel racing.

Discussion

The prevalence of diaphragmatic hernia is rare in adult horses, and is often secondary to trauma. Preoperative diagnosis can be challenging and the condition is often recognized after surgical exploration or on necropsy examination. Overall survival is reported to be 23 percent with success rates of 46 percent following surgical intervention. A small diaphragmatic defect has been reported to be repaired via standing thoracoscopy, but the extensive nature of this lesion precluded thoracoscopic repair. However, with dedicated owners, successful repair of even the most extensive diaphragmatic defects is possible.

Acknowledgements

This case was prepared by Diana Hassel, DVM, PhD, DACVS, DACVECC.

Fig. 4: The patient receives inhaled steroids for a postoperative cough.
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