Laparoscopic-assisted Approach to the Pelvic Flexure for Surgical Treatment of Sand Impaction in a Horse

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ABSTRACT

Background: Laparoscopy provides good visualization of horse’s abdominal cavity, besides providing minimal invasiveness and meticulous manipulation intra-abdominal organs. Laparoscopy is suitable for both diagnosing and treating acute abdomen in horses. The purpose of this study was to report a successful case of laparoscopic-assisted surgery for treating sand impaction in a horse.

Case: A 3-year-old horse, weighing 460 kg, was admitted following chronic intermittent episodes of diarrhea and colic. Physical exam revealed mild abdominal pain and liquid/pasty diarrhea. There was negative survey of gastrointestinal helminthes and microbiological analyses. Fecal sedimentation test revealed sand impaction. Surgical approach was opted for both accomplishment of the abdominal exploration and resolution of the impactation. The patient was anesthetized and positioned in dorsal recumbency. Laparoscopy was performed through an 11-mm trocar placed right cranially to the umbilicus. There were no apparent adhesions, bowel inflammation nor visceral displacement. A 15-cm celiotomy was carried out caudally to the umbilicus, under laparoscopic guidance, for initial inspection of the gastrointestinal tract. Incision enlargement was required for exteriorizing the pelvic flexure. Afterwards, enterotomy was carried out for drainage of the impacting content, followed by enterorrhaphy. The pelvic flexure was rinsed with heparin diluted in normal saline (5 IU/ml) for prophylaxis of postoperative intraperitoneal adhesions. The pelvic flexure was repositioned within the abdominal cavity, followed by withdrawn of the trocar, synthesis of the muscle layer, approximation of the subcutaneous tissue and usual skin suture. Overall surgical time was 64 min and the patient recovered uneventfully from anesthesia. Convalescence was excellent and the patient presented a short-term mild abdominal pain in the early postoperative period, using the visual analogue scale (VAS). The wound healed uneventfully following two weeks and no postoperative complication was noted.

Discussion: Sand impaction a gastrointestinal disorder common in horses bred in sandy soil or subjected to poor quality water source, usually from streams or ponds. The aspect of the feces is an important parameter for the diagnosis, which is accomplished using the fecal sedimentation test. Intraperitoneal adhesions may affect the equine gastrointestinal tract following abdominal surgery or inflammatory disorders, with a predilection not only for anastomosis or enterotomy sites, but also in cases of acute enteritis and impactions. Laparoscopy provided optimal observation of the abdominal cavity and close examination of the intestines for discharging the presence of inflammation-related intraperitoneal adhesions in this case. The laparoscopic-assisted approach to the pelvic flexure reduced the length of the surgical wound, while minimizing the likelihood of adhesion formation and preventing incision complications which are common complications following abdominal surgery in horses. The reduced celiotomy minimized postoperative pain, which has been one of the main efforts of surgeons for enhancing convalescence of patients undergoing exploratory celiotomy. The patient showed no relapsed or painful discomfort and had great recovery and healing, demonstrating that the technique can be applied in equine surgical clinic routine.

Keywords: endosurgery, video-assisted approach, colic, sediment, colt.
INTRODUCTION

Colic syndrome is one of the most important distresses that affect horses, which is characterized by several degrees of abdominal discomfort, most commonly originated of gastrointestinal pain [10]. Despite equines are very selective regarding food intake, improper extensive handling/management may predispose to sand ingestion, either by poor quality water or forage. Sand may fill the intestines causing impaction [13]. The most common site of impaction is the pelvic flexure, right in the proximal transition from right dorsal colon to the transverse colon or small colon, due to natural narrowing of the colonic lumen [2].

Laparoscopy is a minimally invasive technique that allows visualization of the abdominal cavity, causing less trauma compared to conventional abdominal surgical approaches by either laparotomy or celiotomy. Using the median ventral approach, a wide view of the organs of the abdominal cavity of horses is reached [12].

In this context, the purpose of this report was to describe a case of successful treatment of pelvic flexure sand impaction in a horse using laparoscopic-assisted approach.

CASE

A 3-year-old Manga Larga Paulista colt, weighing 460 kg, was admitted following a 4-month corse chronic diarrhea and intermittent episodes of acute abdomen. Physical examination revealed mild abdominal pain and liquid/pasty diarrhea. The patient presented no major cardiovascular compromise nor dehydration. There was negative survey of gastrointestinal helminthes and microbiological assessment. Fecal sedimentation test attested sand impaction. Surgical approach was considered for both abdominal diagnostic exploration and draining the sand sediment.

Following a 12-hour food and water fasting, the patient was premedicated using xylazine hydrochloride (Rompun® - 0.8 mg/kg). Anesthesia was induced after 15 min using an association of guaifenesin (Guaifenesina - 100 mg/kg) and of ketamine hydrochloride (Dopalen - 1 mg/kg) and maintained using isoflurane (Isofluorano®), vaporized in 100% oxygen, following tracheal intubation. Then, proceeded aseptic preparation of the ventral abdomen, followed by infiltrative local anesthetic block using 4 mL of lidocaine hydrochloride without vasoconstrictor (Lidovet®) at the portal site and 20 mL at the celiotomy site.

The patient was placed in dorsal recumbency, without no table tilting. The procedure was performed following insertion of a 11-mm trocar (EndoTIP®) right cranially to the umbilicus, using the open technique. A 8-mmHg CO₂ pneumoperitoneum was created using an automatic insufflator adjusted to a 5-L/min flow rate. A 10-mm 30° laparoscope was inserted through the port for prior inspection. Subsequently, a 15-cm incision was carried out right caudally to the umbilicus for the handling and exposure of the intestines (Figure 1A and 1B).

There were no adhesions, bowel inflammation or visceral displacement on laparoscopic examination. After evaluation of the gastrointestinal tract, the celiotomy was enlarged to 20 cm in order to exteriorize the pelvic flexure under laparoscopic guidance, followed by enterotomy and drainage of the sand sediment (Figure 2A). Following enterorrhapsy, the pelvic flexure was rinsed with heparin sterile normal saline (5 IU/mL) in order to prevent intraperitoneal adhesion formation. The pelvic flexure was repositioned within the abdominal cavity, the trocar was withdrawn and synthesis was carried out in three layers: (1) muscle/linea alba in cross mattress; (2) subcutaneous tissue in inverted cross mattress and; (3) skin in interrupted horizontal mattress pattern (Figure 2B).

Overall surgical time was 64 min. The patient recovered uneventfully from anesthesia. Convalescence was considered excellent in the early postoperative period. The patient presented a short-term mild abdominal pain, which was detected using the visual analogue scale (VAS), receiving flunixin meglumine (Banamine® Injetável - 1.1 mg/kg, IM), ceftiofur (Bioxell - 2.2 mg/kg, IM) and benzatin G penicillin (Benzapen® - 40,000 IU) after surgery.

Surgical wounds healed uneventfully after two weeks and no other postoperative complication was reported. The patient was discharged.

DISCUSSION

Despite advances in the general management of horses, colic syndrome is still the leading cause of morbidity and mortality on the equine species. About 4-10% of a horse population may present several clinical manifestations of acute abdomen per year. Sand impaction is a gastrointestinal disease related to horses bred in sandy soil, or ingestion of water from streams or ponds. Its prevalence may reach 1% to 11%, depending on the geographical area assessed [3].

Figure 1. Patient positioned in dorsal recumbency without table tilt. A pre-umbilical laparoscopic portal was established in the midline, (A). Celiotomy for laparoscopic-assisted inspection of the abdominal cavity (B).

Figure 2. Equine patient submitted to laparoscopic-assisted exposure of the pelvic flexure, followed by enterotomy and sand sediment retrieval (A). The 15-cm wound in seen on the early postoperative period (B).

The fecal content appear to be a significant parameter in diagnosis of sand impaction in horses when associated with other types of obstructive and non-obstructive acute abdomen [4]. The sedimentation test was decisive for the diagnosis of the disease and decision to perform surgery in the current case report.

Intraperitoneal adhesions may affect any intestinal segment, involving not only sites of anastomosis or enterotomy, but also following cases of acute enteritis [14]. Laparoscopy was efficient because provided a general observation of the abdominal cavity, close examination of the intestine and discard the possible presence of intraperitoneal adhesions in this case, which could impair laparoscopic-assisted access to the pelvic flexure.

Another potential advantage of laparoscopic-assisted access was the exposure of the pelvic flexure through a reduced celiotomy. Such approach could minimize the formation of adhesions and decreased trauma to the peritoneum compared to open surgery, as it reduces the contact with foreign bodies, such as glove talc and cotton lint from gauzes and sponges, and keeps the abdominal environment in adequate humidity preventing peritoneal desiccation [8,14].

Incision-related complications are one of the main concerns in abdominal surgery on the equine specie. Evisceration following enterotomy or enterectomy is common [1,7]. A Laparoscopic-assisted approach resulted in decreased surgical access to the pelvic flexure. It is believed that a reduced celiotomy presents lower risk of herniation or evisceration than conventional approach. Besides complete resolution, postoperative pain was reduced and convalescence was uneventful. Pain control is an essential component of post-surgical management of patients undergoing exploratory celiotomy [5,14].

In conclusion, laparoscopic-guided celiotomy was feasible and provided adequate access to the pelvic flexure, as well as decreased postoperative pain. Moreover, laparoscopic-assisted celiotomy should be considered as an alternative to conventional approach for exposure of the pelvic flexure in the equine routine setting.

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REFERENCES