Strangulating lesions of the small intestine associated with the greater omentum in horses: 29 cases (2005-2018).

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Introduction

Although strangulating lesions as incarceration of the small intestine in the epiploic foramen have extensively been described, less is known about other strangulating lesions associated with the free part of the greater omentum. Only a few studies have reported small intestine strangulation by omental adhesions (1), omental herniation (2) or a rent in the greater omentum (3). These studies reported only a few cases and none of them compared the variety of different types of lesions related to the greater omentum and their outcomes.
Therefore the objectives of this study are to describe clinical presentation, surgical findings, prevalence, and postoperative outcome for small intestine strangulating lesions associated with the greater omentum in a larger case series.

Materials and methods

Medical records of horses that underwent exploratory laparotomy for abdominal pain between January 1, 2005 and December 31, 2018 were reviewed. Horses diagnosed with strangulating lesions of the small intestine associated with the greater omentum were included.
Recorded information included breed, sex, age, weight, initial physical examination findings (heart rate and respiratory rate), clinical laboratory values, presence or absence of nasogastric reflux and findings identified through palpation per rectum. If abdominal ultrasonography and abdominocentesis were performed, their results were reviewed.
Intraoperative data recorded included the type of lesion, the affected segment of intestine (jejunum, ileum, or both), the length of the affected segment, the surgical procedure and the length of resected intestine.
Postoperative complications were categorized and recorded: none, diarrhea, ileus, incisional infection. Ileus was defined as the presence of >20 litres of nasogastric reflux in 24 hours or > 8 litres at any single sampling. Diarrhea was defined as soft or liquid fecal emission at least three consecutive times. Incisional infection was defined as purulent discharge from the abdominal wound.
The outcome statuses were categorized as (i) euthanized during surgery, (ii) euthanized or dead after the surgery or (iii) discharged.

Statistical analysis

Data regarding breed, sex, weight and age of horses with strangulating lesions of the small intestine associated with the greater omentum were compared with those for the population of horses without strangulating lesions associated with the greater omentum that underwent exploratory laparotomy during the same period. Those data were also compared amongst themselves for each type of strangulating lesions (direct strangulation, omental rent, pedunculated lipoma-like structures, adhesions). An independent *t*-test was used to identify differences in age between groups. A Pearson X^2 test was used to identify differences in sex between groups. Because of small sample numbers, a Fisher exact test was used to determine differences in breed between groups. Analyses were performed with standard software; a *P* value < 0.05 was considered significant for all comparisons.

Results

A total of 1284 horses underwent exploratory laparotomy for colic between January 1, 2005 and December 31, 2018. A small intestine lesion (strangulating and non-strangulating) was present in 49.8% (639/1284) with 85.8% of those (548/639) being strangulating lesions; 5.3% (29/548) of these strangulating lesions were associated with the greater omentum. Strangulating lesions of the greater omentum occurred in 2.3% (29/1284) of all horses undergoing exploratory laparotomy and represented 4.5% (29/639) of all horses with primary small intestinal lesions.

There were no significant differences between sex, breed, weight or age of horses with strangulating lesions of the small intestine associated with the greater omentum and those of the population that underwent exploratory laparotomy for other types of colic. Clinical findings at admission, blood parameters, paracentesis analysis, rectal palpation and transabdominal ultrasound findings were in agreement with the abnormalities described for strangulating or non- strangulating small intestine lesions depending on the case. Relation to the greater omentum was only diagnosable through surgery.
The results of the surgical findings are summarized in table 1.
Adhesions between the greater omentum and a segment of small intestine or its mesentery (13/29 (45%)) caused direct strangulation of the small intestine (3 horses), secondary volvulus of the small intestine around adhesions (5 horses), incarceration of the small intestine into an omental loop formed by adhesions (2 horses) or a mass formed by adhesions and greater omentum in which small intestine was incarcerated (3 horses). In these 13 horses, enterectomy was performed in 4 cases. Anastomosis techniques included jejunojejunostomy (3/4) and 1 jejunoileostomy (1/4).
Pedunculated lipoma-like masses (7/29 (24%)) were defined as omental masses with a pedicle arising from the greater omentum. The segment of strangulated small intestine was jejunum (6 horses), or jejunum and ileum (1 horse). In 5 cases the length of the strangulated small intestine was recorded, the mean size was 120 cm (range, 20 to 300 cm). In the 3 horses that survived the surgery, resection and anastomosis (jejunojejunostomy (2/3) and jejunoileostomy (1/3)) of the intestine were performed.
Direct strangulation of the small intestine by the greater omentum (6/29 (21%)) involved the ileum in 4 cases and jejunum in 1 case. For 1 horse, the involved portion of the small intestine was not recorded. Enterectomy was performed in 4 cases (1 jejunojejunostomy, 1 jejunoileostomy and 2 jejunocaecostomies).
Incarceration through an omental rent (3/29 (10%)) concerned the jejunum in 1 case and 40 cm of ileum in another case. Details were not specified in 1 case. The 3 horses were discharged and resection and anastomosis was performed in 1 case (anastomosis technique was not recorded).
When euthanasia was elected during surgery (11/29), reasons included severe and extensive lesions with no possibility of viable enterectomy (5/11), requirement to perform a jejunocaecostomy associated with a lower prognosis (3/11), financial issue (2/11) and severe peritonitis (1/11).
Of the 18 horses that recovered from anesthesia, 67% (12/18) developed postoperative complications including ileus (12 horses), diarrhea (3) and incisional infection (2).
Fifteen horses were discharged from the hospital with a mean of 17 days after surgery (range, 7 to 49 days). The short-term survival rate was 52% [15/29]). Specific short-term survival rate according to the lesion subtype is shown in table 1. Omental lipoma-like masses seem to have a poorer prognosis.

Discussion

This study is the first to report a series of strangulating lesions of the small intestine associated with the greater omentum in horses. Strangulation of small intestine associated with the greater omentum is a life-threatening condition in horses, that can only be diagnosed during surgery.
Our study highlights the diversity of omental pathologies leading to strangulation of the small intestine, the lack of specific clinical presentation and the absence of identified risk factors in the signalment. Limitations of our study include its retrospective rather than prospective nature. Because of its retrospective nature some data were not recorded.
While omental involvement causing small intestine strangulation is rare, it should be considered as a differential diagnosis in cases with clinical findings suggestive of small intestine strangulation. Omentectomy could be considered as a preventative method to limit occurrence or recurrence when an exploratory laparotomy is performed.

References

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Table 1: Lesions and short-term survival rate

Lesion	Number of horses	Euthanized at surgery	Euthanized post-surgery	Discharged
Strangulation by omentum	6	0 (0%)	2 (33%)	4 (67%)
Omental rent	3	0 (0%)	0 (0%)	3 (100%)
Omental lipoma-like mass	7	4 (57%)	1 (14%)	2 (29%)
Omental adhesion	13	7 (54%)	0 (0%)	6 (46%)
Total	29	11 (38%)	3 (10%)	15 (52%)