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Case Report

Peritonitis, as a Result of a Retrograde Postoperative Incisional Infection

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ABSTRACT

An 8-year-old Quarter Horse × walking horse cross mare was referred for treatment of septic pedal osteitis and subsequently developed a cecal impaction which was resolved surgically. Postoperative enteritis and incisional drainage developed in the short-term postoperative period. One month postoperatively, the mare developed an acute septic peritonitis with *Streptococcus equi zooepidemicus* that was likely a sequela to the incisional infection. Systemic antibiotic therapy and peritoneal lavage were instituted; however, repeated culture and sensitivity of the abdominal fluid revealed a multidrug resistant *Escherichia coli*. In the face of antibiotic treatment failure, medical grade *Phaenicia sericata* larvae were placed into the abdomen to be used as a biological debriding agent. Clinical improvement was seen for 6 weeks, until the mare was euthanized due to a small intestinal strangulating lesion. Additionally, this case report is a description of the novel use of medical maggots in the treatment of a multidrug resistant peritonitis in a horse.

1. Introduction

Septic peritonitis is a complication after abdominal surgery and typhlotomy in horses and typically results in polymicrobial sepsis, predominantly with gram negative enteric bacteria [1–3]. The overall prevalence of septic peritonitis after colic surgery is reported to be 3.1% [3] to 11% [4]. Wound complication rates after a single initial laparotomy vary from 7.4% [5] to as high as 37% [6], with higher rates of wound suppuration reported in horses that had cecal or large colon obstruction, enterotomy [6,7], or postoperative peritonitis [3]. Abdominal contamination and peritonitis may lead to prolonged incisional drainage; however, little evidence exists in the literature that supports septic peritonitis as a result of a retrograde postoperative incisional infection. Formation of extraperitoneal incisional abscesses after colic surgery has been reported in three horses; however, in these cases, the abscesses invaded the rectus abdominis muscle and did not penetrate into the peritoneum [8]. This report describes the surgical and postsurgical management of an 8-year-old Quarter Horse × walking horse cross mare which developed a septic peritonitis likely resulting from an ascending incisional infection. Additionally, this case report describes the novel, off-label use of medical grade maggots as a biological debriding agent in the treatment of a multidrug resistant peritonitis in a horse.

2. Case Report

2.1. History

An 8-year-old Quarter Horse × walking horse cross mare initially presented for chronic septic pedal osteitis in the left forelimb and was treated with surgical debridement of the distal phalanx under general anesthesia. Perioperative antibiotics with cefazolin (11 mg/kg bwt IV, q8 hours; SAGENT Pharmaceuticals, Inc, Schaumburg, IL) and gentamicin (GentaFuse; 6.6 mg/kg body weight IV;

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Sparhawk Laboratories, Inc, Lenexa, KS) were given. After recovery from anesthesia, the mare was maintained on flunixin meglumine (Banamine; 1.1 mg/kg bwt, IV, q12 hours; Intervet Inc, Merck & Co Inc, Whitehouse Station, NJ) and lidocaine hydrochloride (Lidocaine 2% Injection; 0.05 mg/kg/min; Hospira, Inc, Lake Forest, IL), and butorphanol (Torbugesic; 0.01 to 0.02 mg/kg bwt IV or IM; Fort Dodge Animal Health, a Division of Wyeth, Pfizer Inc, New York, NY) was given as needed for additional analgesia. An intravenous regional limb perfusion was performed with cefazolin and morphine (Morphine Sulfate Injection; West-Ward, Eatontown, NJ) at the time of surgery and then repeated 2 days later.

Two days after her surgical debridement of P3, the mare was observed to show mild-to-moderate colic signs (decreased appetite, reduced fecal output, increased recumbency, inappetence, and infrequent rolling) and was subsequently diagnosed with a cecal impaction on rectal palpation. The mare was initially treated with intravenous and enteral fluids; however, because of unrelenting pain, surgical intervention was elected.

2.2. Surgical Procedure

Antimicrobial therapy with cefazolin and gentamicin was maintained. The patient was premedicated with xylazine (AnaSed; 1.1 mg/kg bwt IV; Akorn, Inc, Decatur, IL) and butorphanol. General anesthesia was induced with ketamine (Ketaset; 2.2 mg/kg bwt IV; Boehringer Ingelheim Vetmedica, Inc, St. Joseph, MO) and diazepam (Diazepam injection; 0.05 mg/kg bwt IV; Hospira, Inc) and maintained with isoflurane (1.5% to 3%; Piramal Healthcare Limited, Digwal Village, Andhra Pradesh, India) and oxygen (5 L/min). A routine 30-cm ventral midline celiotomy was performed which revealed a markedly enlarged cecum filled with hard ingesta. The cecal apex was exteriorized, isolated with laparotomy sponges, and draped with a sterile plastic sheet. A routine typhlotomy was performed. Ingesta were removed by lavaging the cecum with water administered using a nasogastric tube and bilge pump inserted through the typhlotomy site. The typhlotomy was closed with 2-0 Polydioxanone suture using a simple continuous pattern, which was oversewn with 2-0 Polydioxanone in a Cushing pattern. The cecum was lavaged with sterile 0.9% saline solution, containing 500-mg gentamicin per liter and 5×10^6 IU potassium penicillin (PfizerPen; Roerig, Division of Pfizer, Inc, New York, NY), before being replaced into the abdomen. The surgeons replaced gowns and gloves, redraped the surgical field, and lavaged the abdomen with 5-L sterile 0.9% saline solution which was removed by suction. Gross contamination during or after the typhlotomy was not appreciated; and therefore, abdominal drains were not deemed necessary. A final liter of sterile 0.9% saline solution containing 500-mg gentamicin per liter and 5×10^6 IU potassium penicillin was left in the abdomen. The linea alba was sutured with No. 3 Polygalactin 910 in three segments using a simple continuous pattern, and the subcutaneous tissue was apposed with 2-0 Polydioxanone suture using a simple continuous suture pattern. The skin was apposed with stainless steel staples. The incision was protected during recovery by the placement of an adherent absorbent dressing (Telfa pad). After recovery, a clean belly bandage, consisting of sterile cotton padding held in place with adhesive bandage material (Elastikon), was placed to protect the incision site from external contamination.

2.3. Postoperative Course

Recovery from anesthesia was uneventful, and postoperative antibiotic therapy was continued with cefazolin (11 mg/kg bwt IV, q8 hours) and gentamicin (6.6 mg/kg bwt IV, q24 hours) in the immediate postoperative period; however, 48 hours after surgery, the patient developed anterior enteritis, as evidenced by an elevated temperature (103.4°F), moderate signs of endotoxemia, significant volumes of serosanguinous nasogastric reflux, segmental intramural edema, and thickening of the small intestine (4.5 to 9 mm; Figs. 1 and 2). The horse was treated with continuous infusion IV of balanced polyionic fluids, lidocaine hydrochloride (0.05 mg/kg/min), metoclopramide (0.04 mg/kg/hr; Teva Parenteral Medications, Inc, Irvine, CA), and partial parenteral nutrition (lactated Ringer solution containing 500 mL of 50% dextrose and 500 mL of aminosyn [Aminosyn II 10%; Hospira, Inc]) at 0.5 to 1 L/hr, for 4.5 days. Polymyxin B for injection (5,000 U/kg bwt IV, q8 hours; X-GEN Pharmaceuticals Inc, Big Flats, NY) and sodium heparin (40 U/kg bwt sub cut, q8 hours; SAGENT Pharmaceuticals, Inc) were administered for 2 days. Enrofloxacin (Baytril 100; 7.5 mg/kg bwt IV, q24 hours; Bayer Healthcare LLC, Animal Health Division, Shawnee Mission, KS) was administered for 5 days for treatment of anterior enteritis. Nasogastric reflux ceased after 48 hours of enrofloxacin therapy.

Incisional drainage was noted 5 days after the celiotomy (Fig. 3) at which point the skin staples around the points of suppuration were removed to facilitate drainage, and a hernia belt with sterile cotton padding adjacent to the incision was placed to allow for daily bandage changes. Incisional ultrasound showed a hypoechoic area in the subcutaneous tissues at the cranial aspect (2-cm caudal to the cranial extent of the incision) and at the middle aspect of the incision (4-cm caudal to the caudal draining site). Palpation of the incision with sterile gloves revealed no defect in the abdominal wall; however, through palpation

Fig. 1. (Day 3 postceliotomy) This longitudinal image of a small intestinal loop, located in the left ventral flank region, demonstrates a wall that is thickened and edematous, consistent with anterior enteritis. Note there is scant amount of free peritoneal fluid, and the serosal surfaces of the intestine appear smooth.