

Surgical correction of small colon faecalith in a Dare-Shuri foal

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Abstract: A 6-month-old male Dare-Shuri foal was admitted for acute abdominal pain unresponsive to medical treatment. The foal was anxious and exhibiting signs of abdominal pain. The foal had not defecated in the previous 5 days and severe abdominal distension was present. Based on clinical signs and the results of the diagnostic work-up, gastrointestinal obstruction was suspected. Midline exploratory celiotomy revealed a faecalith in the small colon. A longitudinal incision was made through the antimesenteric border of the involved intestine and an approximately 350 g mass mostly composed of dried roughage was removed. The day after surgery, intestinal sounds were detectable; the foal defecated and had good appetite during the 9 months of follow up.

Key words: Colic, small colon, faecalith, Dare-Shuri foal

Introduction

Colic is one of the most common problems in equine practice. It has a significant economic impact on the racehorse industry and is a major concern for owners (1-3). Equine colic can be divided into 2 major categories: gastrointestinal and non-gastrointestinal (2). Gastrointestinal colics can be caused by different conditions, ranging from a harmless spasmodic colic to a life-threatening strangulating obstruction (4). Disorders of the large intestine are frequent causes of equine colic. Simple obstruction of the small colon in horses cause colic, and includes intramural obstruction by foreign material, and abnormal accumulation of ingesta, meconium, fibrous material, and enteroliths (5,6). Stricture and intussusception of the small colon are observed but are uncommon (7). Medical and surgical management of small colon obstruction has

been described (6,8). Simple intramural obstructions caused by fibrous foreign bodies, enteroliths, phytobezoars, trichobezoars, and phytoconglobates are managed successfully by the use of enterotomy. Impactions of the small colon involve large portions of it and are composed of firm, tenacious material. Early medical management has been successful, but long standing impactions may require surgery (6). Faecalith impaction of the small colon is a common finding in miniature breed foals (9). With the exception of miniature breed foals, faecalith impaction of the small colon is an uncommon finding in foals (10). Dare-Shuri is a draft breed horse. To the best of our knowledge, no report has been published describing faecalith impaction of the small colon in a Dare-Shuri foal. The present report describes the assessment and treatment of a Dare-Shuri foal with a small colon impaction.

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Case history

A 6-month-old male Dare-Shuri foal weighing about 180 kg was referred for exhibiting signs of abdominal pain. The first episode of colic had started the previous day with stretching, looking at the flanks, and rolling, and no defecation or urination was seen by the owner. The foal was being kept with her mother, drinking milk and eating dried alfalfa and wheat hay and had been treated for a gastrointestinal parasite with febantel (6 mg/kg, PO) about 4 months before. In the clinical examination, increased heart and respiration rate (92 beats/min and 42 breaths/min, respectively) and decreased borborygmy sounds were obvious. Temperature was 39 °C and the mucus membrane was pink with a capillary refill time (CRT) less than 2 s. A nasogastric tube revealed no gastric reflux. The small size of the foal did not permit a rectal examination of the gastrointestinal tract. Blood samples were obtained for haematological and serum biochemical analysis, which showed a packed cell volume (PCV) of 41% and a total plasma protein (TPP) of 78 g/L (reference range: 63-70 g/L). Abdominocentesis was performed using a teat cannula. The peritoneal fluid was clear and had mild elevation of total protein to 25 g/L (normal range: <20). Based on clinical findings, the common treatment for colic including flunixin meglumine (1.1 mg/kg, i.v., every 12 h), saline 0.9% and dextrose 5% serum (30 mL/kg, i.v.), mineral oil (1.5 L, every 12 h) in warm water plus O.R.S. powder (1 packet, every 12 h) via a nasogastric tube was administered. After treatment, the colic signs were relieved and the foal normally urinated but did not defecate. The foal was brought to the veterinary hospital showing lateral recumbency and severe abdominal distension. On examination, heart rate was above 120 beats/min and respiration rate was 66 breaths/min accompanied by groaning. The mucous membrane was red and CRT was about 4 s. Abdominal distension was symmetrical and a ping sound was heard. Based on clinical signs, trocarisation was performed through the right paralumbar fossa with a 14 gauge needle. After decompression of the gas, the foal was able to stand and suckled her mother's teat and TPR returned to normal values. On the third day, the foal was referred again for recurrent colic signs. Heart rate and respiratory rate were high (88 beats/min and 48

breaths/min, respectively), and the mucus membrane was pink and CRT was less than 2 s. The foal had not passed any faeces within the previous 4 days but had drunk a little water and had urinated. In addition to the previous treatments, enema with mineral oil in warm water was also performed several times. Due to the lack of responses to medical treatment and progressive abdominal distension and prolonged course of the disease, large intestinal obstructive lesions including impaction, simple (non-strangulating) displacement of the large colon, and chronic intussusception without vascular compromise were suspected and the colicky foal was referred for surgery.

The treatment given preoperatively consisted of intravenous administration of a balanced electrolyte solution and analgesics (xylazine HCl). An exploratory celiotomy under general anaesthesia with the horse in dorsal recumbency was performed. The foal was pre-medicated using 1 mg/kg of 2% xylazine HCl. Anaesthesia was induced with 5% ketamine (2 mg/kg) plus diazepam (0.05 mg/kg) and was maintained with O₂-halothane delivered by a large animal circle system. The foal received balanced intravenous fluid including Ringer's and lactated Ringer's as well as saline and dextrose solutions during surgery. Due to severe abdominal distension, the horse was placed in a semi-dorsal position in order to reduce the pressure on the diaphragm. Once the peritoneal cavity was entered, the foal was repositioned to dorsal recumbency.

Results and discussion

The peritoneal fluid was clear. The caecum was noted to be markedly distended with gas. Following decompression of the caecum, exploration of the abdominal cavity revealed small colon impaction by a large faecalith (Figure 1). The intestinal wall was normal and showed no sign of devitalisation. The bowel proximal to the obstruction was distended due to gas and fluid accumulation. The identified mass was so hard and dry that kneading or softening would damage the intestinal wall. The small colon was exteriorized, placed on sterile celiotomy towels, and an approximately 12 cm longitudinal incision was made through the antimesenteric border of the



Figure 1. The site of impaction in the small colon.

involved intestine. An approximately 350 g mass mostly composed of dried roughage was removed (Figure 2). Then the incision was sutured in 2 inverting layers using polyglactin 910 suture material. The midline incision was sutured with an absorbable suture material (Vicryl, No. 2) in a simple interrupted pattern. The fascia was apposed using absorbable suture material and the skin was sutured with non-absorbable suture material (Nylon, No. 2) in a simple interrupted pattern. The foal made an uneventful recovery. Postoperative treatment included ceftriaxone sodium (50 mg/kg, i.v., every 12 h), flunixin meglumine (1.1 mg/kg, i.v., every 12 h), and mineral oil (1.5 L, every 12 h). The day after surgery, intestinal sounds were audible on auscultation of the abdomen; the foal defecated and had good appetite. The foal was discharged 3 days after surgery and followed up every week to 2 months after surgery and every month to 9 months postoperation.



Figure 2. Faecalith removed from the small colon.

Impaction colics are commonly encountered in equine practice (11). Sites of impaction can include the large colon (particularly at the pelvic flexure or just proximal to the transverse colon), stomach, small intestine, caecum, small colon, and less commonly, the rectum (11,12). In mature horses the most common cause of impactions of the small colon is faecalith (2). Impaction with faecalith is not very common in foals (9,13). However, faecalith impaction of the small colon is reported frequently in miniature breed foals (10). The high prevalence of descending colon faecaliths in miniature breeds has been suggested to result from a variety of factors, including low water intake, poor quality roughage, inadequate mastication, dental disease, foreign body ingestion, and small colon stasis or dysfunction (12,14).

Some predisposing factors such as poor quality roughage and low water intake have been noted in the history of the colicky foal in this report. Clinical and laboratory findings associated with impaction are variable, depending on the location, severity, and the duration of impaction. Clinical signs of colic include lack of faecal production, sweating, inappetence, and reduced borborygmi. Abdominal pain may be due to excessively distended intestine, tension on mesentery, intestinal incarceration or twisting, and inflammation (enteritis or peritonitis). Following intestinal distension either by gas, fluid, or ingesta, stretch-sensitive receptors located within the intestinal wall will be stimulated and transmit pain impulses to the brain (15).

Gastrointestinal sounds may be diminished or may increase with each episode of colic (11). The duration of the colic episode, severity of the pain, the response to treatment, deworming history, any changes in diet, and cardiovascular status are important information for an appropriate diagnostic approach. Assessment of the cardiopulmonary system includes evaluation of the mucous membrane (colour, moistness, and CRT), heart rate, and hydration status. High heart rate, prolonged CRT, and discoloration of the mucous membrane reflect the degree of circulatory shock (15). Peritoneal fluid analysis showed mild elevation of total protein without any changes in the colour of fluid. A correlation between elevated peritoneal total protein and intestinal strangulating obstructions has been reported (16).

Ultrasonographic examination of the foal abdomen can demonstrate intussusceptions, the presence of excessive peritoneal fluid, oedematous intestine, hernias, and colonic impactions. Lesions involving the caecum and large colon may be imaged from the ventral abdomen (15). The small colon can be imaged via trans-rectal ultrasonography in adult horses. In diagnosing the problem in the present case the authors could have benefited from ultrasonography, but it was not used in the field situation, due to lack of facilities. The emergency situation of the foal did not allow us to perform ultrasonography at the time of presentation to the hospital.

Passing a nasogastric tube will help prevent fluid or gas accumulation in the stomach, which may result in gastric rupture. The foal had unlimited access to water before surgery. The reason that the foal's general condition did not deteriorate very fast is the location of the impaction. Since the impaction site was within the small colon the liquid could have absorbed through the small intestine proximal to the obstruction site. Furthermore, gastric material reflux did not occur following nasogastric intubation in this foal. Rectal examination, the most definitive part of the clinical examination, is not usually possible in foals due to size limitation.

Medical management of impaction colics consists of pain relief, fluid therapy, and intestinal lubricant and laxatives. The most commonly used analgesics for abdominal pain are non-steroidal anti-inflammatory drugs (NSAIDs) (flunixin meglumine and dipyrone), α_2 -agonists (xylazine and detomidine), and opioids (butorphanol). Flunixin meglumine is also used to protect against endotoxaemia in colic. Fluid therapy is necessary in most horses with colic in order to counteract dehydration and restore tissue perfusion. Fluids may be given i.v. or p.o. through a nasogastric tube for cardiovascular support and hydration of luminal contents. Oral fluid is contraindicated in horses with small intestine obstruction or if fluid reflux is being removed from the stomach.

This foal had been treated several times with mineral oil for its laxative effect, which was ineffective, because of the size of the faecalith. Lubricants given through a nasogastric tube may soften the impacted ingesta, allowing its normal

movement along the GI tract. Patients are usually kept off feed until the faecalith is passed (12). Abdominal distension is an important criterion for distinguishing whether the horse is treated surgically. Abdominal distension may be more severe in horses/foals with complete obstruction of the small colon or in horses/foals with longer duration of clinical signs of disease. Abdominal distension may lead to more severe signs of abdominal pain and worsening of cardiovascular status. In order to prevent severe gas and fluid accumulation in the bowel and consequent cardiorespiratory deterioration, trocarisation was performed. The needle is inserted through the skin and advanced into the abdomen until there is an expulsion of gas through the trocar. The trocar should be kept in position as long as gas is escaping. It may be necessary to replace the needle as the bowel is decompressed and moves away from the trocar. The procedure is reasonably safe but will cause inflammatory changes in the peritoneal fluid. The major danger is laceration of the colon or caecum and leakage of ingesta. It is advisable to administer systemic antibiotics to horses that have been trocarised (15).

Surgical intervention is indicated when signs of abdominal pain become refractory to supportive medical management and analgesic administration, when there is increased tympany, or when vital parameters and laboratory data indicate deterioration or bowel compromise (17). Factors influencing surgical outcome include single vs. multiple sites of impaction, duration of impaction prior to surgical intervention, concurrent displacements or torsions, volume of faecalith, and incidence of postoperative complications (17,18). Postoperative complications that have been reported following surgical management of impactions include diarrhoea, peritonitis, and incisional herniation (12,17,18). Our foal experienced no complication after surgery, and the following day postsurgery the foal defecated and had good appetite with sound audible enteric movements. We advised the owner to reduce the amount of low quality roughage and to include essential minerals in the diet in order to increase feed digestibility in general.

This case was reported because it illustrates some important considerations when dealing with cases of

colic in foals. The occurrence of faecalith obstruction of the small colon in large breed foals should also be considered along with other causes that seem to occur more frequently. Medical management used for feed

impactions cannot always be helpful. Faecalith impactions should probably be considered a surgical condition in large breed foals as well as any other breed.

References

1. Parry, B.W.: Prognostic evaluation of equine colic cases. *Compend. Contin. Educ. Pract. Vet.*, 1986; 8: 98-104.
2. Smith, B.P.: *Large Animal Internal Medicine*. 3rd edn., St. Louis, Mosby, 2002; 108-111.
3. Singer, E.R., Smith, M.A.: Examination of the horse with colic: is it medical or surgical? *Equine Vet. Educ.*, 2002; 14: 87-96.
4. Van Der Linden, M.A., Laffont, C.M., Sloet van Oldruitenborgh-Oosterbaan, M.M.: Prognosis in equine medical and surgical colic. *J. Vet. Intern. Med.*, 2003; 17: 343-348.
5. Keller, S.D., Horney F.D.: Diseases of the equine small colon. *Compend. Contin. Educ. Pract. Vet.*, 1985; 7: 113-117.
6. Ruggles, A.J., Ross, M.W.: Medical and surgical management of small-colon impaction in horses: 28 cases (1984-1989). *J. Am. Vet. Med. Assoc.*, 1991; 199: 1762-1766.
7. Ross, M.W., Stephens, P.R., Reimer, J.M.: Small colon intussusception in a broodmare. *J. Am. Vet. Med. Assoc.*, 1988; 192: 372-374.
8. Archer, R.M., Parsons, J.C., Lindsay, W.A., Wilson, J.W., Smith, D.F.: A comparison of enterotomies through the antimesenteric band and the saccululation of the small (descending) colon of ponies. *Equine Vet. J.*, 1988; 20: 406-413.
9. McClure, J.T., Kobluk, C., Voller, K., Geor, R.J., Ames, T.R., Sivula, N.: Fecalith impaction in four miniature foals. *J. Am. Vet. Med. Assoc.*, 1992; 200: 205-207.
10. Bernard, W.V.: Colic in the foal. *North Am. Vet. Conf. 2003, Large Animal*. Orlando, Florida, USA: 126-127.
11. Byars, T.D.: Management of impaction colics in the horse. *Equine Pract.*, 1993; 15: 30-34.
12. Dabareiner, R.M., White, N.A.: Large colon impaction in horses: 147 cases (1985-1991). *J. Am. Vet. Med. Assoc.*, 1995; 206: 679-685.
13. Gilroy, B.J., Bellamy, J.: Gravel impaction in a 2-year-old Morgan gelding. *Can. Vet. J.*, 1998; 39: 706-708.
14. Hughes, K.J., Dowling, B.A., Matthews, S.A., Dart, A.J.: Results of surgical treatment of colic in miniature breed horses: 11 cases. *Aust. Vet. J.*, 2003; 81: 260-264.
15. Radostits, O.M., Gay, C.C., Hinchcliff, K.W., Constable, P.D.: *Veterinary Medicine A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs, and Goats*. 10th edn., Saunders Elsevier, St. Louis, Missouri, 2007; 215-229.
16. Bernard, W.V.: Differentiating enteritis and conditions that require surgery in foals. *Compend. Contin. Educ. Pract. Vet.*, 1992; 14: 535-537.
17. Specht, T.E., Colahan, P.T.: Surgical treatment of sand colic in equids: 48 cases (1978-1985). *J. Am. Vet. Med. Assoc.*, 1988; 193: 1560-1564.
18. Ragle, C.A., Meagher, D.M., Lacroix, C.A., Honnas, C.M.: Surgical treatment of sand colic. Results in 40 horses. *Vet. Surg.*, 1989; 18: 48-51.