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## Surgical removal of enterolith in a horse at field level

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**Abstract**

The present study evaluated the case of colic in 4 year old mare for acute abdominal pain unresponsive to medical treatment. The mare was exhibiting signs of abdominal pain. The mare had not defecated in the previous 3 days and abdominal distension was present. Based on clinical signs, gastrointestinal obstruction was suspected. Midline exploratory celiotomy revealed an enterolith of approximately 250g concrete typed hard mass (Phytoconglobates) in the large colon and it was removed. The day after surgery, intestinal sounds were detectable; the mare defecated and had good appetite during the 3months of follow up.

**Keywords:** Colic, Large colon, Enterolith, Phytoconglobates

**Introduction**

Brinjal (*Solanum melongena* L.) also known as aubergine or eggplant, is an important Enteroliths are mineral masses that form in the colon of a horse. They are also known as intestinal stones or calculi. 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. The Stricture and intussusception of the small colon are observed but are uncommon. Simple intramural obstructions caused by fibrous foreign bodies, enteroliths, phytobezoars, trichobezoars and phytoconglobates are managed successfully by the use of enterotomy.

Usually these stones build up in thin layers around a bit of foreign matter (a small piece of wood, wire, hair, or other material) that the horse has swallowed. Although mineral content varies about 90% of a typical enterolith consists of struvite (a hydrous phosphate of magnesium and ammonia) and vivianite (a hydrous phosphate of iron). Combinations of sulfur, sodium, potassium, calcium, titanium, aluminum and nickel make up the remaining 10% (Byars, 1993) [4]. A horse may have one or more enteroliths ranging in diameter from pea-sized to softball-sized or larger. Some horses pass small enteroliths with their manure but masses larger than a golf ball usually causes recurring colic symptoms as passage of gut contents is impaired (Gilroy *et al.* 1998) [6]. Affected horses may show decreased appetite resulting in a drop in weight. Ultimately large stones lodge in the gut, frequently where the intestine narrows at the pelvic flexure or right dorsal colon and the gut wall begins to necrotize from abrasion and pressure (Specht *et al.*, 1988) [8]. Unless the stone is removed, the intestine eventually ruptures and the horse develops fatal peritonitis. When the problem is detected before the intestine perforates, about 95% of horses make a full recovery from surgery to remove the enterolith. The present case study describes the assessment and treatment of a Mare with a large colon impaction.

**Case history and Diagnosis**

A 4-year-old mare Lakshmi weighing about 450 kg was referred for exhibiting intermittent signs of abdominal pain with no intestinal motility with normal vital signs. Mild dehydration was noticed. Mucous membrane was pink and moist. Capillary refilling time (CRT) was 2 seconds with normal heart rate. The first episode of colic symptoms had started the previous day with stretching looking at the flanks and rolling with history of improper defecation or urination since three days. Based on clinical findings, a local veterinarian started the common treatment for colic including intravenous administration of flunixin meglumine followed by fluid therapy and mineral oil in warm water was administered with nasogastric tube. Due to the lack of responses to medical treatment and progressive abdominal distension and

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prolonged course of the disease, large intestinal obstructive lesions including impaction, simple displacement of the large colon and intussusception were suspected and the mare was recommended for surgery.

### Treatment

An exploratory celiotomy was performed under general anaesthesia with the horse in dorsal recumbency. The mare was pre-medicated using 1 mg/kg of 1.1% xylazine HCl. The Anaesthesia was induced with 5% ketamine (0.5 mg/kg). The mare received balanced intravenous fluid including Ringer's lactate, Normal saline solutions during surgery. The peritoneal fluid was clear. The caecum was noted to be markedly distended with gas. Due to continuous intubation of liquid paraffin, intestine was filled with more fluids. Further exploration of the abdominal cavity revealed large colon impaction by a enterolith of approximately 250 g concrete typed hard mass (Phytoconglobates) (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 large colon was exteriorized, placed on sterile celiotomy towels and an approximately 15 cm longitudinal incision was made through the antimesenteric border of the intestine and approximately 250 g mass was removed (Figure 2).



**Fig 1:** Identification of Foreign body



**Fig 2:** Removal of Foreign body

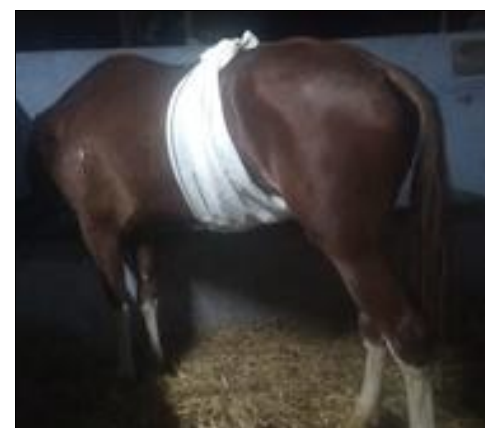


**Fig 3:** Position of large colon

Lambert followed by crushing type of suture was used to oppose the large colon incision site with synthetic absorbable Polyglycolic acid suture material (PGA) No. 2-0 (Figure 3). Simple interrupted type of suture was used to oppose the abdominal muscle using synthetic absorbable Polyglycolic acid suture material (PGA) No. 2. The skin was sutured with non- absorbable suture material (Fish net) in a horizontal mattress (Figure 4).



**Fig 4:** Opposition of Skin



**Fig 5:** Postoperative Condition of mare

Postoperative treatment included ceftriaxone sodium with sulbactam (4g SID) for first three days followed by benzyl penicillin (50 lakhs I.U X 2 vial) along with 20 ml of gentamicin (BID) for next three days, flunixin meglumine (5 ml BID) for seven days, metronidazole (500 ml BID) for five days, beplex forte (10 ml SID) along with fluid therapy (20 litres TID - 10 litres of Ringer's Lactate, 5 litres of Dextrose Saline, 5 litres of Normal Saline) for five days. Additionally chymoral forte tablet (Trypsin / chymotrypsin) (15 tablets BID) and silybon tablet (140 mg – 10 tablets BID) was advised for ten days. The regarding feeding schedule, we advised the owner to start green grass after sixth day of surgery and asked to allow the mare to drink the water from very next day of surgery. The Intestinal sounds were audible on auscultation of the abdomen on the next day of surgery. The mare defecated and had good appetite (Figure 5). After 20 days of surgery, skin suture (fish net) was removed after complete adhesion. The case was followed up every day to monitor postoperative recovery for a period of three months.

### Discussion

Impaction colic is commonly encountered in equine practice (Byars, 1993) [4]. 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 (Byars, 1993) [4], (Dabareiner *et al.*, 1995) [5]. In mature horses the most common cause of impactions of the small colon is faecolith (Smith 2002) [1]. Impaction with faecolith is not very common in foals (McClure *et al.*, 1992) [2], (Gilroy *et al.*, 1998) [6]. However, faecolith impaction of the small colon is reported frequently in miniature breed foals (Bernard *et al.*, 2003) [3]. The high prevalence of descending colon faecoliths 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 (Dabareiner *et al.*, 1995) [5], (Hughes *et al.*, 2003) [7]. 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). 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 (Specht *et al.*, 1988) [8]. Factors influencing surgical outcome include single vs. multiple sites of impaction, duration of impaction prior to surgical intervention, concurrent displacements or torsions, volume of faecolith and incidence of postoperative complications (Specht *et al.*, 1988) [8], (Ragle *et al.*, 1989) [9]. Postoperative complications that have been reported following surgical management of impactions include diarrhoea, peritonitis and incisional herniation (Dabareiner *et al.*, 1995) [5], (Specht *et al.*, 1988) [8], and (Ragle *et al.*, 1989) [9]. Our mare experienced no complication after surgery. The mare defecated on the following day of surgery and had good appetite with pronounced enteric movements. We advised the owner to reduce the amount of low quality roughage and to include more water and essential minerals in the diet in order to increase feed digestibility in

general.

### Conclusion

In this study, a horse with acute abdominal pain was diagnosed for an impaction. Further exploratory celiotomy was performed and revealed large colon impaction by an enterolith and fully recovered after intensive postoperative treatment. From the present findings, it can be concluded that horses with colic when detected in early phase before the intestine perforates, about 95% of horses make a full recovery from surgery to remove the enterolith.

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