Indian J. Vet. Surg. 46(2): 112-115 December 2025

ijvs

Surgical intervention in horses with refractory colic: a study of 10 cases

Jasmeet Singh Khosa[1], Arun Anand[2], J. Mohindroo[2], N.U. Devi[1], Nikita Gupta[3] and Vandana Sangwan[2†]

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana – 141004 (Punjab)

[1]Assistant Professor, [2]Professor, [3]Scientist, Department of Veterinary Surgery and Radiology, College of Veterinary Sciences, Ludhiana

DOI No.: 10.5958/0973-9726.2025.00029.5 *Received: June, 2025*

Ten horses with mild to severe abdominal distension, unresponsive to medical management, underwent exploratory celiotomy under general anaesthesia. Surgical exploration revealed small colon fecaliths in four horses, enteroliths in two, pelvic flexure impaction in two, intussusception in one, and left dorsal displacement of the colon (LDDC) in one. Cecal decompression was performed as required. Small colon fecaliths and enteroliths were removed via small colon enterotomy, while pelvic flexure enterotomy was carried out in cases of pelvic flexure impaction and LDDC to relieve the obstruction and restore normal anatomical positioning. The intussusception was corrected by gentle manual reduction. The abdominal cavity was intermittently lavaged with Ringer's lactate, followed by routine abdominal closure and placement of a passive drain. Postoperative management included fluid therapy, antibiotics, and analgesics. Overall surgical success was 80%, with eight horses recovering and two succumbing within one week post-surgery. The study concludes that small colon obstruction due to fecaliths or enteroliths is a common cause of colic and is associated with a favorable surgical prognosis when promptly managed.

***Keywords**: Celiotomy, Colic, Horse, Refractory, Surgery*

Colic refers to abdominal pain in equines and represents a clinical sign rather than a specific disease entity (Bland, 2016). It may arise from a wide range of conditions involving the gastrointestinal tract, kidneys, liver, or reproductive system. A thorough assessment- including history, signalment, and clinical signs such as pawing, rolling, flank-watching, and changes in defecation-along with evaluation of heart rate, respiratory rate, mucous membrane color, borborygmi, and abdominal distension can help identify the underlying cause (Moore, 2016). Laboratory evaluations, including haemogram (Hb, TLC, PCV) and biochemical parameters such as total protein and lactate, further assist in determining the severity of the condition. Despite comprehensive clinical and diagnostic workup, the exact cause of colic may remain undetermined in many cases.

Although colic is common in equine practice, only a small proportion of affected animals require surgical intervention (Singer and Smith, 2002). Most cases respond well to medical management, and those with unclear etiology are managed symptomatically. However, when pain persists despite appropriate medical therapy, immediate referral to a surgical facility is warranted (MacKinnon *et al*., 2010; Anand and Singh, 2021).

The present case series describes 10 horses presented with colic to a referral hospital in North India, all of which were unresponsive to medical treatment. Exploratory laparotomy/ celiotomy was performed as a lifesaving procedure to identify and correct the underlying causes of colic in these patients.

Materials and Methods

Ten horses presenting with abdominal pain unresponsive to medical therapy were included in the study. For each animal, age, breed, sex, body weight, physiological parameters (heart rate, respiratory rate, rectal temperature, capillary refill time, and mucous membrane colour), presence or absence of pain, and degree of abdominal distension were recorded. Abdominocentesis was performed when feasible, and nasogastric intubation was carried out in 8 of the 10 horses. Haematological parameters - haemoglobin (Hb), total leukocyte count (TLC), and packed cell volume (PCV) - along with biochemical markers (blood lactate and glucose) were evaluated in all cases.

Ultrasonographic examination was performed in 8 horses to assess the abdominal cavity for free fluid accumulation, distention and motility of the small intestine and colon, and to evaluate the nephrosplenic space for evidence of left dorsal displacement of the colon (LDDC).

Exploratory laparotomy was performed under general anaesthesia. All horses were premedicated with xylazine (1.1 mg/kg body weight IV) and butorphanol (0.02 mg/kg IV), and anaesthesia was induced with ketamine (2.2 mg/kg IV) once the head dropped to knee level. Endotracheal intubation was performed using an appropriately sized tube, and horses were positioned on the operating table using a ceiling-mounted lift system. Anaesthesia was

†Corresponding author; Email: drvandanasangwan@rediffmail.com

Table 1: Details of signalment, haematology, ultrasound findings, diagnosis and outcome in colicky equines.

Equines/ parameters	1	2	3	4	5	6	7	8	9	10
Signalment and physical examination										
Age/Wt (kg)	5Y/400	10M/145	2Y/220	4Y/400	3.5Y/650	12d/45	1Y/350	8Y/650	6M/150	3M/120
HR	60	80	75	84	70	95	110	85	80	90
RR	10	25	14	25	25	35	32	24	30	45
CRT (secs)	>3	<3	>3	<3	>3	<3	>3	>3	>3	>3
Temp (°F)	102	100	101	102	102.8	103.2	98.6	99	101.5	100
MM	Congested	Pale & dry	Pink & dry	Pink & dry	Congested	Congested	Injected	Congested	Pale and dry	Injected
Abdominocentesis	Negative	Not done	Not done	straw colored	No fluid	Straw colored	No fluid	No fluid	No fluid	Not done
Nasogastric reflux	Negative	<2l	Negative	Negative	Negative	Not done	Negative	Positive>5l (Fig. 1a)		Negative
Not done										
Pre-operative haematological and biochemical findings										
Hb (g/dL)	11.0	13.6	9.9	14.5	13.2	14.1	9.9	16.5	12.2	13.0
TLC (cells/µL)	8100	12700	13600	9800	9000	8000	20000	8940	9600	18399
PVC (%)	33.5	41	36	37	34	41	36	44	35	35
TP (g/dL)	7.3	6.4	7.0	7.8	7.1	6.9	6.2	7.2	4.9	7.0
Lactate (mmol/L)	2.4	7.0	3.5	4.4	2.2	7.7	9.2	10.0	9.8	10.0
Glucose (mg/dL)	150	125	170	120	110	126	179	181	159	167
Preoperative USG findings										
Free Fluid	+ (Fig. 1b)	-	-	-	+	+	+	Not done	+	Not done
Small Intestines (SI)	Motile	Motile	Motile	Motile	Motile	SI and colon distended and amotile (Fig. 1c, d)	Colon distended and amotsile	Stomach distended with fluid & SI collapsed	—	-
Colon	Distended and amotile	Distended & amotile (Fig. 1e)	Distended and amotile	Distended and motile	Distended and motile (Fig. 1f)					
Distended and amotile	-									
Nephrosplenic space	Clear	Clear	Clear	Clear(Fig. 1g)	Not clear	Clear	Clear	-	Clear	-
Diagnosis	Enterolith	Small colon fecalith	Pelvic flexure impaction (Fig. 2f)	Pelvic flexure impaction	LDDC	Intussuception (Fig. 2h)	Small colon fecalith			
	Enterolith (Fig. 2c)	Small colon fecalith (Fig. 2e)	Small colon fecalith							
Outcome	Recovered	Recovered	Recovered	Recovered	Recovered	Died within 12 hr	Recovered	Died within 24 hr of surgery	Recovered	Recovered

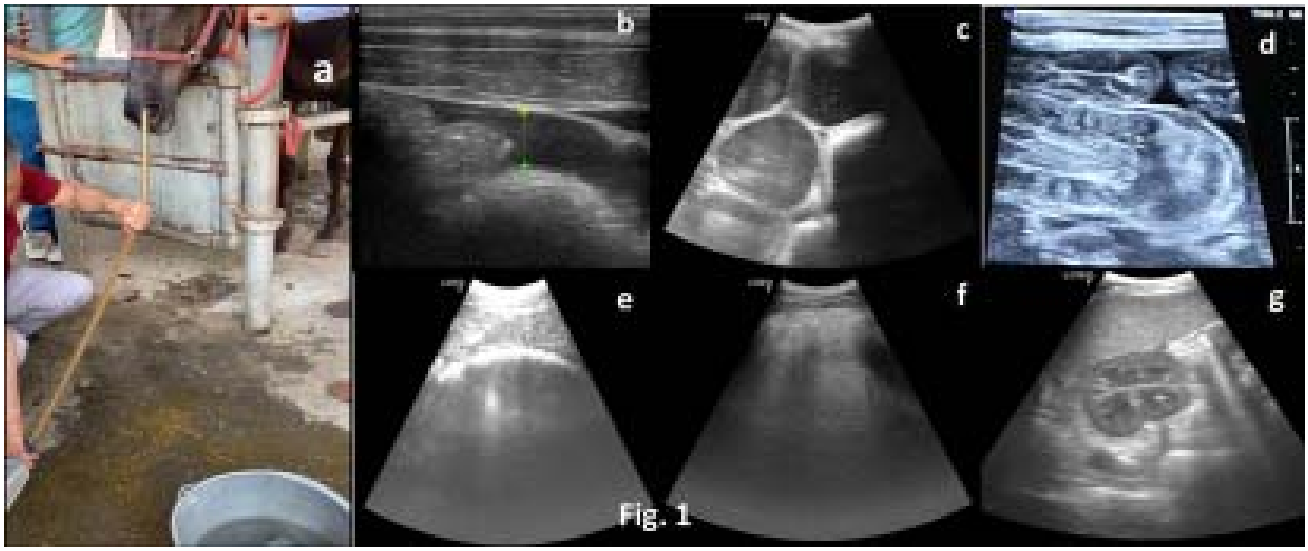

Fig. 1: Photograph showing the nasogastric reflux in enterolith equine (a), ultrasonograms showing; free fluid in between intestines (b), amotile distended small intestines (c), intussusception (d), gas filled left ventral colon (e), motile right ventral colon (f), and normal nephrosplenic region (g).

maintained with isoflurane in 100% oxygen (Saini *et al.,* 2013).

The ventral abdomen was aseptically prepared for a midline celiotomy. The cecum was typically the first structure encountered and was decompressed using a 16G, 1.5-inch needle attached to a suction unit to facilitate manipulation. The large colon, small colon, pelvic flexure, and small intestine were systematically evaluated by palpation for abnormalities such as fecaliths, enteroliths, impactions, or areas of abnormal tension. When a lesion was identified, the affected segment was exteriorized for detailed assessment and corrective treatment, most commonly enterotomy.

Fecaliths were either manually fragmented and advanced into a more dilated segment or removed via enterotomy when firm or when intestinal wall integrity was compromised. Enterotomy incisions were closed using polydioxanone (PDS) 2-0 in an inverting suture pattern. Throughout the procedure, abdominal organs and the peritoneal cavity were intermittently lavaged with large volumes of Ringer's lactate solution. Exteriorized intestines were kept moist with warmed Ringer's lactate. Following enterotomy, the affected segments were thoroughly lavaged before repositioning.

A passive peritoneal drain (18 Fr Foley catheter) was placed in all cases. Routine closure of the abdominal incision was performed using a continuous suture pattern with PDS No. 1 loop. Horses were transferred to a padded recovery room using the ceiling-mounted lift and assisted manually during recovery. Following standing, the ventral abdomen was bandaged using a broad cotton tape (Nivar) dressing.

Postoperative management included intravenous fluid therapy with Ringer's lactate (50-60 mL/kg body weight/day divided into two doses) for a minimum of three days, antibiotics, piperacillin–tazobactam (50 mg/kg body weight IV twice daily) and amikacin (10 mg/kg IM once daily), for 3 to 7 days, and analgesia with flunixin meglumine (1 mg/kg IV) for three days (Anand and Singh, 2021).

Results and Discussion

All horses presented were of the Marwari breed (two Nukras), with an equal sex distribution. Body weights ranged from 45–650 kg. The physiological parameters recorded at admission are summarized in table 1. Tachycardia was noted in all horses, while tachypnea was observed in eight cases. Capillary refill time (CRT) exceeded 3 seconds in six horses. Both elevated heart rate and prolonged CRT are considered poor prognostic indicators in equine colic (Mickevièienë *et al*., 2024). Rectal temperature was markedly elevated (102–103.2°F) in four animals (Aiello and Moses, 2016). All horses were presented after approximately four days of abdominal pain, except for the foal with intussusception, which arrived within 12 hr of symptom onset.

Peritoneal fluid collection was achieved in seven horses; straw-coloured fluid was obtained in two, while five samples were negative (Table 1). Straw-coloured, transparent fluid is considered normal (Anand and Singh, 2021). Peritoneal fluid cytology is useful for detecting intestinal ischemia (Little and Blikslager, 2002; Theofner *et al*., 2003). Nasogastric reflux was positive (>5 L) in only one horse, which was later diagnosed with an enterolith.

Haematological evaluation revealed normal haemoglobin and packed cell volume values in all except two horses, which showed marginal decreases. Increased PCV is associated with cardiovascular compromise (Linden *et al*., 2003). Marked leukocytosis was observed in two horses with small colon fecaliths.

Indian J. Vet. Surg. 46(2) 2025

Lactate levels were elevated (>2 mmol/L) in all horses (Table 1), indicative of intestinal compromise and potential sepsis, which are common in colic cases (White, 2006; Yamout *et al.,* 2011).

Preoperative ultrasonography was performed in eight horses (Table 1). Radiography of the retrieved enteroliths confirmed the presence of a central nidus (Fig. 2d), a typical diagnostic feature. The nephrosplenic space was not visible in one horse, suggesting left dorsal displacement of the colon (LDDC) (Albanese and Caldwell, 2014). In the 12-day-old foal, a characteristic "target-like" lesion on ultrasonography indicated intussusception. Ultrasonography yielded a definitive preoperative diagnosis in only two cases; the remaining etiologies were identified intraoperatively.

Exploratory celiotomy served both diagnostic and therapeutic purposes in all horses (Curtis *et al.,* 2015). Four horses - mostly young - were diagnosed with small colon fecaliths, and two horses (aged 5 and 8 yr) with small colon enteroliths. Small colon enterotomy was performed through the antimesenteric border in these cases. Pelvic flexure enterotomy was performed in two cases with pelvic flexure impaction (Fig. 2g) and in one horse with LDDC to aid colon repositioning. In the foal diagnosed with intussusception, the affected segment was successfully reduced by gentle milking. Although resection and anastomosis may be required when the intestines are non-viable or the intussusception cannot be manually reduced (Sangwan *et al.,* 2025), this foal did not require resection. Intussusception is an uncommon cause of colic in foals less than 30 days old, whereas enterocolitis remains the most frequent etiology (MacKinnon *et al*., 2010). It typically involves the jejunum and/or ileum and often results in complete obstruction (Lin *et al*., 2008). Recent reports describe multiple jejunal intussusception sites in foals, with varied outcomes depending on severity and treatment (Sangwan *et al*., 2025).

Of the 10 horses treated surgically, two died postoperatively - one with intussusception and one with enterolithiasis. Notably, the horse with enterolith also had significant nasogastric reflux. The remaining eight horses recovered uneventfully (Table 1).

In conclusion, small colon obstruction due to enteroliths or fecaliths appears to be a common cause of surgical colic in this region and carries a favourable prognosis when identified early and managed appropriately.

References

Aiello, S.E., Moses, M.A. and Allen, D.G. 2016. The Merck Veterinary Manual. Merck & Company, Inc., White Station, NJ, USA.

Albanese, V. and Caldwell, F.J. 2014. Left dorsal displacement of the large colon in the horse. Equine Vet. Edu. **26**: 107-111.

Anand, A. and Singh, S.S. 2021. Surgical Management of Colic. A Practical Approach to Diagnosis and Mangement of Equine Colic. Jaya Publishsing House. pp 75-110.

Bland, S.D. 2016. Equine colic: a review of the equine hindgut and colic. Vet. Sci. Develop. **6: 6223:** 48-51**.**

Curtis, L., Burford, J.H., Thomas, J.S.M., Curran, M.L., Bayes, T.C., England, G.C.W. and Freeman, S.L. 2015. Prospective study of the primary evaluation of 1016 horses with clinical signs of abdominal pain by veterinary practitioners and the differentiation of critical and non-critical cases. Acta Vet. Scand. **57**: 69.

Lin, C.C., Chuang, S.T., Hsuan, S.L., Huang, W.G. and Chan, J.P. 2008. Jejunojejunal intussusception and colonic impaction in a 12-day-old orphan foal. J. Equine Vet. Sci. **28**: 473-475.

Linden, M.A., Laffont, C.M. and Oldruitenborgh Oosterbaan, M.M. 2003. Prognosis in equine medical and surgical colic. J. Vet. Int. Med. **17**: 343-348.

Little, D., Tomlinson, J.E. and Blikslager, A.T. 2005. Post-operative neutrophilic inflammation in equine small intestine after manipulation and ischaemia. Equine Vet. J. **37**: 329-335.

MacKinnon, M.C., Southwood, L.L., Burke, M.J. and Palmer, J.E. 2013. Colic in equine neonates: 137 cases (2000–2010). J. Am. Vet. Med. Assoc. **243**: 1586-1595.

Mickevièienë, I., Mikalauskienë, D. and Miknienë, Z. 2024. The prognostic importance of physiological and biochemical parameters in horses afflicted with colic. Open Vet. J. **14**: 1801.

Moore, J.N. 2016. Overview of colic in horses. Merck Veterinary Manual. http://www.merckvetmanual.com/mvm/digestive_system/colic_in_horses/overview_of_colic_in_horses.html.

Saini, N.S., Mohindroo, J., Mahajan, S.K., Raghunath, M., Kumar, A., Sangwan, V., Singh, T., Singh, N., Singh, S.S., Anand, A. and Singh, K. 2013. Surgical correction of uterine torsion and mare–foal survival in advance pregnant equine patients. J. Equine Vet. Sci. **33**: 31-34.

Sangwan, V., Kumar, A., Vardhan, K.V., Ashwin, G., Sharma, D and Bhat, A.M. 2025. Dual site jejunal intussusception in a neonatal foal with positive surgical outcome. Large Anim. Rev. **31**: 201-203.

Singer, E.R. and Smith, M.A. 2002. Examination of the horse with colic: is it medical or surgical. Equine Vet. Edu. **14**: 87-96.

Thoefner, M.B., Ersbøll, B.K., Jansson, N. and Hesselholt, M. 2003. Diagnostic decision rule for support in clinical assessment of the need for surgical intervention in horses with acute abdominal pain. Can. J. Vet. Res. **67**: 20.

White, N.A. 2006. Equine colic. Proc. Am. Assoc. Equine Practnr. **52:** 109-174.

Yamout, S.Z., Nieto, J.E., Beldomenico, P.M., Dechant, J.E., leJeune, S. and Snyder, J.R. 2011. Peritoneal and plasma d lactate concentrations in horses with colic. Vet. Surg. **40**: 817-824.

Indian J. Vet. Surg. 46(2) 2025