

# Dual site jejunal intussusception in a neonatal foal with a positive surgical outcome



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## SUMMARY

This communication puts on record the successful surgical management of a rare case of dual site jejuno-jejunal intussusception in an eleven-day-old, 50kg foal. The foal had an acute incidence of abdominal pain following a single episode of diarrhea. The colt exhibited a respiratory rate of 60 breaths per minute and a heart rate of 140 beats per minute. The oral mucous membranes were congested, with a capillary refill time of 3seconds. Despite being active, alert, and attempting to suckle, the colt remained unresponsive to analgesic and other conservative treatments. Ultrasonographic examination of the abdomen revealed a characteristic «bull's eye» or «target» appearance in the jejunum, suggestive of intussusception, prompting emergency surgical intervention under general anaesthesia. General anaesthesia was achieved using intravenous diazepam (0.02 mg/kg) and ketamine (2.2 mg/kg) mixture followed by endotracheal intubation and maintenance with Isoflurane mixed in 100% oxygen. The foal was positioned in dorsal recumbency and was prepared aseptically for a midline linea alba laparotomy. Intraoperatively, one superficial intussusception was manually relieved, while another intussusception which was caudally in the jejunum and was deep seated, required intestinal resection (approximately 45 cm) of necrotic jejunum followed by end-to-end anastomosis. The foal recovered uneventfully and was discharged on the third postoperative day. A one-month follow-up revealed the foal to be healthy.

## KEY WORDS

Colic; Colt; Surgery; Two site intussusception; Ultrasound.

## INTRODUCTION

Intussusception is the telescoping of one segment of the intestine (mostly cranial with smaller diameter) into an adjacent segment (mostly caudal with larger diameter) and is a significant cause of colic in equine neonates<sup>1</sup>. Compared to adult horses, foals aged less than six-months are less prone to colic<sup>2</sup>. However, when colic does occur in young foals, it can be associated with various conditions including meconium impaction, atresia, uroperitoneum, intussusception, diaphragmatic and inguinal hernias, ruptured viscus, and pneumoperitoneum<sup>3</sup>. Due to the small size of foals, trans-rectal examination is not feasible; but, non-invasive diagnostic imaging modalities like; radiography and ultrasonography are very helpful. Most of the colic cases in foals necessitate surgical intervention, as medicinal treatment often fails<sup>4,5</sup>. The wall of small intestine in foals is notably thin, and make them susceptible to conditions like intussusception mostly following diarrhea, and often require surgical resection and anastomosis.

The occurrence of more than one, simultaneous intussusceptions within the small intestine is rare in foals and is typically associated with a poor prognosis due to the complexity of

the condition and the challenges inherent in surgical management. This case study details a neonatal foal diagnosed with dual-site jejunal intussusception, which, following prompt surgical intervention, resulted in a successful outcome.

## CASE HISTORY AND PRESENTATION

An 11-day-old colt, weighing 50 kg, was presented as an emergency with an acute, persistent abdominal pain for the past six hours, following a 12-hour period of mild discomfort. The colt also had experienced a single episode of diarrhea on the previous day and exhibited abdominal distention, with no fecal passage since the morning. Despite being active, alert, and attempting to suckle, the colt remained unresponsive to analgesic and other conservative treatments.

## CLINICAL EXAMINATION AND DIAGNOSIS

Upon presentation, the colt exhibited a respiratory rate of 60 breaths per minute and a heart rate of 140 beats per minute. The oral mucous membranes were congested, with a capillary refill time of 3 seconds. Ultrasonographic examination of the abdomen revealed a characteristic «bull's eye» or «target» ap-

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**Figure 1** - Ultrasonogram showing the bull's eye appearance in an 11 day old colt, suggesting intussusception.

pearance in the jejunum, suggestive of intussusception (**Figure 1**). Considering the ultrasound findings, an emergency surgical intervention was decided and the consents were taken for the same.

## ANAESTHESIA

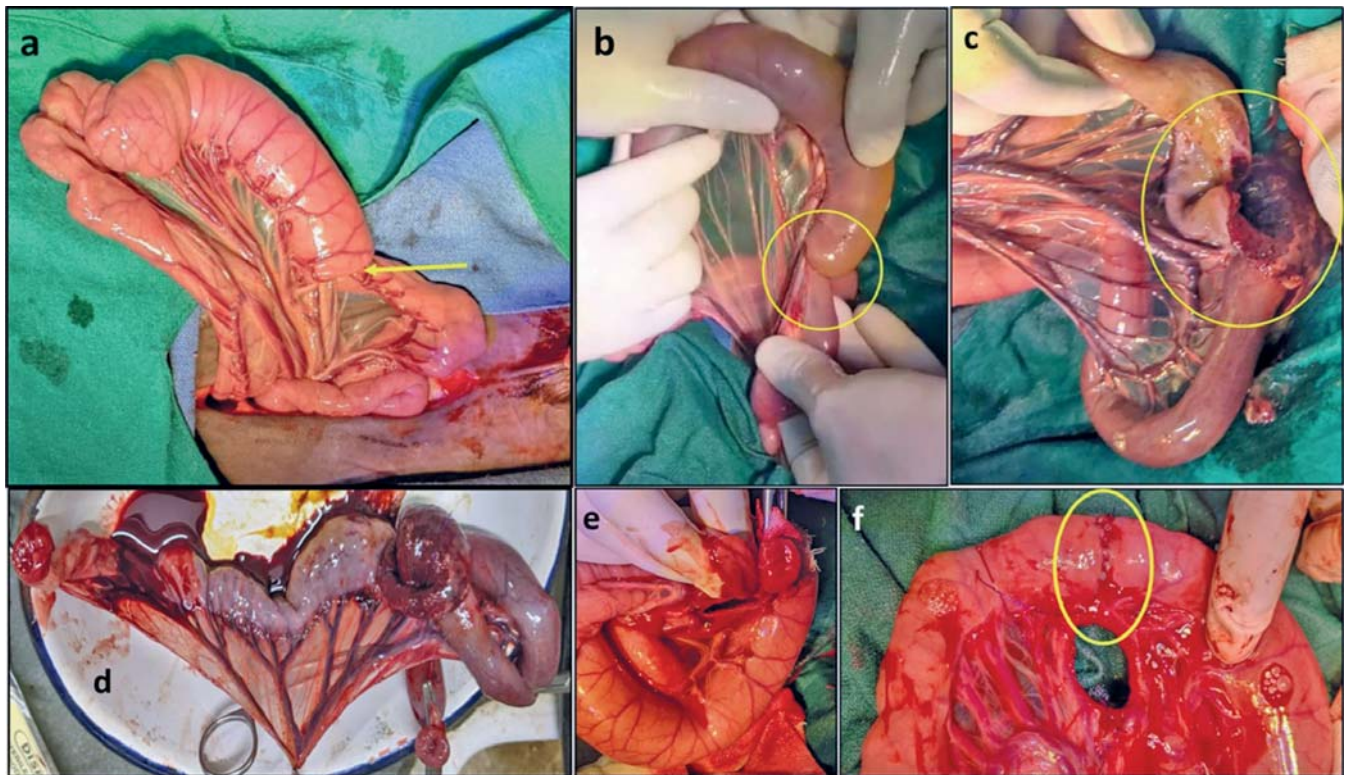
A three-way central venous catheter was placed in the jugular vein, and fluid therapy (Ringer's lactate) was initiated. General

anesthesia was induced using intravenous diazepam (0.02 mg/kg) and ketamine (2.2 mg/kg) mixture. Endotracheal intubation was done using a 16 mm (ID) tube, and the foal was maintained on inhalant anesthesia with isoflurane in 100% oxygen using partial rebreathing circuit. The foal was positioned in dorsal recumbency and was prepared aseptically for a mid-line linea alba laparotomy. Throughout the procedure, the vital parameters remained stable, with SpO<sub>2</sub> ranging from 92-100%, a heart rate of 66-84 beats per minute, and a respiratory rate of 5 breaths per minute.

## SURGICAL FINDINGS

A midline linea alba approach was used for the laparotomy. Just upon entering the abdominal cavity, an intussusception in the jejunum was identified. This segment was soft and could be manually reduced (**Figure 2a**) but, the jejunum was still dilated. Further exploration by milking out all the jejunum revealed a second, deep-seated intussusception (**Figure 2b**), which was partially reducible but exhibited bluing of jejunum, necrosis and tearing (**Figure 2c**).

Due to the non-viability of the affected segment, surgical resection of approximately 45 cm of the jejunum was done after ligating the mesenteric vessels supplying that part (**Figure 2d**). The end-to-end anastomosis (**Figure 2e, f**) of the resected jejunum was done using a simple continuous pattern with 3-0 polydioxanone (PDS) starting at the mesenteric end, with a knot at the anti-mesenteric end and coming back the initial point. The mesentery was sutured with few interrupted sutures. The site of anastomosis and the abdominal cavity was properly lavaged with normal saline solution. The linea alba was



**Figure 2** - Serial photographs of the surgical findings of an 11 day old colt suffering from dual site jejunal intussusception. The first intussusception (**a, yellow arrow**) just after entering the abdomen. The second intussusception, caudal in jejunum and deep seated (**b, yellow circle**). The tear in the intestines while relieving the second intussusception with bluing of intestines (**c, yellow circle**). The resected jejunum from the site of second intussusception (**d**). The healthy jejunum after resection and the resected ends close (**e**). The anastomosed jejunum (**f, yellow circle**).





**Figure 3** - Photograph showing the healthy foal at one month follow up.

closed using a continuous lock-stitch pattern with 0-0 PDS, and the skin was closed with polyamide. An abdominal Foley's (16F) was placed lateral to incision as a passive drain.

## POSTOPERATIVE CARE AND FOLLOW-UP

Postoperative management included intravenous administration of Ringer's lactate (2 liters) in the morning and 5% dextrose normal saline (1 liter) in the evening for three consecutive days. Antibiotic therapy with piperacillin-tazobactam (50mg/Kg) was administered intravenously twice daily for five days. Analgesia was provided with flunixin meglumine (1 mL/50Kg) intravenously once daily for three days. An antacid, pantoprazole (40 mg), was given intravenously once daily for five days. A liver tonic (injectable Polybion, 2 mL) was administered intramuscularly once daily for five days. The wound was dressed with betadine and an abdominal bandage with a thick cotton cloth was done.

The foal was withheld from milk intake for the first 24 hours post-surgery. By the following morning, the foal demonstrated significant recovery in alertness and with no abdominal pain. The foal began suckling after the 24-hour mark, and responded well to the treatment regimen. The foal was discharged on the third postoperative day after removing the Foley's. The skin sutures were removed on day 12<sup>th</sup> post-operative. A one-month telephonic follow-up revealed the foal to be healthy and thriving (**Figure 3**).

## DISCUSSION

Persistent abdominal pain that does not respond to analgesics is a strong indicator of a strangulating lesion in equines<sup>6</sup>. Intussusception is relatively common in foals aged 3-5 weeks<sup>7</sup> but most of the literature reports post-mortem findings of intussusception in equines. The condition is often attributed to factors such as parasitic infestation and altered intestinal motility secondary to enteritis<sup>7-9</sup>.

Ultrasonography is considered the gold standard for diagnosing intussusception, particularly in small foals where the abdomen can be thoroughly examined in the ventro-dorsal position. On ultrasound, the characteristic transverse view of an intussusception appears as a target or bull's-eye sign, featuring a thick hypoechoic rim<sup>7</sup>.

Small intestinal obstruction in foals usually have a fair to poor prognosis and is associated with a high mortality rate<sup>4,8</sup>. Reported survival rates for neonatal foals undergoing medical or surgical management for colic range from 25% to 75%<sup>4,8</sup>. Early diagnosis and prompt surgical intervention, as demonstrated in this case, are critical for improving outcomes.

Postoperative care in equine neonates, especially following intestinal surgery, is critical for recovery. Monitoring for complications such as postoperative ileus, adhesions, and incisional infections is essential.

## CONCLUSION

The study reports a rare case of dual site intussusception in the jejunum of an 11 day old colt. Early presentation, diagnosis and surgical intervention bears positive surgical outcome. Full exploration of intestines is recommended to avoid missing more than one lesion.

## Conflicts of interest

The authors have no conflicts of interests with anyone.

## Authors contribution

Author 1 and 4 were the anesthesiologist and Author 1 wrote the manuscript, Author 2 and 3 were the part of surgical team and did follow up treatment of the foal, Author 5 and 6 were the ultra-sonologists and did the primary treatment of the foal in emergency till surgical intervention.

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