Surgical management of ileocolic intussusception in a German shepherd dog

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Abstract

Intussusception occurs when excessive peristaltic motility forces one segment of the intestine into another slightly larger part of the intestine. The incidence of intussusception is more in German shepherd dogs. A six-month old German shepherd dog weighing 17 kg was presented with a history of anorexia, vomiting, diarrhoea, and lethargy for the past 7 days. Clinical examination revealed a congested conjunctival mucous membrane, bounding pulse and tachycardia. Abdominal palpation evinced pain and a bunch of coiled sausage shaped mass was identified during deep palpation. Abdominal ultrasonography revealed bulls eye appearance in the intestine confirming the occurrence of intussusception. Pre-operatively, the animal was hydrated and stabilized with intravenous fluids. Prophylactic antibiotic therapy using ceftriaxone was given at a dose rate of 25 mg per kg bodyweight and pre-emptive analgesia with meloxicam at a dose rate of 0.2 mg per kg bodyweight was also given. Emergency laparotomy was performed under general anaesthesia maintained with isoflurane. A 20 cm long necrosed irreducible intestinal segment was identified. The necrosed loop was resected after ligating the mesenteric vessels. The cut ends of the intestine being uneven, was cut at right angles and the smaller segment was further cut at an oblique angle to correct the disparity in the lumen size. End to end anastomosis was performed using polydioxanone suture in a simple continuous pattern. The abdominal cavity was lavaged with normal saline. Laparotomy wound was closed in a routine pattern. Post operatively, the dog was treated using fluids, antibiotics, and analgesics for seven days. The owner was advised to give easily digestible liquid diet in small quantities from fourth day onwards and gradually shift to normal food. The skin sutures were removed on 10th post-operative day and the animal made an uneventful recovery.

Keywords: Ultrasonography, Intestinal telescoping, Resection, Anastomosis, Surgical management, Deworming

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Introduction

Intussusception can be defined as prolapse of one part of the intestine into the lumen of an immediately adjoining part (Applewhite, 2001). An intussusception consists of intussusceptum (i.e., the invaginated segment), intussusciens (i.e., the invaginating segment), apex (the junction between the entering and the returning segments), and neck (the junction of the returning segment and the intussusciens) (Lewis and Ellison, 1987; Kovak and Buriko, 2015). The condition is common in dogs and cats, especially in young ones (Patsikas et al., 2019). The predisposing factors for the intussusception can be multiple, like intestinal parasitism, bacterial and viral enteritis, intestinal foreign bodies, prior abdominal surgery, intestinal neoplasia, and extra/intra-luminal mass lesions that cause intestinal motility disturbances (Applewhite et al., 2002; Colomé et al., 2006).

The invagination of intestine usually happens in the direction of peristaltic movement and rarely in the opposite direction (Lewis and Ellison, 1987). Intussusception can be classified according to the location like entero-colic (ileo-colic), caeco-colic, entero-enteric, duodeno-gastric, and gastro-oesophageal. It is also classified as high intussusception (proximal to the jejunum) and low intussusception (distal to the duodenum) (Dixon, 2004). In animals, intussusceptions commonly occur at ileoceocolic junction (Wilson and Burt, 1974; Levitt and Bauer, 1992; Fossum et al., 2002). However, intussusceptions of oesophagus, stomach, and colon are also reported in dogs (Pass and Lennox, 1972).

Diagnosis of intussusception can be done by palpation, radiography, ultrasonography, and computed tomography (Patsikas et al., 2019). Ultrasonography is considered as the accurate diagnostic method for the diagnosis of intestinal intussusception in humans and animals (Penninck and Anjou, 2008). The 'target sign' or 'Bull's eye' appearance is a characteristic sign of intussusception on ultrasonography. It may be due to compression of the mucosal and serosal surfaces and intestinal oedema (Lee et al., 2005). Manual reduction can be adopted for correction of the condition if the intussusception is reducible, otherwise, resection of affected portion and enteroanastomosis is needed for correction. This case report describes in detail about small intestinal intussusception in a six-month-old German shepherd dog, outlines successful treatment, and depicts the

surgical procedure to prevent its recurrence.

Case history and diagnosis

A six-month-old German shepherd dog weighing 17 kg was presented with a history of anorexia, vomiting, diarrhoea and lethargy for the past 7 days. Clinical examination revealed congested conjunctival mucous membrane, bounding pulse, and tachycardia. Fecal sample examination revealed the presence of *Toxocara* Spp ova. Palpation evinced pain and a bunch of coiled sausage shaped mass was palpable at the mid caudal abdominal region. Ultrasonographic examination of the hard portion identified multiple concentric hyperechoic and hypoechoic rings known as 'bulls eye/target sign' (Fig. 1). Longitudinal ultrasonographic scan shown a sausage-shaped mass with folded layers of intestinal wall. The history, clinical, and ultrasonographic findings were suggestive of intestinal intussusception.

Surgical management

It was decided to manage the case surgically, and the patient was prepared for surgical procedure. Pre operatively, the animal was hydrated and stabilized with intravenous fluids. Prophylactic antibiotic therapy was initiated with ceftriaxone at the dose rate of 25 mg per kg body weight and pre-emptive analgesia with meloxicam at the dose rate of 0.2 mg per kg body weight was also given. The animal was given pre anesthetic drugs, Acepromazine at the dose rate of 0.05mg/kg body weight (intramuscular), Butorphanol at 0.4 mg/kg (intravenous), and Midazolam at 0.2 mg/kg (intramuscular). The anesthesia was induced by Ketamine at 5 mg/kg intravenously to effect. The anaesthesia was further maintained using isoflurane inhalant anesthesia. The animal was positioned in dorsal recumbency for ventral midline celiotomy and was prepared for aseptic surgery by scrubbing with povidone-iodine (0.75% w/v) surgical scrub.

The peritoneal cavity was opened by giving an incision on the skin, subcutaneous tissue, at linea alba and the peritoneum. On exploration, the intussusception was found to be on ileo-colic junction. An approximately 20 cm long necrosed intestine which was irreducible was identified (Fig. 2). Atraumatic clamps were applied on proximal and distal ends before resection (Fig. 3b). The necrosed loop was resected after ligating the mesenteric blood vessels (Fig. 3a). End to end anastomosis was performed using 4/0 polydioxanone suture in simple continuous pattern (Fig. 4a). The dilated segment was cut at right angles and the smaller segment at an oblique angle to correct

Figure 1: (a) Area of palpation at the mid caudal abdominal region where the bunch of coiled sausage shaped mass was observed. (b) and (c) Bull's eye/Target sign on ultrasonography.

Figure 2: (a) The area of intussusception where the ileum (intussusceptum) invaginated into caecum (intussusciens). (b) The necrotic area of intestine that was resected.

the disparity in lumen size as the opposing ends were uneven (Fig. 3d). The abdominal cavity was lavaged with normal saline. Laparotomy wound was closed in standard procedure. Post operatively, the dog was treated with fluids, antibiotics, and analgesics for seven days. The owner was advised to give easily digestible liquid diet in small quantities from fourth day onwards and gradually shift to normal food. The skin sutures were removed on 10th post-operative day and the animal made an uneventful recovery.

Discussion

The incidence of intussusceptions is more common in German shepherd dogs (Sivasankar, 2000). Intussusceptions occurs most commonly

in younger dogs below 6 months of age (Weaver, 1977; Lewis and Ellison, 1987). The most common clinical signs of intussusception in dogs are anorexia, vomiting and diarrhoea. Prevalence of *Toxocara canis* in younger dogs of age below 6-months are much higher in case of stray dogs (62.79%) and owned dogs (41.74%) (Shukla et al., 2007; Swai et al., 2010). This high prevalence of parasites might have contributed to the increased rate of intussusceptions in puppies. Presence of parasites in the intestine leads to abnormal peristaltic movement and results in telescoping of intestinal segment into the adjacent parts of intestine. In this case, the improper deworming of animal might have resulted in toxocariasis further resulting in ileo-colic intussusception.

Figure 3: (a) Mesenteric blood vessels were ligated to check bleeding while resection. (b) The clamps were applied on the proximal and distal ends of necrosed intestinal segments. (c) Resection of the necrosed intestinal segment. (d) The dilated segment was cut at right angles and the smaller segment at an oblique angle to correct the disparity in the lumen size.

Figure 4: (a) Suturing of proximal and distal ends of the intestine (b) Intestine and mesentery after suturing.

Abdominal palpation is a helpful tool for the identification of intussusceptions. The presence of a tubular structure can be felt at the cranial or mid abdomen during palpation. Plain radiography cannot always differentiate the intestinal obstruction. If there is complete obstruction of intestine, at the region of intussusception, gas filled intestinal loops can be visualised proximal to the obstructed site. Contrast radiography of intestine by using barium sulphate can be done to confirm the intestinal obstruction (Wilson and Burt, 1974). However, in this case, animal was very weak so the barium contrast radiography could not be performed. The best method for the differentiation of intussusceptions is the abdominal ultrasonography (Manczur and Voros, 2000). In ultrasonographic examination, intussusception can be visualised as concentric rings in transverse section and in longitudinal section multiple hyper and hypo echoic parallel lines are seen (Patsikas et al., 2003).

Conclusion

Complication of intussusception include ischemia and necrosis of intestinal segments. There will be obstruction of blood vessel at the site of intussusception and initially intestine will be swollen and congested later the condition progress and adhesion of intestinal segment occurs due to fibrinous exudation from the serosal layer of the intestine. As the obstruction of arterial blood flow continues, it will lead to the necrosis of the affected part. Enterectomy can be performed for the removal of non-viable region of intestinal segment and end to end anastomosis can be performed. This case report points out the importance of proper deworming and hence the prevention of life-threatening intussusception in puppies as well as timely diagnosis along with proper surgical intervention will be help to save the life of the animal.

Authorship contribution statement

C. K. Faslu Rahman: Conceptualization, Methodology, Investigation, Writing - original draft, **Gokul Raj S:** Writing - original draft, **Khan Sharun:** Writing - review & editing.

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Declaration of Competing Interest

All authors declare that there exist no commercial or financial relationships that could, in any way, lead to a potential conflict of interest.

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