

# Rare Case of Double Intussusception in a Pup and Its Surgical Management

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## Abstract

Double intussusception is a rare intestinal disorder in companion animals. The condition is more commonly seen in puppies and young dogs following gastroenteritis. A male German shepherd pup aged three months was brought with the history of anorexia, intermittent vomiting and bloody diarrhoea since 10 days. Medical treatment for haemorrhagic gastroenteritis was initiated but did not prove to be effective in reducing the clinical signs. Physical examination revealed a sausage shape mass in the caudal abdomen. Ultrasound examination revealed multiple concentric hyperechoic and hypoechoic rings resembling bull eye appearance at two different locations suggesting double intestinal intussusception. Midline celiotomy was performed and ileo-colic and colocolic double intussusception was found on examination. To maintain the patency of gastrointestinal tract, resection of the intussuscepted mass followed by anastomosis was undertaken

## Key Words

Double intussusception, puppy, ileo-colic, colocolic, sausage, ultrasonography

## I. INTRODUCTION

Intussusception is defined as the telescoping or invagination of one intestinal segment- the intussusceptum, into the lumen of an adjacent segment- the intussusciens (Fossum, 2015) and occurrence of double intestinal intussusception is a rare surgical problem in dogs (Atray *et al.*, 2012; Valiei and Beheshti, 2011). Intussusception can occur in any location of gastro-intestinal tract from stomach to large intestine (Hanet *et al.*, 2008), however ileocolic and jejunojejunal intussusceptions are the most common in small animals (Fossum, 2015). Intussusception that occurs in the direction of normal peristalsis is called as direct or normograde intussusception whereas that occurs against the direction of normal peristalsis is called as indirect or retrograde intussusception (Applewhite *et al.*, 2002). Puppies and kittens are most likely to develop intussusception (Hanet *et al.*, 2008) and among the breeds, the German shepherd dogs and the Siamese cats are more commonly affected (Fossum, 2015).

Intussusceptions can occur as a sequela to enteritis or intestinal irritation caused by parasites, viral or bacterial infections, dietary changes, foreign bodies, intraluminal and extraluminal intestinal masses and systemic illness that leads to intestinal hypermotility which causes one intestinal loop to invaginate into other resulting in intussusception (Fossum, 2015; Rodriguez-Alarcon *et al.*, 2013; Valiei and Beheshti, 2011). The present article reports a rare case of double intussusception involving the ileum and colon in a German shepherd pup and its surgical management.

## II. CASE HISTORY AND OBSERVATIONS

A three month old male German shepherd pup was presented to surgery section of Veterinary Clinical Complex with the history of anorexia, intermittent vomiting and melena, refractory to medical treatment spanning more than ten days. The pet was under medical treatment for suspected haemorrhagic gastroenteritis on fluid therapy, antibiotic and antiemetic during the entire ten days period but did not show any positive response and was finally referred to surgery section. On clinical examination, the pet was found dull, inactive and dehydrated with sunken eyeballs and tented skin and slightly congested mucous membrane. Physiological parameters on examination were within the normal clinical range. Physical examination of the abdomen revealed a sausage shaped soft swelling at the caudo-ventral aspect of the abdomen. Further endoscopy was performed to rule out any haemorrhages or ulcers in the digestive tract but could not reveal any characteristic changes upto the stomach. Radiography revealed gas filled stomach and intestine and ruled out the presence of any foreign body (Fig.1). Finally ultrasonography of the abdomen was performed which revealed multiple hyperechoic and hypoechoic concentric rings with hyperechoic centre (Bull's eye pattern) on transverse section at two places along the length of the intestine suggesting double intestinal intussusception (Fig.2a). On longitudinal section ultrasonography revealed multiple hyperechoic and hypoechoic parallel lines of the intestine (Fig.2b). On the basis of ultrasonography, it was finally diagnosed as a rare case of double intestinal intussusception.

### III. SURGICAL TREATMENT

The pup was prepared for aseptic surgery as per the standard protocol. The pup was premedicated with Inj. Atropine sulphate @ 0.04mg per kg body weight subcutaneous followed by Inj. Xylazine Hydrochloride @ 1mg per kg body weight intramuscular. Induction of anaesthesia was done using Inj. Ketamine hydrochloride @ 5mg per kg body weight intramuscular and the pet was secured in dorsal recumbency. Anaesthesia was maintained on Isoflurane inhalant anaesthetic for the rest of the surgical procedure. Following midline celiotomy, the intussuscepted mass at the two different locations were identified and retracted out of the abdominal cavity (Fig.3a). On examination, the intussuscepted segments at the two positions involved a part of ileum and part of colon suggesting ileo-colic (normograde) and colocolic (retrograde) double intussusception. Manual reduction of the intussuscepted mass failed because of the development of adhesion between the serosal surface of intussusceptum and intussusciens. Thus it was decided to perform resection of the affected intestinal segments followed by anastomosis after careful assessment of intestinal viability based on colour, thickness and arterial pulsation. The intestinal segments were resected out after ligating the mesenteric vessels using Vicryl no: 1 followed by anastomosis of the remaining intestinal segments by simple appositional suture pattern using suture material poliglecaprone no: 3-0 (Fig.3b). The muscles, subcutaneous tissue and skin were closed as per standard surgical procedure.

Postoperatively the pup was maintained on intravenous fluids for a period of one week along with antibiotics and analgesics for five days intramuscular. The owner was advised to keep the pup off feed for a minimum period of one week followed by feeding of semi-liquid diet in small quantities from the second week. Daily wound dressing using povidone iodine and application of fly repellent spray was also advised. The skin sutures were removed 10 days postoperative and the pup was reported to have normal appetite and defecation with no incidence of vomiting and constipation.

### IV. DISCUSSION

Intussusception is one of the most common causes of mechanical obstruction of intestines in dogs (Singh, *et al.*, 2015). The most important clinical signs associated with ileo-colic intussusception are intermittent vomiting, progressive loss of appetite, mucoid bloody diarrhoea and palpable cylinder shaped mass in the caudal abdomen, depression and anorexia (Gharhghaii *et al.*, 2017) all of which were consistent with the present case. Intussusception can occur in any age or species, but more than 80% have been reported to occur in immature and one year old puppies (Fossum, 2015; Valiei and Beheshti, 2011). Parasitism

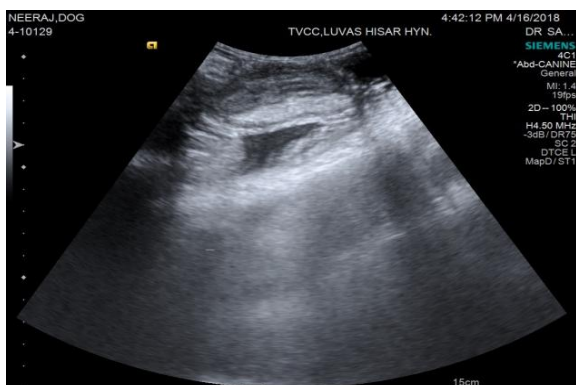
and enteritis should be suspected as the cause of intussusception in young dogs whereas intestinal thickening or masses as the cause in adults (Fossum, 2015). The formation of intestinal intussusception is proposed to be the result of lack of homogeneity in the bowel wall caused by any abnormality within the bowel wall that alter the local intestinal mobility or pliability (Applewhite *et al.*, 2002). Reverse peristalsis may increase the length of the intestine involved in intussusception but the amount of available mesentery limits the extent of intestinal involvement and degree of vascular compromise (Fossum, 2015). In young dogs the other forms of intussusception that has been reported include gastroesophageal, pylorogastric, enteroenteric, enterocolic and colocolic (Hanet *et al.*, 2008). The present case of intussusception was that of ileocolic and colocolic. Ultrasonography is considered as the accurate method for detection of intussusception (Valiei and Beheshti, 2011). On differential diagnosis, the present case was diagnosed by ultrasonography. Timely diagnosis with typical clinical signs and ultrasonographic findings, effective management of haemato-biochemical parameters and immediate surgical intervention can improve the prognosis for these cases (Atray *et al.*, 2012). The surgical treatment involves reduction of the intussusception and reestablishment of patent gastro-intestinal tract. This involves exploratory celiotomy and either manual reduction of the intussusception or resection of the intussuscepted mass and anastomosis of remaining intestine (Applewhite *et al.*, 2002). In this case resection of the intestine and anastomosis was performed. Delay in surgery increased the chances of adhesion formation and subsequently decreased the chances of manual reduction (Singh *et al.*, 2015). In the present case there was adhesions between the intussuscepted mass and thus resection was performed. Recurrence, ileus, anastomotic suture dehiscence, short bowel syndrome, peritonitis and death are the major complications following intestinal surgery (Weaver, 1977). Surgical resection and anastomosis of intestine following intussusception is reported to lesser the incidence of recurrence when compared to manual reduction (Gharhghaii *et al.*, 2017).



**Fig.1: Lateral radiograph of the abdomen showing multiple gas-filled severely distended intestinal loops**



**Figure 2a:** Ultrasonogram showing the typical, multi-layered appearance produced by an intussusception is shown here in transverse section. The lumen of the intussusciens is hyperechoic.



**Fig.2b:** In the longitudinal plane, multiple hyperechoic and hypoechoic parallel lines consistent with intussusception are visible.



**Figure 3a:** Photograph showing double intussusception before resection



**Figure 3b:** Photograph after intestinal resection and anastomosis

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