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Diagnostic imaging and successful surgical management of double intussusception in a Labrador retriever puppy

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Abstract

A 3-month-old male Labrador retriever puppy was presented with a history of intermittent vomiting, inappetence, and abdominal discomfort for three days. Clinical examination revealed dehydration, abdominal tenderness, and a palpable cylindrical mass in the mid-abdomen. Haematological analysis showed leucocytosis with a left shift, while radiography demonstrated loss of serosal detail and soft-tissue opacity in the mid-abdominal region. Ultrasonography revealed concentric ring patterns the characteristic “triple-circle sign” confirming a diagnosis of double intussusception. Exploratory laparotomy confirmed an ileo-ileo-colic intussusception with an additional jejuno-jejunal invagination. Surgical reduction followed by resection and end-to-end anastomosis was performed. Post-operative care included fluid therapy, broad-spectrum antibiotics, analgesics, and gradual dietary reintroduction. The patient recovered uneventfully without recurrence. This case emphasizes the importance of diagnostic imaging in identifying complex intestinal invaginations and highlights successful surgical correction as the mainstay of treatment in double intussusception.

Keywords: Enteroanastomosis, dog, intussusception, radiography, ultrasonography

Introduction

Thyroid hormones are essential for normal development, neural differentiation and metabolic regulation in mammals. They play an important role in endochondral ossification and are essential for skeletal development, linear growth, maintenance of bone mass and efficient fracture healing. They are also essential for fetal and post-natal nervous system development and play a key role in the maintenance of adult brain function.

Materials and Methods

Intussusception refers to the telescoping of one segment of intestine (intussusceptum) into the lumen of an adjacent segment (intussusciens) ^[1-6, 8-20]. It is a significant cause of intestinal obstruction in young dogs, particularly in puppies less than six months of age ^[7, 19]. Predisposing factors include enteritis, parasitism, abrupt dietary changes, previous abdominal surgery, foreign bodies, and altered intestinal motility ^[1, 10].

The condition may occur anywhere along the gastrointestinal tract, but the ileo-caeco-colic region is most commonly affected due to the abrupt change in luminal diameter and motility at this junction ^[15]. Double intussusception is an extremely rare variant characterized by one intussusception occurring within another or two invaginations forming concurrently at different sites ^[3, 13].

This paper describes the diagnostic imaging features with high quality images and successful surgical management of a rare double intussusception in a Labrador retriever puppy, with emphasis on diagnostic imaging findings and post-operative recovery.

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Case History and Clinical Examination

A 3-month-old male Labrador retriever puppy, weighing 6.2 kg, was presented to the Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, OUAT, Bhubaneswar, with a history of intermittent vomiting, inappetence, and lethargy for the past 03 days. The owner also reported mild abdominal distension and passage of scanty, blood-tinged faeces.

On physical examination, the puppy appeared dull, dehydrated, and mildly depressed. Rectal temperature was 102.6°F, pulse rate 128 beats/min, and respiration 28 breaths/min. Abdominal palpation revealed a firm, tubular, movable mass in the mid-abdominal region with mild discomfort on manipulation. Mucous membranes were pale pink, and capillary refill time was 1.8 seconds.

Diagnosis and Treatment

Hematological analysis revealed leucocytosis ($17.2 \times 10^9/L$) with neutrophilia and a left shift, while serum biochemistry indicated mild hyponatremia (130 mEq/L) and hyperkalemia (6.2 mEq/L). These findings suggested inflammatory response and early electrolyte imbalance secondary to gastrointestinal obstruction. Right lateral abdominal contrast radiograph following a barium series revealed gas- and contrast-filled proximal intestinal loops, along with a soft-tissue opacity in the mid-abdomen (Figure 1). The calculated ratio of maximum small intestinal diameter to the narrowest height of the fifth lumbar vertebral body was 3.70, supporting the diagnosis of mechanical intestinal obstruction. However, as reported previously, radiography alone is not specific for intussusception [17, 20].

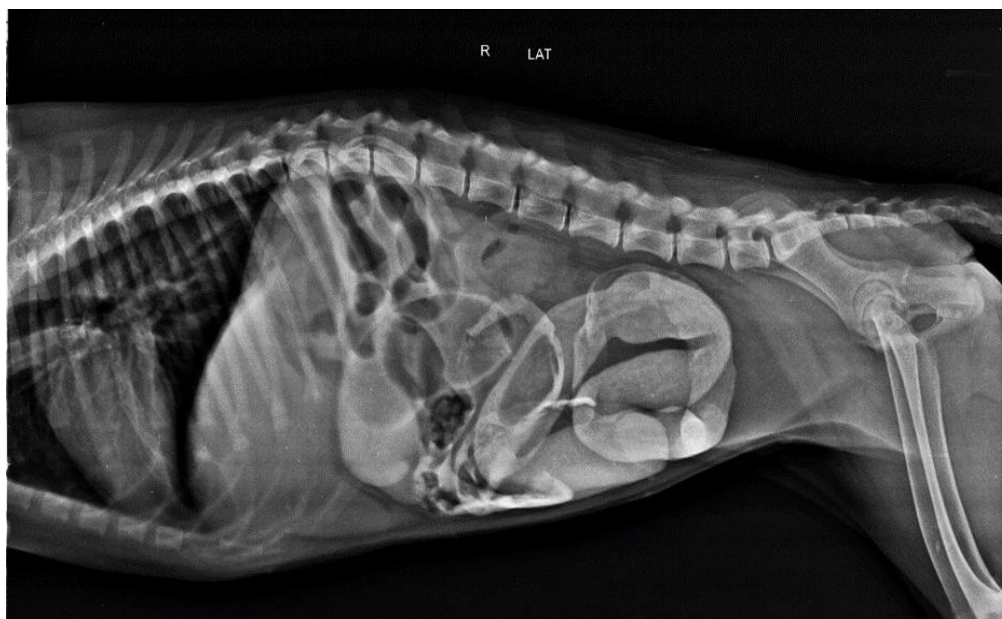
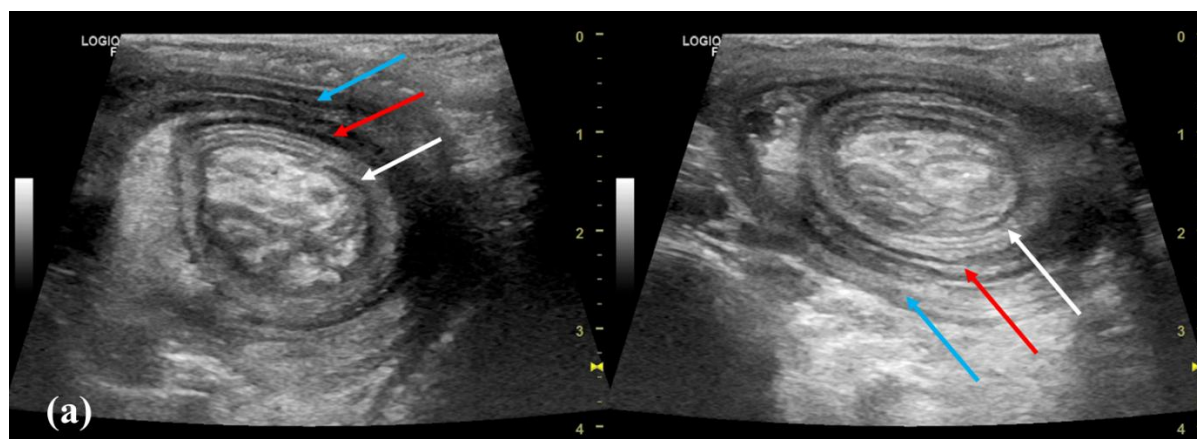


Fig 1. Right lateral abdominal contrast radiograph obtained after a barium series revealed gas- and contrast-filled proximal intestinal loops. The calculated ratio of maximum small intestinal diameter to the narrowest height of the fifth lumbar vertebral body was 3.70, which is consistent with intestinal obstruction.

Abdominal ultrasonography was performed using a linear transducer (6-12 MHz) of ultrasound scanner (Make: GE, Model: Logiq F8 Expert). Transverse images of the mid-abdomen revealed concentric alternating hyperechoic and hypoechoic rings, consistent with the classic *target* or *bull's-eye* sign (Figure 2a). A second concentric structure was identified within the first, producing the characteristic *triple-circle* (or *triple-target*) sign, which is pathognomonic for double intussusception [9, 12, 13]. Longitudinal scans

demonstrated parallel echogenic and hypoechoic lines corresponding to invaginated intestinal walls and mesenteric fat¹⁷ (Figure 2b). Power Doppler confirmed vascular supply within the involved intestinal segments, indicating viability (Figure 2c). Collectively, the ultrasonographic findings conclusively established the diagnosis of double intussusception involving the ileo-ileal and ileo-colic segments.



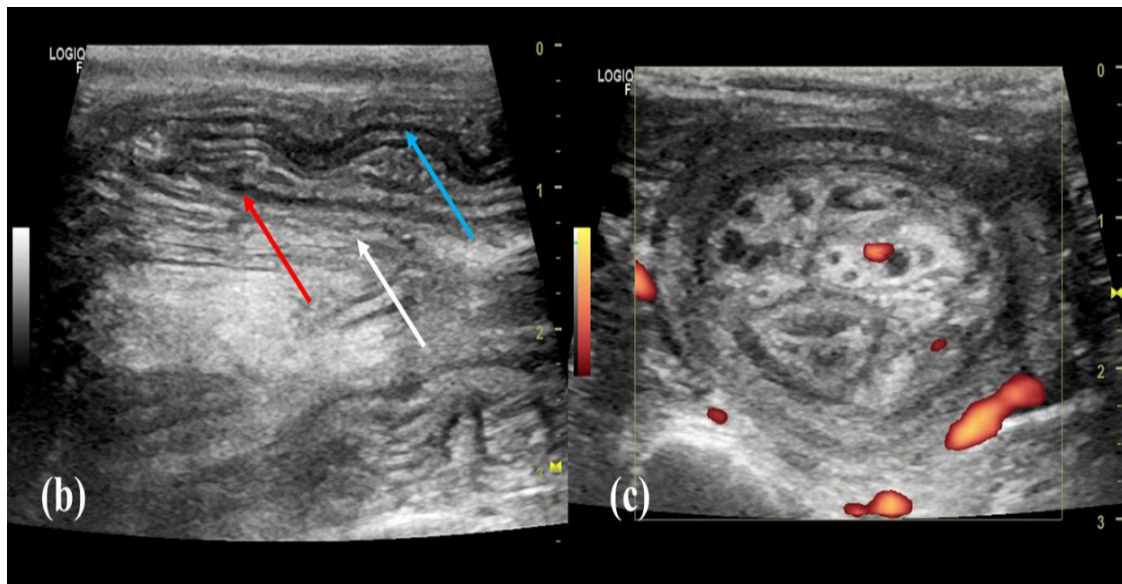


Fig 2: Abdominal ultrasonography in transverse view (a) and longitudinal view (b) demonstrating the characteristic triple-circle (or triple-target) sign diagnostic of double intussusception. The white arrow indicates the innermost circle (intussusceptum), the red arrow denotes the middle circle (first intussusciens), and the blue arrow represents the outermost circle [second or 'parent' intussusciens]. (c) Power Doppler image confirming vascular supply within the involved segments, suggestive of intestinal viability

Following stabilization with intravenous isotonic crystalloids (Lactated Ringer's solution at 5 mL/kg/h), the patient was premedicated with atropine sulfate (0.04 mg/kg, IM), and butorphanol (0.2 mg/kg, IM). General anaesthesia was induced with propofol (4 mg/kg, IV) and maintained with isoflurane (2%) in oxygen using a circle rebreathing system. Preoperative antibiotic prophylaxis included Ceftriaxone + Tazobactam (20 mg/kg, IV) and metronidazole (10 mg/kg, IV).

A ventral midline celiotomy was performed from the xiphoid to the pubis. Upon entering the abdomen, a double intussusception was identified a primary ileoceccocolic intussusception and a secondary jejuno-jejunal invagination nested proximally. The outer serosal surface appeared mildly congested with serous exudation, but no evidence of perforation or peritonitis was observed (Figure 3).

Gentle manual reduction was attempted by "milking" aborally the intussusceptum from the intussusciens. The proximal

jejunal segment, however, was non-viable, displaying dark-red discoloration and lack of peristalsis, indicating ischemic necrosis. Consequently, resection of the devitalized segment was performed, followed by end-to-end anastomosis using single-layer simple continuous sutures with 3-0 polyglactin 910 (Vicryl), (Figure 4).

Serosal adhesions were induced by gently folding the small intestines into loops and apposing their antimesenteric borders. Simple interrupted sutures were placed at these adjoining sites, thereby creating controlled serosal contact that promoted adhesion formation and helped prevent recurrence of intussusception (Figure 5).

The anastomosis site was omentally wrapped to enhance vascularization and healing. The abdominal cavity was lavaged with warm sterile saline, as well as metronidazole solution and routinely closed using 2-0 polyglactin 910 (Vicryl) for Linea Alba, 3-0 Vicryl for subcutaneous tissue, and 2-0 polyamide for skin sutures.



Fig 3: Intraoperative image showing double intussusception (ileo-colic and jejuno-jejunal) with mild serosal congestion



Fig 4: End-to-end intestinal anastomosis performed following resection of non-viable intestinal segment.



Fig 5: Serosal adhesions were created by gently folding the intestines into loose loops and securing them with simple interrupted sutures placed along the adjoining antimesenteric borders.

Post-operative Care and Outcome

Post-operatively, the puppy was maintained on IV fluids (Lactated Ringer's 5 mL/kg/h) for 48 hours. Analgesia was provided using meloxicam (0.2 mg/kg, SC, once daily for 3 days) and tramadol (2 mg/kg, IM, twice daily for 2 days). Broad-spectrum antibiotic coverage with ceftriaxone + tazobactam (20 mg/kg, IV, OD for 5 days) and metronidazole (10 mg/kg, IV, BID for 3 days) was continued.

The animal was fasted for 24 hours post-surgery, after which small quantities of oral rehydration solution were offered, followed by a soft, easily digestible diet from the third day. The dog passed normal faeces by day four, indicating restoration of gastrointestinal function. Skin sutures were removed on the tenth postoperative day. No recurrence or complications were noted during the 30-day follow-up period.

Discussion

Intussusception in dogs, particularly double intussusception, is an uncommon but clinically significant surgical emergency [2, 3, 6, 9-13, 18]. The condition involves invagination of a bowel segment into another, leading to luminal obstruction and vascular compromise. When two sites are involved either sequentially or within each other the diagnostic and surgical complexity increases considerably [10, 18, 19].

Clinical presentation depends on the duration and severity of obstruction. Affected animals typically exhibit vomiting, anorexia, lethargy, dehydration, abdominal pain, and occasionally hematochezia. If left untreated, compromised blood supply can result in bowel necrosis, perforation, peritonitis, and death [5, 6, 11]. Due to early presentation and timely diagnosis of the affection resulted in favourable prognosis. In the present case, the coexistence of jejuno-jejunal and ileocecolic intussusceptions is consistent with reports describing compound forms of the disorder [13]. Such cases are rare and often result from altered motility and inflammation in multiple intestinal segments [1-9]. Predisposing factors include parasitic infestation, viral enteritis, dietary changes, or idiopathic hypermotility. Although the exact cause in this case was not identified, a history of recent dietary transition could have contributed. Diagnostic imaging, particularly ultrasonography, is indispensable for early and accurate detection. The "target sign" or "bull's-eye sign" typically indicates simple intussusception, while a "triple-circle sign" is pathognomonic of double intussusception [9, 12, 13]. This ultrasonographic finding represents multiple invaginated bowel layers and mesenteric fat. Similar imaging features have been documented in previous canine and human cases [3, 17].

Radiography alone is less specific but may demonstrate gas and contrast accumulation proximal to the obstruction [7, 20]. The ultrasonographic features in this puppy aligned with previous literature, aiding in prompt surgical decision-making [1, 2, 4]. Surgical intervention remains the definitive treatment [11, 19]. Manual reduction may suffice in early, viable cases, whereas necrosis or adhesions necessitate resection and anastomosis. The use of absorbable monofilament sutures such as polyglactin 910 provides superior tensile strength and delayed absorption, facilitating optimal healing. Omental wrapping of the anastomosis, as performed here, has been shown to enhance local perfusion and resistance to leakage. Enteroplication has been advocated by some authors [1, 8, 16] to prevent recurrence, but it may predispose to postoperative obstruction or ileus [8]. In this case, enteroplication was performed, and the animal remained recurrence-free for 30 days post-surgery.

Prognosis after successful surgical correction is generally favourable if addressed before irreversible ischemic damage or peritonitis sets in [5]. The uneventful recovery in the present case aligns with similar reports [11, 13], emphasizing that timely diagnosis and meticulous surgical technique are pivotal for survival and long-term intestinal function.

Conclusion

Double intussusception, though rare, should be considered in young dogs presenting with persistent vomiting and abdominal mass. Ultrasonography serves as a rapid, non-invasive diagnostic modality for early detection, while prompt surgical intervention ensures an excellent prognosis. This case underscores the diagnostic value of the *triple-circle sign* and reaffirms that successful surgical correction combined with diligent postoperative care can result in complete recovery without recurrence.

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Reference

- Applewhite AA, Cornell KK, Selcer BA. Diagnosis and treatment of intussusceptions in dogs. *Compend Contin Educ Pract Vet.* 2002;24(2):110-127.
- Atray M, Raghunath M, Singh T, Saini NS. Ultrasonographic diagnosis and surgical management of double intestinal intussusception in three dogs. *Indian Vet Surg J.* 2012, p. 1-4. Available from: <https://pubmed.ncbi.nlm.nih.gov/23372193>
- Bellenger CR, Middleton DJ, Ilkiw JE. Double intussusception followed by reintussusception in a kitten. *Vet Rec.* 1982;110(14):323-324.
- Byrne AT, Geoghegan T, Govender P, Lyburn ID, Colhoun E, Torreggiani WC. The imaging of intussusception. *Clin Radiol.* 2005;60(1):39-46.
- Cera SM. Intestinal intussusception. *Clin Colon Rectal Surg.* 2008;21(2):106-113.
- Ghashghaii A, Javdani M, Mazdarani P. Double intestinal intussusception due to acute enteritis in a young Tibetan Spaniel dog. *Iran Vet Surg Assoc J.* 2017, p. 1-5. <https://doi.org/10.22034/ivsa.2017.50242>
- Graham JP, Lord PF, Harrison JM. Quantitative estimation of intestinal dilation as a predictor of obstruction in the dog. *J Small Anim Pract.* 1998;39(11):521-524. <https://doi.org/10.1111/j.1748-5827.1998.tb03698.x>
- Haider G, Leschnik K, Katic N, Dupré G. Enteroplication in cats with intussusception: A retrospective study (2001-2016). *J Feline Med Surg.* 2019;21(6):488-94.
- Kim HS, Jeon SH, Hwang TS, Yoon YM, Yeon SC, Lee HC. Double intussusception in a Jindo puppy: triple-circle sign. *J Vet Clin.* 2016;33(3):176-178.
- Jennes D. Intussusception in canines: A review. *Pharma Innov J.* 2022;11(Suppl 1):89-97.
- Joy CL, Patterson JM. Short bowel syndrome following surgical correction of a double intussusception in a dog. *Can Vet J.* 1978;19(8):254-259.
- Kim JM, Kang SS, Kim G, Choi SH. Double intussusception in a Shih-Tzu puppy: the triple-circle sign. *Pak Vet J.* 2012;32(2):292-294.
- Levitt L, Bauer MS. Intussusception in dogs and cats: A review of thirty-six cases. *J Am Vet Med Assoc.* 1992;33:660-4.
- Lewis DD, Ellison GW. Intussusception in dogs and cats. *Compend Contin Educ Pract Vet.* 1987;9(5):523-32.
- Oakes MG, Lewis DD, Hosgood G, Beale BS. Enteroplication for the prevention of intussusception recurrence in dogs: 31 cases (1978-1992). *J Am Vet Med Assoc.* 1994;205(1):72-5. <https://doi.org/10.2460/javma.1994.205.01.72>
- Patsikas MN, Papazoglou LG, Paraskevas GK. Current views in the diagnosis and treatment of intestinal intussusception. *Top Companion Anim Med.* 2019;37:100360. <https://doi.org/10.1016/j.tcam.2019.100360>
- Prathaban S, Ramprabhu MR, Simon S. Double intussusception in a dog. *Indian J Canine Pract.* 2013;5(1):45-7.
- Saharan S, Niwas R, Mathew RV, Agnihotri D. Rare case of double intussusception in a pup and its surgical management. *Int J Agric Environ Sci.* 2018;5(3):38-40. <https://doi.org/10.14445/23942568/ijaes-v5i3p107>
- Wilson GP, Burt JK. Intussusception in the dog and cat: a review of 20 cases. *J Am Vet Med Assoc.* 1974;164(5):515-518.
- Su HK, Hee SJ, Sung TH, Min YY, Chan SY, Chun HL. Double intussusception in a Jindo puppy: Triple-circle sign. *J Vet Clin.* 2016;33(3):176-178.

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