

Double Intussusception in a Jindo Puppy : Triple-circle Sign

Hyun-su Kim*, Soo-hee Jeon, Tae-sung Hwang, Young-min Yoon, Seong-chan Yeon and Hee-Chun Lee¹

Institute of Animal Medicine, College of Veterinary medicine, Gyeongsang National University, Jinju 660-701, Korea
**Busan Animal Medical Center, Busan, Korea*

(Received: April 14, 2016 / Accepted: June 13, 2016)

Abstract : Here we report a case of a 7-month-old Jindo puppy with a double intussusception. On survey radiography, a soft tissue opacity mass was identified in the mid-abdomen. Abdominal ultrasonography revealed a triple-circle sign. Double intussusception was diagnosed based on these findings. Exploratory laparotomy confirmed it to be a double intussusception in the small intestine. Small intestine involving the double intussusception was surgically resected followed by anastomosis. The dog had good prognosis without any complication. To the best of our knowledge, double intussusception is an extremely rare form of intestinal disease in dogs. It may cause blood supply to that section to be greatly reduced, thus causing ischemia and necrosis of the bowel tissue. Timely diagnosis with ultrasonographic findings and immediate surgical intervention are important to improve the prognosis of such cases.

Key words : Double intussusception, Triple-circle sign, Ultrasonography.

Introduction

An intussusception is strictly defined as the taking up or receiving one part within another part, especially in reference to the invagination of one segment of the intestine within another segment of the intestine. The portion of gastrointestinal (GI) tract that is displaced in the lumen of another segment of the GI tract is referred to as intussusceptum, whereas the outer part or the receiving portion is referred to as the intussusciens. Intussusceptions occur primarily in dogs younger than 1 year of age. They are most commonly found at the ileocecolic junction (1). Although double intussusception (DI) in dogs is rare, it can cause standard intussusception symptoms indistinguishable from classical intussusception preoperatively (7). A number of conditions including ingestion of bones, linear foreign bodies, prior abdominal surgery, and intestinal parasitism have been suggested as the predisposing factors of DI (3,4). Most intussusceptions in young animals are idiopathic. The most common clinical signs of intussusception are vomiting, diarrhea, depression, anorexia, palpable abdominal mass, and abdominal pain (3,4,9). Intussusception in dogs and puppies has been reported previously (9). Although double intussusception is rare in dogs, it has been reported in dogs and puppies (3,4,7,12,13). Ultrasonography with radiography can be used to establish a definitive diagnosis.

Case

On June 20, 2012, a 7-month-old intact female Jindo dog with weight of 13.8 kg was referred to Gyeongsang National

University Veterinary Medical Teaching Hospital with symptoms of anorexia and depression for three days. The dog had a history of vomiting two days ago. Clinical history, physical examination, laboratory examination, abdominal radiographic examination, and ultrasonographic examination were used as diagnostic methods. On physical examination, there was no remarkable abnormality except depression and vital signs. Hematological examination revealed mild leukocytosis and electrolyte imbalance.

On plain abdominal radiographs, a mild loss of serosal detail in the entire abdomen and an ill-defined soft-tissue opacity mass at the mid-abdomen were found (Fig 1). Abdominal ultrasonographic examination was performed to evaluate the mass more accurately. The transverse ultrasonographic image of the mass at the mid-abdomen level showed a typical "triple circle sign" (Fig 2) different from the target sign of classic single intussusception. Ultrasonographic features included multilayered concentric rings with a hyperechoic center in the transverse plane and multiple parallel lines in the longitudinal plane.

A double intussusception was tentatively diagnosed based on these descriptive findings. At exploratory laparotomy, a double intussusception was detected in the small intestine (Fig 3A and 3B) with severe adhesions between the intussusceptum and intussusciens. Therefore, the involved intestinal segment at the site of double intussusception was resected followed by end-to-end anastomosis. The ultrasonographic features of the transverse section of the double intussusception are shown in Fig 3C. Postoperative course of the dog was uneventful.

Discussion

Double intussusception in small animal is a very rare entity. It has symptoms typical for intussusception. DI is

¹Corresponding author.
E-mail : lhc@gnu.ac.kr

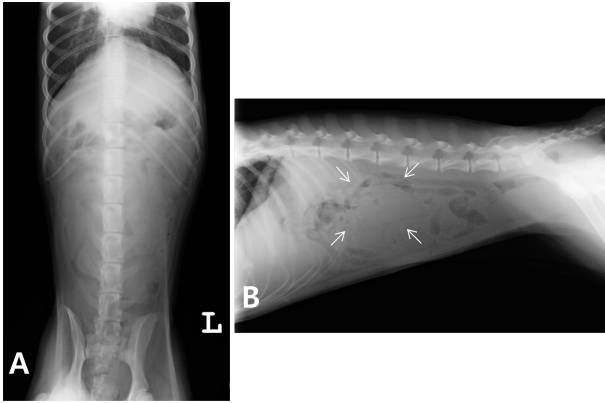


Fig 1. Survey radiographs of the dog. Plain abdominal radiographs showing a mild loss of serosal detail in the entire abdomen and a soft-tissue opacity mass (white arrows) at the mid-abdomen.

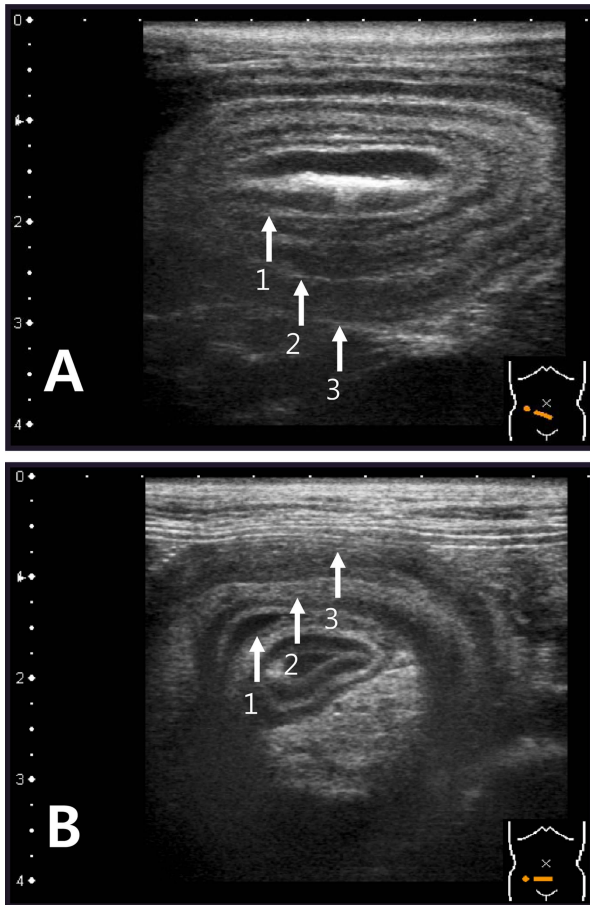


Fig 2. Triple-circle appearance in the transverse section. 1 = the proximal prolapsed segment; 2 = the distal prolapsed segment; 3 = the distal intestinal segment.

indistinguishable from classical intussusception preoperatively. Therefore, confirmed diagnosis of DI can be made during surgical intervention.

Signs of intussusceptions in small animals can vary. The most common clinical signs in dogs with intestinal intussusceptions are vomiting, diarrhea with hematochezia or melena, anorexia, and weight loss. Other clinical signs include dehydration, abdominal pain, tenesmus, and rectal prolapse. Pal-

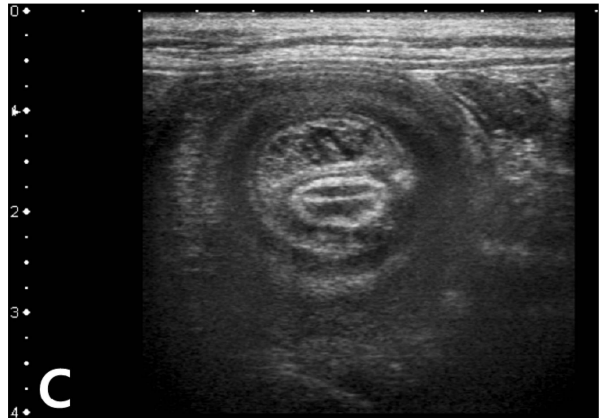
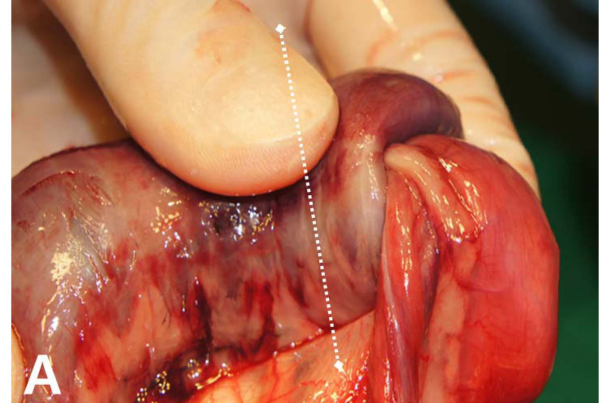


Fig 3. Identification of double intussusception. A, B: Intraoperative and surgically resected intestine. White dot line representing cross-sectioned guideline. C: Transverse ultrasonographic image of 3B.

pable abdominal mass is present in 50% to 70% of dogs with intussusception. Most palpable abdominal mass is in the cranial abdomen (2,9-11,14,15). The current case had common clinical signs including depression, anorexia, and vomiting.

Abdominal radiographs in dogs with intussusception commonly reveal fluid- or gas-distended bowels, consistent with mechanical intestinal obstruction. A soft-tissue opacity mass may be identified on survey radiographs (6,10,11). A soft tissue opacity mass was also identified on abdominal plain radiographs in this case. Therefore, abdominal ultrasonography was progressed.

Abdominal ultrasonography has been used as a reliable diagnostic tool for intestinal intussusceptions in dogs (5,8). The characteristic ultrasonographic features of an intestinal

intussusception include a series of concentric rings in the transverse plane frequently described as “target sign” or “bull’s-eye lesion” with multiple parallel lines in the longitudinal plane. These findings correlate with the feature of multiple layers of the intestinal wall of intussusceptum and intussusciptens present within intussusceptions (8). The target sign is a typical finding of classic intussusceptions on ultrasonography. However, a triple-circle sign that is completely different from the classic target sign is the characteristic finding of dogs with double intussusceptions on ultrasonography (7). We found the typical descriptive findings with a triple-circle sign of double intussusception and the target sign of intussusceptions.

Conclusion

This case is diagnosed as a double intussusception with a triple-circle sign on ultrasonography. The definitive diagnosis was surgically confirmed.

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