

*Case Report*

## **INTESTINAL LYMPHANGIECTASIA IN DOGS, CHALLENGING DIAGNOSIS: FOUR CASES**

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### **Abstract**

Intestinal lymphangiectasia is an uncommon disease which can cause severe, chronic protein-losing enteropathy in dogs. Four dogs were presented at the Belgrade Clinic for Small Animals with clinical signs of chronic diarrhea, lethargy, anorexia, vomiting and weight loss. Abnormal physical examination findings included dehydration, signs of pain on abdominal palpation, and ascites. The most important clinicopathological findings were lymphopenia and hypoproteinemia with hypoalbuminemia. Abdominal ultrasound revealed intestinal abnormalities in all dogs. To establish an undoubted diagnosis of intestinal lymphangiectasia, endoscopy and histopathology were conducted.

**Key Words:** diagnosis, dogs, lymphangiectasia, protein-losing enteropathy

## **CASE PRESENTATION**

Intestinal lymphangiectasia (IL) is a dilatation of lymphatic vessels within the gastrointestinal tract. It is an uncommon disease which can cause severe, chronic protein-losing enteropathy in dogs. IL may be a primary (congenital) disorder or secondary (acquired) process (Larson et al., 2012). Secondary IL develops in adult dogs and can be attributable to obstructive lesions in the lymphatic system or venous hypertension (Kull et al., 2001; Peterson & Willard, 2003). Definitive diagnosis of IL is obtained through histopathologic evaluation of intestinal biopsies, which can be obtained surgically or endoscopically (Washabau et al., 2010).

Four dogs were admitted to the Clinic for Small Animals and Teaching Hospital at the Faculty of Veterinary Medicine in Belgrade for medical consultation and assistance. All

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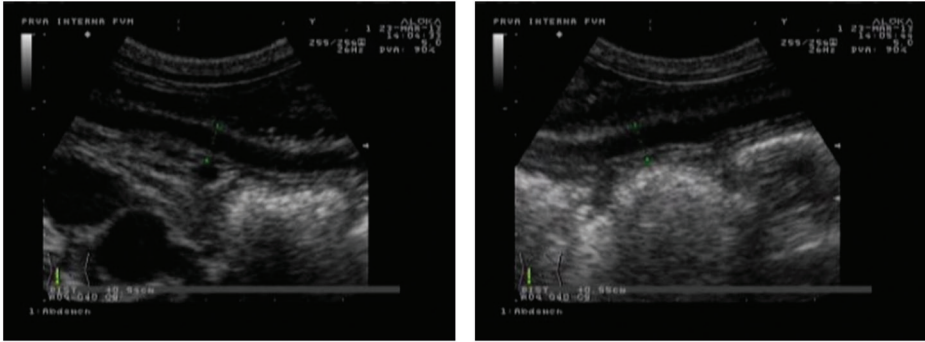
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relevant data (e.g. age, breed, gender, history of the disease, major clinical signs) of the patients were collected and recorded by the veterinarians during clinical examination. After a general clinical examination, venous blood samples were collected for complete blood count (CBC), and the serum biochemistry profile including blood urea nitrogen, creatinine, total protein, albumin, glucose, creatine kinase, alkaline phosphatase, aspartate aminotransferase and alanine aminotransferase. CBC was determined with an automatic cell counter (Abacus Junior Vet, Diatron, Austria), using the pre-formatted software for analyzing dog's blood. The biochemical profiles were obtained by using a semi-automated biochemistry analyzer (Vet Evolution, BSI, Italy) with the original reagents, in accordance with the recommended standard protocols. Urinalysis was conducted in all cases. For ultrasound, animals were examined in the dorsal position. Aloka ProSound 5000 SSD (Hitachi Aloka Medical, Tokyo, Japan) with 10 MHz linear transducer and 7 MHz convex transducer was used. Endoscopy was performed with a commercial video endoscope (Karl Storz, Tuttlingen, Germany). Biopsy specimens of the small intestine were fixed in neutral-buffered 10% formalin and hematoxylin and eosin stained sections were prepared.

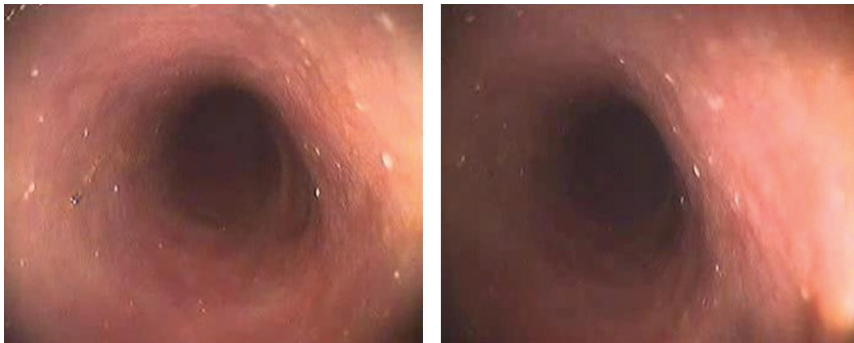
Two dogs were castrated males (four and five years old), one was a sexually intact male (six years old), and one was a spayed female (five years old). The affected breeds were Yorkshire Terriers (2/4 cases), Scottish Terrier (1/4) and English Bulldog (1/4). The most common clinical signs were diarrhea (4/4), lethargy (4/4), vomiting (3/4), anorexia (2/4) and weight loss (2/4). Abnormal physical examination findings included dehydration (2/4), signs of pain on abdominal palpation (2/4) and ascites (1/4).

In all cases, CBC showed mild lymphopenia. All other hematological parameters were within the reference ranges. Biochemical profiles showed moderate hypoproteinemia with hypoalbuminemia in all cases (total protein  $38 \pm 5$  g/L, reference range 50-80 g/L; albumin  $16 \pm 3$  g/L, reference range 28-40 g/L), and a mild increase in aspartate aminotransferase and alanine aminotransferase in two cases. Urinalyses revealed no pathological alterations. Abdominal ultrasound examination revealed thickening of the small intestinal wall (3/4 dogs), peritoneal effusion (2/4) and hyperechoic mesentery in one dog (Fig. 1). In both cases with peritoneal effusion, abdominocentesis yielded a pure transudate, with no cellularity on cytologic examination.

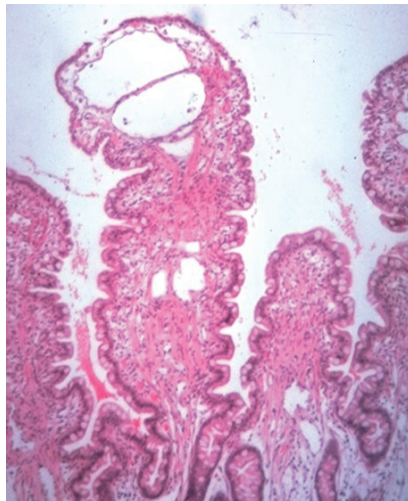
Clinical and imaging findings were compatible with the following differential diagnosis of protein-losing enteropathy (e.g. IL) and severe enteritis (e.g. small intestinal inflammatory bowel disease, small intestinal bacterial overgrowth, acute ulcerative enteritis, or intestinal neoplasia). To elucidate a final diagnosis it was necessary to do an endoscopy (gastroscopy and duodenoscopy) and to take biopsies for histopathology. Duodenoscopy revealed moderate to marked mucosal granularity and white discoloration of the duodenal mucosa in all cases (Fig. 2). In one case, mucoid milky exudate along the mucosa of the proximal descending duodenum was seen. IL was confirmed histologically in all four cases (mild in one case, moderate in two cases and severe in one case) (Fig. 3).



**Fig. 1.** Abdominal ultrasound revealed thickening of the small intestinal wall in 3 of 4 cases



**Fig. 2.** Mucosal granularity and white discoloration of the duodenal mucosa



**Fig. 3.** Dilated lacteals of the small intestinal villi (H&E)

## DISCUSSION

IL is a relatively rare disease in dogs, but is one of the most common causes of gastrointestinal protein loss. It is very difficult and challenging to come to an indisputable diagnosis of lymphangiectasia in dogs. The right approach to patients with suspected IL requires interpretation of all the necessary analyses and results (CBC, biochemical parameters, ultrasound, endoscopy and finally, histopathology).

In this report, three of four cases were dogs of breeds with a higher incidence of IL. Beside Yorkshire Terriers and Scottish Terriers, IL often occurs in Soft-coated Wheaten Terriers, Basenjis, Rottweilers and Lundeheunds (Littman *et al.*, 2000; Melzer & Sellon, 2002). All detected clinical signs were nonspecific (diarrhea, lethargy, vomiting, anorexia and weight loss), as it usually is in dogs with IL (Potocnjak *et al.*, 2001; Fogle & Bissett, 2007). The main clinicopathological findings were lymphopenia, hypoproteinemia with hypoalbuminemia and a mild increase in aspartate aminotransferase and alanine aminotransferase in two cases. These results correspond well to the abnormalities reported previously in dogs with IL (Kull *et al.*, 2001). Ascites, which was detected in two cases, is mainly found in dogs with IL due to decreased oncotic pressure secondary to hypoproteinemia. Other disorders that should be excluded in dogs with hypoalbuminemia include protein-losing nephropathy and liver diseases. In our cases, nephropathy was unlikely because there was no proteinuria recorded. Liver disease could not be definitively ruled out because liver function tests and liver biopsy were not performed.

Abnormalities on the abdominal ultrasonography described in our cases without other significant abnormalities cannot be used as a distinctive feature but can support a tentative diagnosis of IL. Abdominal ultrasonography findings in dogs with IL may not correlate with the severity of the disease (Kull *et al.*, 2001). A definitive diagnosis of IL was made following a histological assessment of intestinal biopsies, which had been obtained endoscopically. Advantages of endoscopic biopsies include decreased invasiveness, expense, and patient risk relative to surgical biopsies, and the opportunity to obtain biopsies via direct magnified visualization of the mucosa (Larson *et al.*, 2012).

Unfortunately, in everyday clinical practice, many IL cases are left with only the working diagnosis of protein-losing enteropathy. The right approach, which could lead to a more precise diagnosis of IL, is to collect and consider all necessary results and finally, to perform suitable histological evaluation.

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### Authors' contributions

VK conceived the study, designed and coordinated all the clinical work. Darko D participated in study conceiving and manuscript writing. MV and AIB were involved in all clinical work. Dajana D and MDj participated in analysis and interpretation of data and manuscript writing. All authors read and approved the final manuscript.

### Declaration of conflicting interests

Hereby we disclose any financial and personal relationships with other people or organisations that could inappropriately influence our work.

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## **CREVNA LIMFANGIEKTAZIJA KOD PASA, TEŠKO DO DIJAGNOZE: 4 SLUČAJA**

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### **Kratak sadržaj**

Crevna limfangiektazija predstavlja retko oboljenje kod pasa koje može izazvati ozbiljne, hronične enteropatije sa gubitkom proteina. Na Klinici za male životinje u Beogradu su primljena četiri psa sa simptomima hronične dijareje, letargije, anoreksije, povraćanja i gubitka na težini. Opštim pregledom su ustanovljene promene u smislu dehidracije, bolnosti na palpaciju abdomena i ascitesa. Najznačajnije kliničko-patološke promene su bile limfopenija i hipoproteinemija sa hipoalbuminemijom. Ultrazvučnim pregledom abdomena su ustanovljene promene na crevima kod svih pasa. Da bismo postavili nesumljivu dijagnozu crevne limfangiektazije urađena je endoskopija i histopatologija.

**Ključne reči:** dijagnoza, enteropatija sa gubitkom proteina, limfangiektazija, psi