

ELEMENTS OF CLINICAL AND PARACLINICAL DIAGNOSIS IN THE ACUTE DIARRHEAL SYNDROME IN DOGS ELEMENTE DE DIAGNOSTIC CLINIC ȘI PARACLINIC ÎN SINDROMUL DIAREIC ACUT LA CÂINI

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ABSTRACT | REZUMAT

This paper aimed to identify the clinical and para-clinical diagnostic elements of the acute diarrheal syndrome in dogs, useful in streamlining treatment. The clinical diagnosis of haemorrhagic acute diarrheal was easy to establish given the profoundly altered general condition with cortical inhibition and melena; sometimes it has been clinically evolved as dysentery (frequent bloody defecation). In catarrhal acute diarrheal, it can sometimes be profuse (exhausting), accompanied by alteration of the patient's general condition and drowsiness. The ultrasonographical examination revealed inflammation of the intestinal wall with a hyperechoic appearance and a halo exterior hypoechogenic corresponding to parietal congestion. The haematological examination revealed hypochromic, normocytic anaemia and a systemic inflammatory syndrome (increased WBC=17.2±0.3x10³/μL, decreased RBC=5.3±0.4x10³/μL, HGB=11.8±0.4 g/dL, and CHEM=31.0±0.2 g/dL). The blood biochemical examination showed subclinical liver failure without impairment of renal and exocrine pancreas functions. The sero-haemorrhagic acute diarrhoea had been clinically manifested by cyclic episodes of diarrhoea. The radiological examination revealed inflammation of the intestinal mucosa and the presence of superficial ulcers, and the coproparasitological examination confirmed cryptosporidiosis. The sero-haemorrhagic acute diarrhoea was the consequence of traumatic gastroenteritis, confirmed by a radiological exam (dense, radiolucent contents in the gastrointestinal mass). In this situation, the haematological examination revealed a systemic inflammatory process (increased WBC=18.0±0.3x10³/μL) and hypochromic, normocytic anaemia (decreased value only CHEM=31.8±0.3 g/dL). The blood biochemical examination re-vealed subclinical liver failure (increased values only ALT=88.2±0.3 IU/L and ALP=120.3±0.4 IU/L).

Keywords: acute diarrhoea, dog, differential diagnosis

Scopul acestei lucrări a fost identificarea elementelor de diagnostic clinic și paraclinic ale sindromului diareic acut la câini, utile în eficientizarea tratamentului. Diagnosticul clinic în diareea acută hemoragică a fost ușor de stabilit având în vedere starea generală profund alterată cu inhibiție corticală și melenă; uneori a evoluat clinic ca dizenterie (defecare frecventă cu sânge). Diareea acută catarrhală poate fi uneori profuză (epuizantă), însoțită de alterarea stării generale a pacientului și de somnolență. Examenul ecografic a evidențiat inflamația peretelui intestinal cu aspect hiperecogen și un halo exterior hipoechogen corespunzător congestiei parietale. Examenul hematologic a evidențiat anemie hipocromă, normocitară și un sindrom inflamator sistemic (creșterea WBC=17,2±0,3x10³/μL, scăderea RBC=5,3±0,4x10³/μL, HGB=11,8±0,4 g/dL și CHEM=31,0±0,2 g/dL). Examenul biochimic al sângelui a indicat o insuficiență hepatică subclinică fără afectarea funcțiilor renale și ale pancreasului exocrin. Diareea acută sero-hemoragică s-a manifestat clinic prin episoade ciclice de diaree. Examenul radiologic a pus în evidență o inflamație a mucoasei intestinale și prezența ulcerelor superficiale, iar examenul copropazitologic a confirmat criptosporidioza. Diareea acută sero-hemoragică a fost și consecința unei gastroenterite traumatice, confirmată prin examen radiologic (conținut dens, radiotransparent în masa gastrointestinală). În această situație, examenul hematologic a evidențiat un proces inflamator sistemic (creșterea WBC=18,0±0,3x10³/μL) și anemie hipocromă, normocitară (doar cu scăderea CHEM=31,8±0,3 g/dL). Examenul biochimic al sângelui a pus în evidență insuficiența hepatică subclinică (valori crescute numai ale ALT=88,2±0,3 UI/L și ALP=120,3±0,4 UI/L).

Cuvinte cheie: diaree acută, câine, diagnostic diferențial

Functional diarrhoea is a typical clinical sign of enteritis, and in dogs, enteritis also evolves with clinical signs of gastritis due to the particularities of the digestive tract (7, 11).

Clinically, an acute diarrheal syndrome in dogs has frequently a haemorrhagic, catarrhal, or sero-haemorrhagic appearance, which has added to the common clinical signs of gastroenteritis (1, 2, 4). Also, an acute diarrheal syndrome in dogs has a varied aetiology that doesn't allow it to be addressed by a unitary therapeutic protocol (3, 5, 10). In order to establish the etiological diagnosis and to adopt a curative-prophylactic

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approach, it is often also necessary to carry out paraclinical diagnostic elements such as laboratory tests (haemoleucogram, some parameters of the blood biochemical profile) and imaging investigations (ultrasound, radiography) (6, 8).

Thus, the clarification of clinical and paraclinical diagnostic elements in the acute diarrheal syndrome frequently encountered in dogs, facilitates the clinical diagnosis and streamlines the treatment.

MATERIALS AND METHODS

Research has been done on 25 dogs of different ages, sexes and breeds, showing clinical signs of the acute diarrheal syndrome. The clinical diagnostic elements were the consistency and appearance of faeces, the frequency of defecation, and the general condition of the patient. From this point of view, acute diarrheal syndrome was haemorrhagic, catarrhal, or sero-haemorrhagic.

Subsequently, depending on the clinical diagnosis were performed paraclinical examinations in order to specify the primary disease and to recommend the appropriate treatment. For this purpose, were determined the haemoleukogram, some blood biochemical parameters of liver profile – aspartate-aminotransferase (AST), alanine-aminotransferase (ALT), alkaline phosphatase (ALP), renal profile – creatinine (CRT N), blood-urea-nitrogen (BUN) and amylase (AMY), the ultrasound, radiological and copro-parasitological examination.

For the haematological examination, blood samples were collected on anticoagulant (EDTA) and were determined RBC (red blood cells), HCT (haematocrit), HGB (haemoglobin), VEM (mean corpuscular volume), HEM (mean corpuscular haemoglobin), CHEM (mean corpuscular haemoglobin concentration), WBC (white blood cells) and PLT (platelets). For these determinations was used an automatic haematology analyser (Vet Scan HM5, Abaxis, USA).

For the biochemical examination, blood was collected in test tubes without anticoagulant for the serum expression and analysed with an automatic biochemical analyser (Vet Scan VS2, Abaxis, USA).

The ultrasound examination was performed using the Acuson NX3 Elite Ultrasound System (Siemens Healthcare GmbH, Germany) and the probe 5-8 MHz.

RESULTS AND DISCUSSIONS

The clinical signs in haemorrhagic acute diarrhoea started with inappetence and retching associated with vomiting and diarrhoea with haemolyzed blood (melena). The patient's general condition was profoundly altered, with cortical inhibition (deviation) and pulse with diminished qualities (increased frequency -

92/min, decreased amplitude and tension). The dehydration was severe (skin fold persisting for more than 60 sec.), the gaze was expressionless, and during the examination, the posterior train was observed soiled with soft, bloody, and foul-smelling faeces (melena) (Fig. 1).



Fig. 1. Dog, half-breed Husky, 6 months old, haemorrhagic acute diarrhoea (deviation, melena, posterior train soiled with soft, and bloody faeces)

In 3 out of 12 patients with haemorrhagic acute diarrhoea this had the appearance of dysentery (frequent bloody defecation and profound impairment of general condition). Clinical examination also revealed a thready pulse, inert attitudes, cyanosis and discoloration of the buccal mucosa, hypothermia ($T=36.8^{\circ}\text{C}$), and traces of soft, bloody faeces remaining on the thermometer (Fig. 2).



Fig. 2. Puppy, half-breed Bichon, 4 months old, dysentery (comatose state, traces of blood around the anus, severe dehydration)

In the haemorrhagic acute diarrheal no other paraclinical examinations were necessary to establish the clinical diagnosis and recommend treatment. The data obtained on clinical examination (bloody diarrhoea) and anamnesis (lack of prophylactic vaccination) were sufficient to specify the diagnosis of haemorrhagic gastroenteritis, most likely viral. The clinical signs of catarrhal acute diarrhoea started with inappetence, vomiting, discrete haematuria, and catarrhal diarrhoea. Later, clinical signs of cortical inhibition (deviation), moderate dehydration (skin fold returning in 50 sec), tachycardia (75 cardiac contractions/min), cold extremities, elevated rectal temperature (39.8°C), soft faeces mixed with mucus remained on the thermometer.

In one out of 9 patients with catarrhal diarrhoea this was profuse (exhausting), and the patient's general condition deteriorated abruptly with repeated vomiting, followed by severe dehydration (skin fold persists over 60 seconds) and profound cortical inhibition (drowsiness) (Fig. 3).



Fig. 3. Puppy, half-breed Bichon, 5 months old, profuse diarrhoea (drowsiness, severe dehydration)

On the ultrasonographic examination, in catarrhal acute diarrhoea was observed the intestinal loops with hypoechoic fluid content, the inflamed intestinal wall with hyperechogenic appearance, and a halo hypoechoic outside corresponding to parietal congestion. The pyloric mucosa was also thickened with obvious hyperechogenic folds and a hypoechoic inflammatory halo (catarrhal gastroenteritis) (Fig. 4).

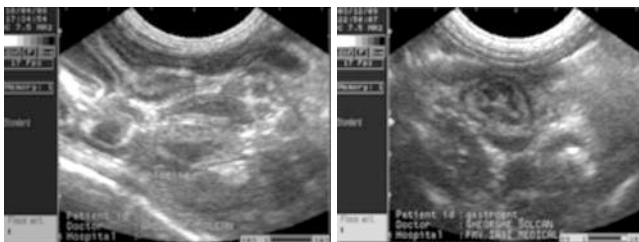


Fig. 4. Catarrhal gastroenteritis (intestinal loops with hypochoic content; thickened pyloric mucosa)

The haematological examination showed increased

WBC ($17.2 \pm 0.3 \times 10^3/\mu\text{L}$), decreased RBC ($5.3 \pm 0.4 \times 10^3/\mu\text{L}$), and HGB (11.8 ± 0.4 g/dL), and unchanged HCT and PLT values (Table 1).

At the same time, the values of the calculated haematological parameters, namely VEM and HEM were within the limits of the mean reference values and CHEM (31.0 ± 0.2 g/dL) was below the limit of the physiological mean values. These data indicate a hypochromic, normocytic anaemia and an inflammatory syndrome that often accompanies catarrhal gastroenteritis.

The blood biochemical examination showed elevated values of AST (60.8 ± 0.3 UI/L), ALT (178.0 ± 0.4 UI/L), and ALP (147.0 ± 0.3 UI/L). At the same time, CRTN, BUN, and AMY values were within the average reference values. These data indicate subclinical liver failure without impairment of renal and exocrine pancreas functions (Table 2).

The clinical examination and history which revealed diarrhoea, vomiting, and the appearance of faeces that were soft and mucousy, to which was added the inflammatory syndrome were the data that indicated the clinical diagnosis of catarrhal gastroenteritis. Clinical signs of sero-haemorrhagic acute diarrhoea are the appetite present and the general condition slightly altered (listlessness). At long intervals of about 1-2 months, episodes of sero-haemorrhagically diarrhoea were observed, sometimes even with streaks of non-haemolysed blood. The radiological examination with contrast medium (barium sulphate) revealed inflammation of the intestinal mucosa and the presence of superficial ulcers, and coproparasitological examination indicated cryptosporidiosis (Fig. 5).

Table 1

Results of the haematological tests in 9 dogs with catarrhal gastroenteritis

Blood parameter	WBC	PLT	RBC	HCT	HGB	VEM	HEM	CHEM
Unit of measuring	$\times 10^3/\mu\text{L}$	$\times 10^3/\mu\text{L}$	$\times 10^6/\mu\text{L}$	%	g/dL	μ^3	pg	g/dL
Values of reference (9)	6-17	160-430	5.5-8.5	37-55	12-18	64-74	22-27	34-36
Determined values	17.2 ± 0.3	378	5.3 ± 0.4	38.0 ± 0.3	11.8 ± 0.4	71.6 ± 0.3	22.2 ± 0.3	31.0 ± 0.2

Legend: WBC-white blood cells; PLT-Platelets; RBC-red blood cells; HCT-haematocrit; HGB-haemoglobin; VEM- mean corpuscular volume; HEM-mean corpuscular haemoglobin; CHEM- mean corpuscular haemoglobin concentration

Table 2

Results of the blood biochemical tests in 9 dogs with catarrhal gastroenteritis

Blood parameter	AST	ALT	ALP	CRTN	BUN	AMY
Unit of measuring	UI/L	UI/L	UI/L	mg/dL	mg/dL	UI/L
Values of reference (9)	8.9-48.5	8.2-57.3	10.6-100.7	0.5-1.6	8.8-25.9	269.5-1462.4
Determined values	60.8 ± 0.3	178.0 ± 0.4	147.0 ± 0.3	0.9 ± 0.2	12.4 ± 0.2	752.0 ± 0.5

Legend: AST-aspartate-aminotransferase; ALT-alanine-aminotransferase; ALP-alkaline phosphatase; CRTN-creatinine; BUN-blood urea nitrogen; AMY-amylase

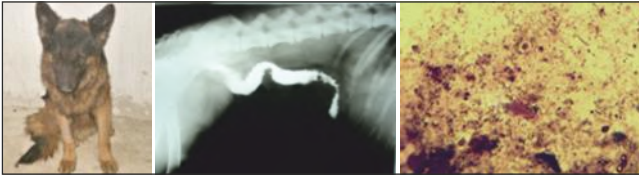


Fig. 5. German Shepherd dog, 5 years old, sero-haemorrhagic diarrhoea (apathy, superficial intestinal ulcers, cryptosporidiosis)

In one out of 4 patients with sero-haemorrhagic diarrhoea this was the consequence of traumatic gastroenteritis. The clinical examination revealed inappetence, vomiting, alternating periods of watery diarrhoea and constipation, abdominal contraction, tachypnoea (50 respiratory movements/min), and tachycardia. The radiological examination was the investigation that confirmed the diagnosis and recommended surgical treatment. A dense, radiolucent content was observed in the gastrointestinal mass (Fig. 6).

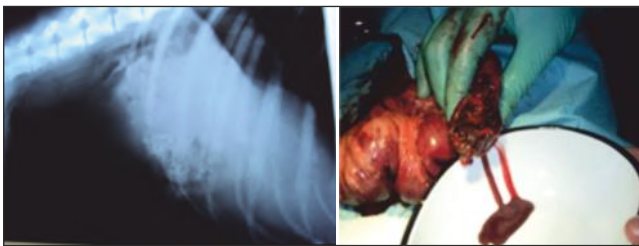


Fig. 6. Doberman dog, 4 years old, traumatic gastroenteritis (through foreign bodies)

Thus, in the sero-haemorrhagic diarrhoea the etiological diagnosis of the primary disease is necessary for the appropriate treatment.

The haematological examination showed only an increased WBC ($18.0 \pm 0.3 \times 10^3/\mu\text{L}$), the other haematological parameters determined had values within the physiological limits of the mean reference values. The calculated haematological parameters had values within physiological limits, except for CHEM (31.8 ± 0.3 g/dL). These data indicate a systemic inflammatory process and a hypochromic, normocytic anaemia (Table 3).

On the blood biochemical examination only elevated ALT (88.2 ± 0.3 IU/L) and ALP (120.3 ± 0.4 IU/L) values were obtained. These data indicate a subclinical liver failure without impairment of renal and exocrine pancreas functions (Table 4).

CONCLUSIONS

In haemorrhagic acute diarrhoea, the clinical examination (bloody diarrhoea) and the history (patient's age and lack of prophylactic vaccination) are often sufficient to establish the diagnosis and recommend treatment, without further paraclinical examinations. Sometimes, it can evolve as dysentery (frequent bloody defecation) with profound impairment of the general condition.

In the catarrhal acute diarrhoea, in addition to the clinical examination, other paraclinical investigations are necessary to clarify the diagnosis, such as ultrasound, haematological or blood biochemical examination, in which case found an inflammatory syndrome or a pathophysiological syndrome of hepatocytolysis (increased serum transaminases). At other times, it may evolve clinically with the appearance of profuse (exhausting) diarrhoea and profound cortical inhibition (drowsiness).

Table 3

Results of the haematological tests in 4 dogs with sero-haemorrhagic diarrhoea

Blood parameter	WBC	PLT	RBC	HCT	HGB	VEM	HEM	CHEM
Unit of measuring	$\times 10^3/\mu\text{L}$	$\times 10^3/\mu\text{L}$	$\times 10^6/\mu\text{L}$	%	g/dL	μ^3	pg	g/dL
Values of reference (9)	6-17	160-430	5.5-8.5	37-55	12-18	64-74	22-27	34-36
Determined values	18.0 ± 0.3	362	6.2 ± 0.4	44.0 ± 0.3	14.0 ± 0.3	70.9 ± 0.4	22.5 ± 0.4	31.8 ± 0.3

Legend: WBC-white blood cells; Plt-Platelets; RBC-red blood cells; HCT-haematocrit; HGB-haemoglobin; VEM-mean corpuscular volume; HEM-mean corpuscular haemoglobin; CHEM-mean corpuscular haemoglobin concentration

Table 4

Results of the blood biochemical tests in 4 dogs with sero-haemorrhagic diarrhoea

Blood parameter	AST	ALT	ALP	CRTN	BUN	AMY
Unit of measuring	UI/L	UI/L	UI/L	mg/dl	mg/dl	UI/L
Values of reference (9)	8.9-48.5	8.2-57.3	10.6-100.7	0.5-1.6	8.8-25.9	269.5-1462.4
Determined values	37.8 ± 0.3	88.2 ± 0.3	120.3 ± 0.4	1.0 ± 0.2	18.2 ± 0.2	640.0 ± 0.5

Legend: AST-aspartate-aminotransferase; ALT-alanine-aminotransferase; ALP-alkaline phosphatase; CRTN-creatinine; BUN-blood urea nitrogen; AMY-amylase

In sero-haemorrhagic diarrhoea, the paraclinical diagnostic elements (radiological, coproparasitological) are essential for the aetiological diagnosis (primary disease) and recommendation of appropriate treatment.

Sometimes, in case of the traumatic gastroenteritis, a more extensive clinical and paraclinical examination is necessary to confirm the presence of foreign bodies in the gastrointestinal tract. It may be accompanied by a systemic inflammatory syndrome, anaemia, or subclinical liver failure.

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