



Eosinophilic and lymphoplasmacytic enteritis in a horse – case report

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[*Colite eosinofílica e linfoplasmocitária em equino – relato de caso*]

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ABSTRACT

Among the Inflammatory Bowel Diseases in horses, eosinophilic and lymphoplasmacytic enteritis is rare and is characterized by an infiltrate of inflammatory cells, causing problems with nutrient absorption, diffuse neoformation and changes in the histological structure of all the tissue layers of the intestine. This report describes a case of eosinophilic and lymphoplasmacytic colitis in an 11-year-old male horse with progressive weight loss, signs of colic syndrome and apathy. No alterations were found in the blood Count, except for leukocytosis with neutrophilia. The biochemical examination showed an increase in indirect bilirubin, and the peritoneal fluid showed a high concentration of total protein, lactate and total nucleated cells. Ultrasound identified free fluid in the abdominal cavity and neoformation in the colon. In view of the findings, exploratory celiotomy was recommended; however, euthanasia was chosen considering the cost-benefit and zootechnical value of the animal. *Post-mortem* histopathological examination of fragments of the greater and lesser colon identified Lymphoplasmacytic colitis and eosinophilic colitis, chronic process, with no determined cause and treatment that is not always effective, but preventive health management measures minimize the triggering factors.

Keywords: cell-infiltrate, colon, equine, inflammatory-bowel-disease

RESUMO

Dentre as doenças inflamatórias intestinais nos equinos, a enterite eosinofílica e linfoplasmocitária é rara, e caracterizada por um infiltrado de células inflamatórias, gerando problemas na absorção de nutrientes, neoformação difusa e mudança de estrutura histológica em todas as camadas teciduais do intestino. Este relato descreve um caso de colite eosinofílica e linfoplasmocitária em um equino macho, de 11 anos de idade, com emagrecimento progressivo, sinais de síndrome cólica e apatia. No histórico do animal, foi relatado emagrecimento progressivo e apatia. No hemograma, não foram encontradas alterações, exceto leucocitose com neutrofilia. No exame bioquímico, a bilirrubina indireta foi aumentada, e o líquido peritoneal apresentou elevada concentração de proteína total, lactato e células nucleadas totais. O exame ultrassonográfico identificou líquido livre na cavidade abdominal e neoformação no cólon. Em vista dos achados, recomendou-se a celiotomia exploratória; contudo, optou-se pela eutanásia, considerando-se o custo-benefício e o valor zootécnico do animal. O exame histopatológico post mortem de fragmentos do cólon maior e menor identificou colite linfoplasmocitária e colite eosinofílica, processos crônicos, sem causa determinada, cujo tratamento nem sempre é eficaz, mas com medidas preventivas de manejo sanitário, minimizam os fatores desencadeantes.

Palavras-chave: cólon, doença-inflamatória-intestinal, equino, infiltrado-celular

INTRODUCTION

Enteritis and colitis are part of the complex of inflammatory diseases that affect the gastrointestinal system of the horses and are

capable of triggering colic syndrome. In this sense, eosinophilic enterocolitis stands out among the inflammatory intestinal diseases because it presents macroscopic lesions characterized as erythematous, and in some cases

may present fibrinoid and proliferative traits. In addition, regarding to the distribution and extent of the lesions, eosinophilic enterocolitis can be classified as idiopathic focal eosinophilic enteritis, when there is a focal and individual presentation, as well as being classified as diffuse eosinophilic when there are extensive lesions affecting different portions of the intestine (Southwood *et al.*, 2000).

In addition, lymphoplasmacytic enteritis, a disease that also belongs to the complex of inflammatory intestinal diseases in horses, is uncommon in this species and has a poor to reserved prognosis in most cases. The cause of the disease is unknown and its main symptoms, as with eosinophilic enteritis, are lethargy, progressive weight loss and recurrent episodes of colic syndrome (Mair *et al.*, 2006).

Thus, the aim of this paper is to report the case of a horse diagnosed with lymphoplasmacytic colitis and eosinophilic colitis, uncommon types of colitis for the species, and to reveal the laboratory findings.

CASUISTRY

An 11-year-old male, cross breed horse, with a history of intermittent abdominal discomfort and progressive weight loss in the 90 days prior to

the treatment was seen at the Unimax Veterinary School Hospital (Indaiatuba, São Paulo, Brazil).

On admission, the animal was listless, had pale mucous membranes, a capillary refill time of 3 seconds, a heart rate of 76bpm, a respiratory rate of 28mpm, a rectal temperature of 37.5°C and intestinal hypomotility in all the abdominal quadrants on auscultation. Bilateral ventral abdominal distension was also observed. Transrectal palpation revealed distension of the pelvic flexure loops, medial and ventral tapeworm of the caecum and lesser colon.

In the abdominal ultrasound examination using a 4.5 MHz convex and 2.5 MHz linear transducer (MINDRAY DP-50 VET) of the ventral region, close to the xiphoid cartilage and parallel to the linea alba, showed an irregular, hyperechoic image, adhered to the wall of an intestinal segment (Fig. 1), containing free fluid at different points in the abdomen.

Blood was taken from the jugular vein for hematological and biochemical evaluation. The blood count showed parameters within the reference values, but the hemoparasites test found *Theileria equi*, hyperbilirubinemia plasma and the biochemical test showed an increase in indirect bilirubin (Table 1).

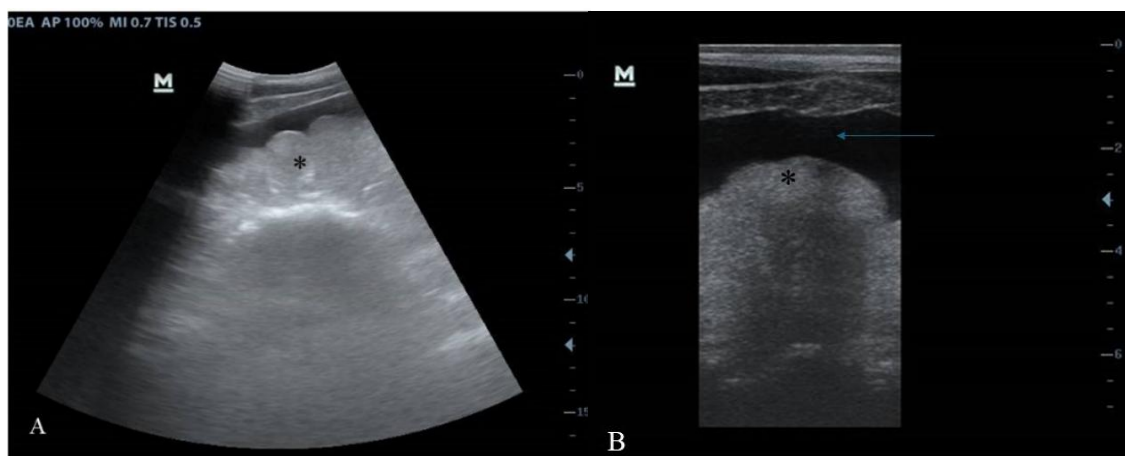


Figure 1. Transabdominal ultrasound image of the ventral region of the midline near the xiphoid cartilage of an equine. A: Hyperechoic irregular mass (asterisk) (3.0MHz convex transducer). B: Free fluid (arrow) observed throughout the abdominal region (linear transducer, 2.5MHz).

Table 1. Complete blood count, serum lactate concentration and serum biochemical analysis of an equine with eosinophilic and lymphoplasmacytic colitis

Parameter	Reference*	Result
Erythrocytes (millions/mm ³)	6.5 - 12.5	6.2
Hemoglobin (g/dL)	11.0 - 19.0	12.8
Hematocrit (%)	32 - 52	35
Total plasma protein (g/dL)	5.8 - 8.7	6.4
Albumin (g/dL)	2.6 - 3.7	2.96
Platelets (mil/mm ³)	100 - 300	124
Leukocytes (10 ³ /μL)	5.5 - 12.5	9
Segmented (%)	30 - 65	89
Lymphocytes (%)	25 - 75	10
Presence of <i>Theileria equi</i> inclusions (+)		
Sample observations: Bilirubinemic plasma (++++)		
Blood lactate (mmol/L)	0.3 - 2.5	2.109
Total bilirubin (mg/dL)	0 - 2.0	11.27
Direct bilirubin (mg/dL)	0 - 0.4	0.42
Indirect bilirubin (mg/dL)	0.2 - 2.0	10.85

*Thrall *et al.* (2015).

Abdominocentesis was guided by ultrasound and peritoneal fluid was collected from the ventral abdominal region of the midline, close to the xiphoid cartilage. The sample was cloudy and bloody, and the lactate (7.33mmol/L), total protein (3/gL), and total nucleated cell count

(82,000/mm³) values of the peritoneal fluid were above the reference values (Table 2), with the laboratory concluding that there was a pyogranulomatous inflammatory exudate (Brooks *et al.*, 2022.).

Table 2. Biochemical analysis of peritoneal fluid

Parameter	Reference*	Result
Total protein (g/dL)	<2.5	3
Total nucleated cells (g/dL)	<10.000	82.000
Lactate (mmol/L)	<2	7.33
Conclusion: Pyogranulomatous inflammatory exudate		

*Brooks *et al.* (2022).

The treatment carried out immediately after admission to hospital was the administration of Dipyrone 500mg (0.25mg/kg) intravenously, Flunixin Meglumine (1.1 mg/kg, IV), hydration with Ringer's Lactate solution with dilution of Lidocaine (0.5mg/kg/h) and Calcium (5ml/L) for prokinetic effect, both diluted in serum and administered intravenously.

Considering the alterations observed in the clinical assessment and complementary tests, as well as the pain that was unresponsive to

analgesia, exploratory celiotomy was indicated. However, considering the poor prognosis and the cost of the surgical procedure, the owner decided to euthanize the animal.

At necropsy, macroscopic findings suggested compaction of the left dorsal and ventral colons, the presence of a diffuse neoformation with an irregular surface adhered to the serosa of the mesenteric and antimesenteric border of the lesser colon (Fig. 2).



Figure 2. Diffuse neoformation with an irregular surface (asterisk) adhered to the serosa of the antimesenteric and mesenteric border of the lesser colon of an equine with suspected eosinophilic and lymphoplasmacytic enteritis.

Histopathological evaluation of intestinal fragments from the smaller and larger colon showed erosion of the mucosa, inflammatory reaction with lymphoplasmacytic infiltrates and eosinophilic traces, edema in the lamina propria and follicular hyperplasia. The findings were compatible with the diagnosis of lymphoplasmacytic erosive colitis and eosinophilic erosive colitis.

DISCUSSION

The term inflammatory bowel disease includes sporadically occurring chronic idiopathic enteropathies such as equine eosinophilic enteritis, equine granulomatous enteritis, lymphoplasmacytic enterocolitis and equine proliferative enteropathy (Olofsson, 2016).

Circumferential bands are formed by fibrous cell infiltrates, which in severe cases lead to obstruction of the intestinal lumen, followed by distension, complete obstruction and acute pain (Kalck, 2009), however, in situations where surgery is indicated, the animal may already be in advanced stages of the disease, making the procedure unfeasible, as in the case reported here. Exploratory celiotomy was the initial plan, however, due to the worsening clinical condition, the procedure was not carried out. Even though

the animal was in a stable condition, surgical success was unlikely due to the extent of the diffuse lesions, spread over large portions of the digestive tract (Blikslager, *et al.*, 2017).

Eosinophilic enteritis can be revealed by diffuse cellular infiltrates, affecting not only portions of the intestine, but also other organs, however in the case in question there was no evidence of involvement in the skin, liver or other organs, except the intestine (Latson *et al.*, 2005; Kalck, 2009).

The lymphoplasmacytic enterocolitis diagnosed in this report is a common intestinal disease in dogs and cats (Siwinska *et al.*, 2017). In horses, there are few reports, but the small intestine is often affected, with no preference for age, sex or breed, associated or not with peritonitis (Kalck, 2009). However, in this report, peritonitis was a finding, since the peritoneal fluid was opaque and bloody, representing the presence of leukocytes and red blood cells, with a total protein concentration and nucleated cell count above the reference values, originating from the translocation of bacteria from the intestine, from devitalized or ruptured regions, indicating the presence of enteritis and ischemia (Latson *et al.*, 2005; Delesalle *et al.*, 2007), confirmed later in the *post-mortem* examination.

Studies have shown that lactate in the peritoneal fluid has been more sensitive than blood lactate, which is then used as a parameter for ischemic lesions in cases where it is high, as shown in this report (Latson *et al.*, 2005). The increase in lactate concentration is caused by tissue hypoperfusion, also suggesting hypotension, ischemic conditions and even impairment due to obstruction (Thrall, *et al.*, 2015; Belingieri *et al.*, 2017).

The presence of *Theileria equi* in the animal described may present an episode of abdominal pain, accompanied by diarrhea or compaction (Martini, 1999). *T. equi* can explain the hyperbilirubinemic blood plasma, icteric coloration of the mucous membranes and lethargy, clinical signs that can lead to confusion with diagnoses of lymphoplasmacytic enteritis and eosinophilic enteritis. *T. equi*, the causative agent of equine piroplasmosis, is transmitted by ectoparasites and can show clinical signs such as anemia, fever, lethargy, jaundice due to liver damage, weight loss, edema and kidney failure (Macedo *et al.*, 2021). Treatment for this infection consists of the use of antiprotozoal drugs.

In these cases of enteritis or in other cases of inflammatory bowel disease involving other intestinal portions, the prognosis is unfavorable to poor, and the clinical therapy indicated is the administration of systemic corticosteroids, usually dexamethasone as a choice, for prolonged periods due to the greater efficacy, although limited, and the lower daily cost of this drug for both diseases (Blikslager, *et al.*, 2017; Archer *et al.*, 2006, 2014). Treatment with corticosteroids would be feasible in this case if the animal did not show changes suggestive of peritonitis, which has a high mortality rate (56%) in the postoperative period (Delesalle *et al.*, 2007).

One of the diagnostic strategies when enteritis is suspected is rectal biopsy or skin biopsy in cases of dermatitis secondary to eosinophilic enteritis, but this was not carried out due to the severity of the clinical condition, with the owner refusing surgery and opting for euthanasia (Kalck, 2009).

Other laboratory tests recommended are the determination of serum IgA albumin concentrations, which, when reduced, indicate a

failure in the immune response, without predisposing factors. In this case report, the patient did not present hypoalbuminemia, hypothesizing that the plasma colloid oncotic pressure was maintained (Kemper *et al.*, 2000).

The clinical signs found in this case are not compatible with those reported in the literature since progressive weight loss is the main clinical sign, followed by diarrhea, signs of colic and apathy (Kemper *et al.*, 2000; Blikslager, *et al.*, 2017).

Abdominal ultrasound was an important tool in determining the severity of the case, identifying free fluid in the ventral region during ultrasound examination suggests bacterial content (Siwinska *et al.*, 2017), but the culture was not carried out as the patient was euthanized, although there were indications in the leukogram of bacterial infection.

Chronic inflammatory bowel diseases are associated with dysfunction of the gastrointestinal tract due to infiltration of the mucosa and submucosa by eosinophils, plasma cells, lymphocytes, basophils or macrophages (Schumacher *et al.*, 2000), characteristics also observed in the case reported, since histopathological evaluation revealed the presence of lymphoplasmacytic and eosinophilic infiltrates in the fragments of the large and small colon. The histopathological examination of animals affected by eosinophilic enteritis revealed infiltrations with a predominance of eosinophil in relation to the other polymorphonucleated cells, in areas of hemorrhage and neovascularization, as well as fibrosis. Eosinophilic enteritis is transmural, and the lesions described above can be found in all histological layers, causing changes in the architecture of the intestinal wall (Southwood *et al.*, 2000; Blikslager, *et al.*, 2017).

The lesions visualized microscopically in the intestinal mucosa vary according to the severity of the condition, and atrophy or fusion of villus, epithelial damage, hyperplasia, degeneration, necrosis, erosion, ulceration, glandular dilation, edema and fibrosis can be observed, varying according to the evolution of the pathology (Hostetter and Uzal, 2022).

In general, inflammatory bowel diseases can be correlated with malabsorption, poor digestion and have the immune response as a secondary cause, such as intestinal lesions caused by the fungus *Pythium* sp., or by nematodes (*Strongylus vulgaris*), but in most cases it is not possible to determine the cause of the lesion (Archer et al., 2014, Oliveira, 2021; Kalck, 2009).

CONCLUSION

Eosinophilic enteritis and lymphoplasmacytic enteritis are chronic processes with no determined cause and treatment is not always effective, as it depends on the stage of the disease in each case. Studies are needed to determine the pathophysiology of the changes, although preventive measures such as deworming, ectoparasite control, quality feed, dental health, attention to changes in the animal's health, especially in cases of abdominal pain and diarrhea, can minimize the risks and in a scenario where the animal is diagnosed positively, it is essential that it is at an early stage of the disease, favoring clinical treatment.

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