

CASE REPORT

Horses and other equids

Idiopathic focal eosinophilic enteritis associated with ileocaecal and ileal obstruction in a 10-year-old warmblood gelding

Graeme Piketh¹  | Alischa Henning²  | Yolandi Smit¹ 

¹Department of Companion Animal Clinical Studies, Faculty of Veterinary Science, University of Pretoria, Pretoria, South Africa

²Department of Paraclinical Sciences, Faculty of Veterinary Science, University of Pretoria, Pretoria, South Africa

Correspondence

Graeme Piketh, Department of Companion Animal Clinical Studies, Faculty of Veterinary Science, University of Pretoria, Pretoria, South Africa.

Email: graeme.piketh@up.ac.za

Abstract

A 10-year-old, 600-kg, warmblood gelding was referred due to persistent colic, non-responsive to medical treatment. Diagnostic evaluation revealed abdominal distention, tachycardia and distended small intestines. Preoperative blood testing revealed an increased packed cell volume and normal total white cell count, whereas an abdominocentesis revealed raised peritoneal fluid lactate. Exploratory laparotomy was performed and revealed a circumferential band of thickened tissue and hyperaemia in the distal jejunum, as well as marked wall thickening of the distal ileum and ileocaecal valve, leading to complete luminal obstruction. Due to financial constraints and complications associated with jejuno-caecostomy, the owner requested the horse to be humanely euthanased. Postmortem examination findings revealed a circumferential constriction of the distal ileum and ileocaecal valve. Histopathology of the affected segments was characterised by a large population of eosinophils within the mucosa, submucosa and muscularis layers in conjunction with severe submucosal oedema. A diagnosis of idiopathic focal eosinophilic enteritis was made.

BACKGROUND

Idiopathic focal eosinophilic enteritis (IFEE) is a rare but emerging and important cause of abdominal pain (colic) in horses. This condition is part of the inflammatory bowel disease complex and characterised by an inflammatory reaction predominated by eosinophils.¹ The disease has been documented in several other species, including humans,² dogs,³ cats^{4,5} as well as cattle.^{6,7} Currently however, there appears to be limited comprehension of the specific pathophysiology behind the genesis of these so-called idiopathic eosinophilic diseases.⁸ While a specific aetiological diagnosis for these conditions remains elusive, it is recommended that careful nomenclature be observed during classification of these enteric disorders.⁸

General classifications of these diseases should differentiate systemic eosinophilic disease, namely, multisystemic eosinophilic epitheliotropic disease (MEED), from idiopathic eosinophilic disease that is restricted to the intestinal tract.⁸ Idiopathic, eosinophilic, small intestinal disease without concurrent systemic involvement can be classified as either diffuse eosinophilic enteritis or IFEE.⁸ It has been suggested that IFEE is an augmented form of the more diffuse infiltrative process.⁹

Current thinking with regards to the pathophysiological process is a point of contention. Some literature implicates an allergic/hypersensitivity mechanism; possibly associated with

findings including gastrointestinal parasitism, fungal infiltration, intestinal foreign bodies, dietary allergens as well as transitory periods of intestinal ischaemia.¹⁰ Alternatively, some publications contest this thinking indicating that the inflammatory cell infiltration pattern does not support the pathomechanism of a typical hypersensitivity reaction.¹¹ Currently however, these pathophysiological hypotheses require significant substantiation before a definitive standpoint can be adopted.

CASE PRESENTATION

A 10-year-old warmblood gelding (600-kg bodyweight) was referred to the Onderstepoort Veterinary Academic Hospital with a history of intermittent mild to moderate colic signs of 12-hour duration before referral. Clinical findings included a severe tachycardia and depressed borborygmi, according to the referring veterinarian. Before referral, a nasogastric tube was inserted but no reflux was collected. Rectal examination reportedly revealed no clinically significant findings. Before the referral, the horse received 1.1 mg/kg bodyweight of flunixin meglumine (Finadyne, 50 mg/ml, MSD Animal Health) intravenously.

Upon arrival at the Onderstepoort Veterinary Academic Hospital, the gelding was dull and showed moderate colic

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Veterinary Record Case Reports* published by John Wiley & Sons Ltd on behalf of British Veterinary Association.

signs. The horse was in good body condition and the coat appeared short and glossy, with no evidence of pathological skin lesions. He also presented with severe bilateral abdominal distention. The heart rate was increased (64 beats per minute) and no borborygmi could be auscultated. The mucous membranes appeared pale pink, and dry with a capillary refill time of 2.5 seconds and a delayed skin tent. A nasogastric tube was placed, and 22 L of reflux was collected. Multiple distended, amotile small intestinal loops and a firm large colon impaction were palpable on examination of the rectum. Abdominal ultrasonography revealed multiple, distended (up to 80 mm in diameter), amotile and fluid-filled small intestinal loops, with mild, generalised, intestinal wall thickening (up to 5 mm) and a moderate amount of free peritoneal fluid.

Abdominal fluid analysis showed a dark yellow-coloured and cloudy fluid with a lactate concentration of 2.7 mmol/L (normal reference range: <2 mmol/L) and a total protein of 20 g/L (normal reference range: <25 g/L).¹² Laboratory analysis of a peripheral blood sample revealed a packed cell volume of 47%, total serum protein of 68 g/L and a total white cell count of 8500 cells/ μ l.

An intravenous catheter was aseptically placed in the right jugular vein and the horse was started on crystalloid fluid therapy (Sabax PlasmaVet, Adcock Ingram Holdings) at a rate of 75 ml/kg/h. The horse received a total of less than 3 L of crystalloids preoperatively.

The horse continued to show colic signs and at this time the owner agreed to progress to a surgical exploration.

The horse received 20 mg/kg bodyweight of ampicillin (Ampicillin Fresenius, 500 mg, Fresenius Kabi) intravenously and 6.6 mg/kg bodyweight of gentamicin (Genta 50 Phenix, 50 mg/ml, Virbac) intravenously preoperatively. After a pre-anaesthetic, intravenous tranquilisation with 0.01 mg/kg bodyweight of detomidine (Equidine, 10 mg/ml, Virbac) and 0.04 mg/kg bodyweight of butorphanol (Dolorex, 10 mg/ml, MSD Animal Health), general anaesthesia was induced with a combination of 0.1 mg/kg bodyweight of diazepam (Pax injection, 10 mg/2 ml, Pharmacare) and 2.2 mg/kg bodyweight of ketamine (Ketamine Fresenius, 100 mg/ml, Fresenius Kabi) intravenously. Endotracheal intubation was then performed using a silicone orotracheal tube with a 28-mm internal diameter. The horse was then moved from the induction box to the surgical table and placed in dorsal recumbency. General anaesthesia was maintained with isoflurane (Isofor Inhalation Anaesthetic, Safeline Pharmaceuticals) inhalation delivered in pure oxygen via a large animal circle system (Dräger Narkovet-E Electronic Large Animal Control Center) and a partial intravenous infusion (PIVA) that included 2 mg/kg bodyweight per hour ketamine and 0.0002 mg/kg bodyweight per hour medetomidine (Domitor, 1 mg/ml, Zoetis South Africa). Volume-controlled, mandatory ventilation was applied during the maintenance phase of general anaesthesia. Mean arterial blood pressure was kept above 70 mmHg, with an intravenous infusion of 1.0 μ g/kg bodyweight per minute of dobutamine (Dobutamine Fresenius, 250 mg/20 ml, Fresenius Kabi) when required. The patient was monitored under general anaesthesia using invasive, direct arterial blood gas monitoring, base-apex electrocardiography and capnography. These parameters as well as the isoflurane concentrations were monitored using the Datex Ohmeda CardioCap 5 (GE Health Care) system. The horse also received crystalloid fluid therapy

LEARNING POINTS/TAKE HOME MESSAGES

- Idiopathic focal eosinophilic enteritis can present as an acute, obstructive small intestinal colic.
- Idiopathic focal eosinophilic enteritis is prevalent in the horse population of Southern Africa.
- Although idiopathic focal eosinophilic enteritis can present with typical macroscopic lesions (circumferential mural bands or hyperaemic plaques), the absence of these lesions does not preclude the diagnosis of idiopathic focal eosinophilic enteritis.
- Biopsy of segmental areas of small intestinal thickening should be considered to make a definitive diagnosis of idiopathic focal eosinophilic enteritis.

(Ringer lactate solution Fresenius, Fresenius Kabi) at a rate of 10 ml/kg/h during the surgical exploration of the abdomen.

Standardised mid-line laparotomy revealed multiple, fluid-filled loops of distended small intestine that had decreased motility and a moderately extensive large colon impaction. A circumferential band, approximately 5 mm in width, of thickened tissue with a central ring of hyperaemia was identified in the distal jejunum. This area was also surrounded by localised hyperaemia (see Figure 1). The small intestine aboral from this lesion showed the most severe distension. Further exploration revealed marked wall thickening affecting approximately 150 mm of the distal ileum with complete lumen narrowing of the ileum at the level of the ileocaecal valve. Decompression and milking of small intestinal contents through the distal ileum and ileocaecal valve failed due to marked narrowing of the lumen.

Owing to the abnormalities detected in the distal ileum and ileocaecal valve, a jejunal-caecostomy bypass procedure was advised to the owner. Based on the financial implications and postoperative complications associated with a jejunal-caecostomy, the owner elected that the horse should be humanely euthanased. The horse was euthanased under general anaesthesia with intravenous administration of potassium chloride. Death was confirmed based on continuous electrocardiographic monitoring.

On postmortem examination, there was a roughly 150-mm circumferential constriction that extended oral from and included the ileocaecal valve. The latter was accompanied by multifocal, roughly 10-mm areas of shorter intestinal constrictions throughout the small intestine. All the constrictive segments were flanked by fluid-filled intestines. On cut surface, the constrictive segments revealed a decreased luminal diameter and increased mural thickness. The remainder of the postmortem examination revealed non-specific lesions characterised by mild, diffuse nephrosis and hepatitis.

Tissue samples from all the major organs and including the affected and unaffected intestinal tract were fixed in 10% buffered formalin and routinely processed, embedded and sectioned for histopathological evaluation. Most of the examined intestinal sections revealed the widespread presence of eosinophils not only within the mucosa but also within the submucosa (see Figures 2, 3 and 4). Occasional eosinophils were also detected in the tunica muscularis (see Figure 5).

FIGURE 1 Exploratory laparotomy revealed a roughly 5-mm circumferential constricting band (arrow) of thickened tissue with localised hyperaemia in the distal jejunum. The constricted segment is flanked by distended intestinal loops (star)

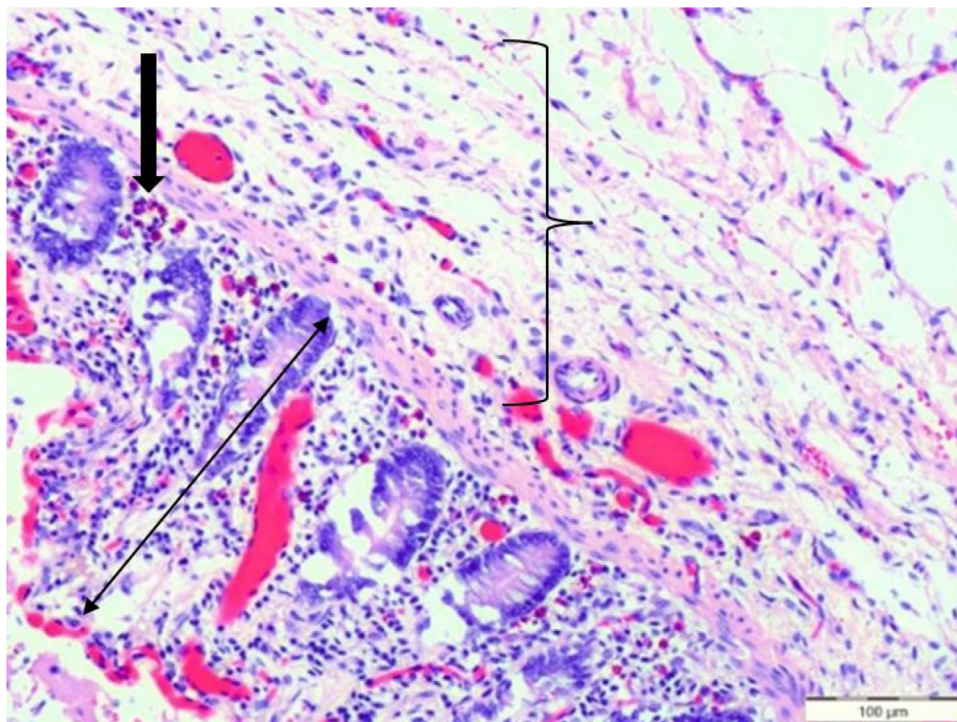
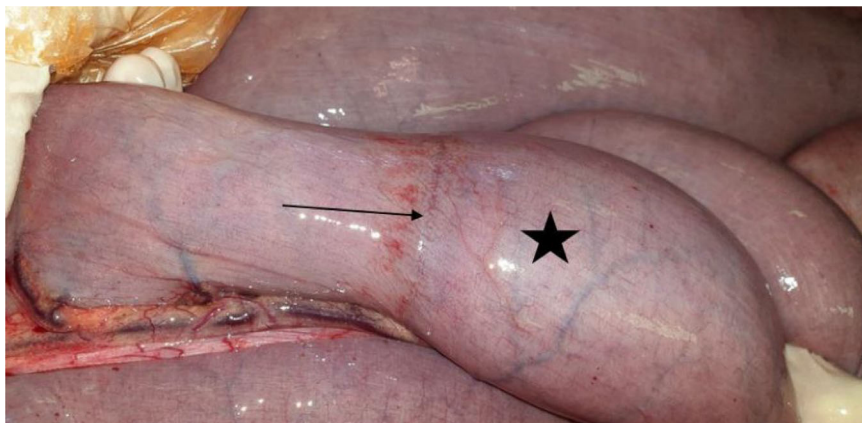


FIGURE 2 Intestinal tract (HE, 10× magnification). Presence of numerous eosinophils (block arrow) throughout mucosa (arrow) and scattered in submucosa (bracket). Notice submucosal oedema characterised by the presence of numerous clear spaces throughout submucosal connective tissue

This was associated with severe submucosal oedema throughout (see Figures 2 and 3). The eosinophils were admixed with few macrophages, lymphocytes and plasma cells. The constrictive segments correlated with sections characterised by the largest population of eosinophils within the mucosa, submucosa and muscularis layers in conjunction with severe, especially submucosal, oedema on histopathology.

A diagnosis of IFEE was made supported by the clinical presentation, exploratory celiotomy, postmortem examination and histopathological findings.

DIFFERENTIAL DIAGNOSIS

Differential diagnosis for acute small intestinal obstruction colic:

- Small intestinal volvulus/strangulating lesions;
- Small intestinal impaction;
- Epiploic foramen entrapment;

Inflammatory bowel disease - idiopathic eosinophilic enteritis.

OUTCOME AND FOLLOW-UP

Due to financial implications and postoperative complications associated with a jejunal-caecostomy, the horse was humanely euthanased under general anaesthesia.

DISCUSSION

The cohort of diseases present in the inflammatory bowel disease classification is primarily reported to present with clinical symptoms akin to a chronic wasting syndrome.¹³ These symptoms commonly include persistent weight loss and indications of protein-losing enteropathy. These diseases are also commonly associated with mild, recurrent episodes of colic.¹⁴

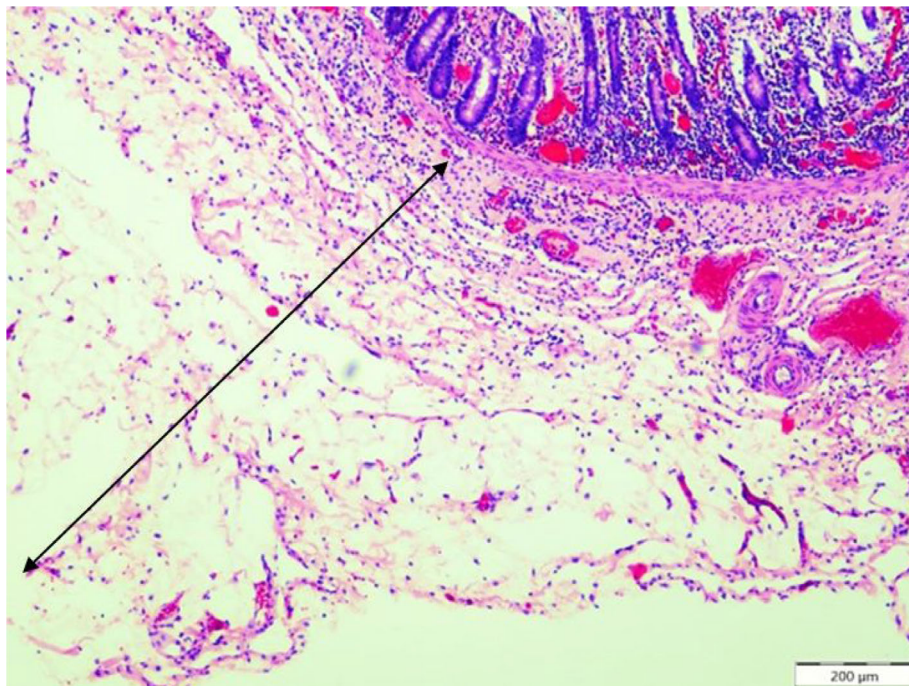


FIGURE 3 Intestinal tract (HE, 4X magnification). Severe, extensive submucosal oedema (arrow) characterised by the presence of numerous clear spaces throughout submucosal connective tissue

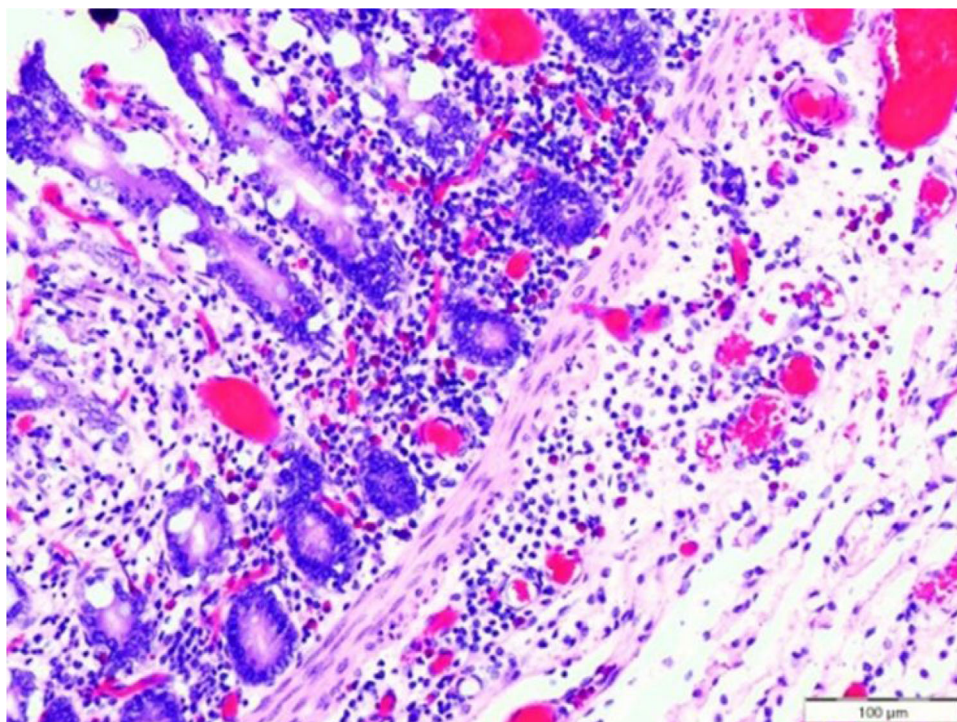


FIGURE 4 Intestinal tract (HE, 10X magnification). Numerous eosinophils scattered throughout mucosa and submucosa, accompanied by submucosal oedema. Eosinophils are characterised by granulated, bright eosinophilic cytoplasm

It is therefore of some interest to note that the colic seen in this individual was of acute onset and was more severe in its degree. IFEE is especially reported to present as an acute, severe colic episode with indications of small intestinal obstruction.¹⁰

The mild small intestinal wall thickening present on trans-abdominal ultrasound can be suggestive of several forms of inflammatory bowel disease as well as other small intestinal pathology. In this case however, many of the paradigmatic

findings seen in other forms of inflammatory bowel disease were conspicuously absent. The horse was noted to be in good body condition and had no evidence of hypoproteinaemia and no history of recurrent colic. This appears to be commonplace in the case of idiopathic eosinophilic diseases confined to the intestine.⁸

Unfortunately, the current case yielded no obvious leads into a specific cause behind the inflammatory lesion. The horse had no specific macroscopic or histopathological

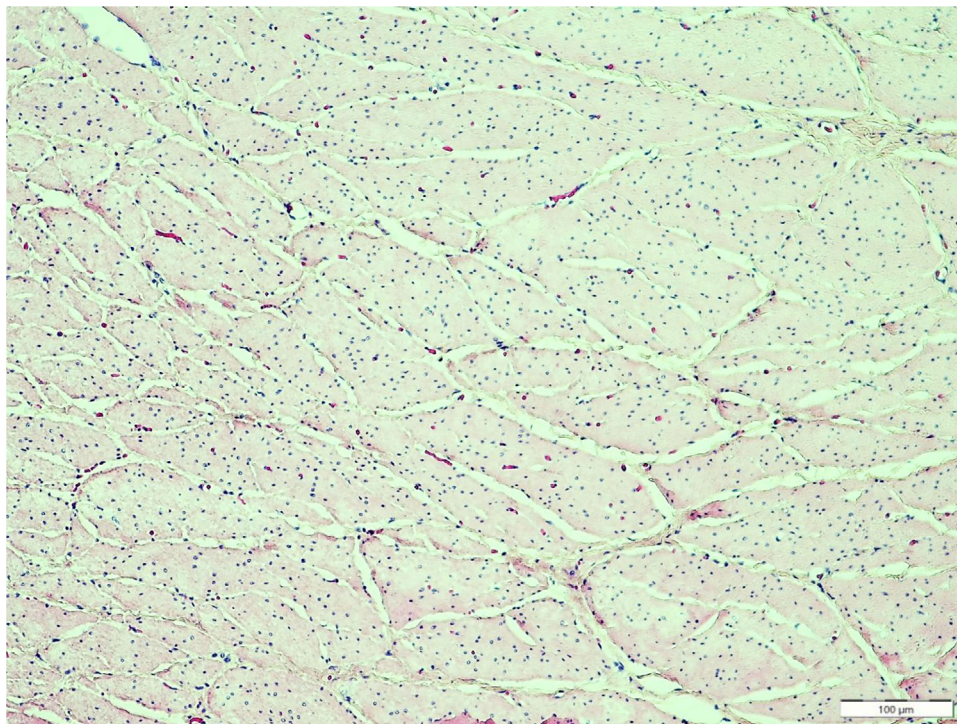


FIGURE 5 Intestinal tract (HE, 10X magnification). The tunica muscularis layer shows scant, scattered eosinophil infiltration without further evidence of abnormalities

evidence of verminosis or intestinal parasitism on post-mortem evaluation. Surgical and postmortem findings also do not support fungal infection or intestinal foreign bodies as a cause of disease in this case. Dietary allergens are a difficult causative agent to exclude and as such could not be completely ruled out in the current case. Although definitive causation can be complicated to determine, macroscopic lesions identified at surgery can in some cases be highly suggestive of a diagnosis of inflammatory bowel disease. Macroscopic lesions have been described as either circumferential bands of thickened tissue (circumferential serosal or mural bands) surrounded by hyperaemia or well-circumscribed serosal plaques.^{15,16} Indeed, some authors have suggested that these are pathognomonic for idiopathic eosinophilic enteritis confined to the intestine.^{8,15} These lesions, coupled with an obstructive type of distension of the small intestine, should serve to raise the diagnosis of IFEE to the top of the clinician's differential diagnosis list.

Taking this into consideration, identification of these lesions during exploratory laparotomy is of vital importance to provide a more targeted approach to the definitive diagnosis, resolution and treatment of the colic episode. In these cases, intestinal biopsies should be considered to allow for histopathological confirmation of IFEE or other inflammatory bowel disease.

During surgical exploration, two main areas of the intestine appeared macroscopically abnormal. Lesions were visually identified in the distal jejunum while a site of small intestinal mural thickening and lumen size reduction in the ileum was palpated intra-operatively. The site in the mid-jejunum is a classical location for these lesions,^{15,16} and presented with the classical 'fibrous ring' that often accompanies IFEE.¹⁶ Although the peristalsis in this region was absent, the lesion did not appear severe enough to cause mechanical obstruction

at this location. However, in this case the lesion in the ileum extending to the ileocaecal valve was undoubtedly the main cause of the small intestinal obstruction, preventing even manual decompression of the small intestine into the caecum during surgery. The involvement of the ileocaecal valve has been reported in a case of multisystemic eosinophilic epitheliotropic disease in a standardbred horse,¹⁷ although this case did not present with an obstructive type colic. As such, this appears to be the first reported case where a lesion that could be clinically and histologically associated with idiopathic focal eosinophilic enteritis extended to involve the ileocaecal valve.

Literature currently advocates manual decompression of the small intestine, with surgical resection only considered in the cases with significant reduction in the luminal diameter of the small intestine.¹⁸ Postoperative treatment with corticosteroids should also be evaluated on a case-by-case basis, especially when surgical resection of the intestine has not been performed. It has been reported that outcomes in horses from the idiopathic eosinophilic diseases confined to the intestine grouping are generally favourable when treated appropriately.¹⁸ It is however important to note that this is dependent on the location of the lesion and the degree of invasiveness required to treat the pathology. In this case for instance, the obstructive nature of the disease and need for small intestinal resection coupled with the location of the affected portion of the intestinal tract led to a reduction in the prognosis for the patient.

CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

FUNDING INFORMATION

The authors received no specific funding for this work.

ETHICS STATEMENT

This case report presents a clinical case within the Onderstepoort Veterinary Academic Hospital. Research ethics approval was obtained to publish this case through the University of Pretoria's Ethics Committee, reference number REC019-21.

AUTHOR CONTRIBUTIONS

Graeme Piketh contributed to the literature review and clinical findings as well as history and the discussion. Yolandi Smit contributed to the surgical findings. Alischa Henning contributed to the postmortem examination and histopathology findings.

ORCID

Graeme Piketh  <https://orcid.org/0000-0002-1556-3418>

Alischa Henning  <https://orcid.org/0000-0003-3632-0279>

Yolandi Smit  <https://orcid.org/0000-0002-4298-4496>

REFERENCES

1. Archer DC, Costain DA, Sherlock C. Idiopathic focal eosinophilic enteritis (IFEE), an emerging cause of abdominal pain in horses: the effect of age, time, and geographical location on risk. *PLoS One*. 2014;9(12):e112072.
2. Yun M, Cho Y, Park I, Choi SK, Kim S, Shin S-H, et al. Eosinophilic gastroenteritis presenting as small bowel obstruction: a case report and review of the literature. *World J Gastroenterol*. 2007;13:1758–60.
3. Quigley PJ, Henry K. Eosinophilic enteritis in the dog: a case report with a brief review of the literature. *J Comp Pathol*. 1981;91(3):387–92.
4. Hendrick M. A spectrum of hypereosinophilic syndromes exemplified by six cats with eosinophilic enteritis. *Vet Pathol*. 1981;18(2):188–200.
5. Griffin HE, Meunier LD. Eosinophilic enteritis in a specific-pathogen-free cat. *J Am Vet Med Assoc*. 1990;197(5):619–20.
6. Cebra ML, Cebra CK, Garry FB, Gould DH. Idiopathic eosinophilic enteritis in four cattle. *J Am Vet Med Assoc*. 1998;212(2):258–61.
7. Fushimi Y, Takagi M, Kawaguchi H, Miyoshi N, Tsuka T, Deguchi E. Three cases of idiopathic eosinophilic enteritis with chronic obstinate diarrhea in Japanese black fattening cattle. *J Vet Med Sci*. 2015;77(3):337–40.
8. Schumacher J, Legere R. Eosinophilic intestinal diseases of the horse. *Equine Vet Educ*. 2017;30. <https://doi.org/10.1111/eve.12723>
9. Makinen P, Archer D, Baptiste KE, Malbon A, Proudman C, Kipar A. Characterisation of the inflammatory reaction in equine idiopathic focal eosinophilic enteritis and diffuse eosinophilic enteritis. *Equine Vet J*. 2008;40(4):386–92.
10. Southwood LL, Kawcak CE, Trotter GW, Stashak TS, Frisbie DD. Idiopathic focal eosinophilic enteritis associated with small intestinal obstruction in 6 horses. *Vet Surg*. 2000;29(5):415–9.
11. Proudman CJ, Kipar A. IFEE: new acronym, new challenge. *Equine Vet J*. 2006;38(4):290–1.
12. Hurcombe SD. Critical care. In: Reed SM, Bayly WM, Sellon DC, editors. *Equine internal medicine*. 4th ed. W.B. Saunders; 2018. p. 158–90.
13. Ceriotti S, Zucca E, Stancari G, Conturba B, Stucchi L, Ferro E, et al. Sensitivity and specificity of ultrasonographic evaluation of small intestine wall thickness in the diagnosis of inflammatory bowel disease in horses: a retrospective study. *J Equine Vet Sci*. 2016;37:6–10.
14. Kalck KA. Inflammatory bowel disease in horses. *Vet Clin North Am Equine Pract*. 2009;25(2):303–15.
15. Scott EE, Scott EA, Heidel JR, Whitler WA. Inflammatory bowel disease in horses: 11 cases (1988–1998). *J Am Vet Med Assoc*. 1999;214(10):1527–30.
16. Archer DC, Barrie Edwards G, Kelly DF, French NP, Proudman CJ. Obstruction of equine small intestine associated with focal idiopathic eosinophilic enteritis: an emerging disease? *Vet J*. 2006;171(3):504–12.
17. Bosseler L, Verryken K, Bauwens C, De Vries C, Deprez P, Ducatelle R, et al. Equine multisystemic eosinophilic epitheliotropic disease: a case report and review of literature. *N Z Vet J*. 2013;61:177–82.
18. Perez Olmos JF, Schofield WL, Dillon H, Sadlier M, Fogarty U. Circumferential mural bands in the small intestine causing simple obstructive colic: a case series. *Equine Vet J*. 2006;38(4):354–9.

How to cite this article: Piketh G, Henning A, Smit Y. Idiopathic focal eosinophilic enteritis associated with ileocaecal and ileal obstruction in a 10-year-old warmblood gelding. *Vet Rec Case Rep*. 2022;10:e421. <https://doi.org/10.1002/vrc2.421>