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Case Report

Cecal dilatation and distension in a Holstein calf

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Abstract

Cecal dilatation and distention is an important disorder in early lactation dairy cows, however, reports describing the anatomical pathology findings of this condition are scarce in the literature. Etiopathogenesis of cecal dilatation and distention is often attributed to high concentrate feeds, but there is also evidence of myoelectrical dysfunction contributing to its occurrence. Diagnosis is often made based on physical exam findings, with the contribution of ancillary exams. This paper aims to describe a case of cecal dilatation with clinical, laboratorial and pathology findings of a 5-month-old Holstein calf that presented abdominal distension, positive succussion of the right flank and mild dehydration. Clinical pathology findings included neutrophilic leukocytosis with regenerative left shift and elevated ruminal chloride. Ultrasonographic examination of the right abdomen showed distended and hypomotile intestinal loops. Despite that, due to the patient's age, which prevented rectal palpation, and lack of some characteristic clinical and clinical pathology findings, diagnosis was only possible *post mortem*. Macroscopical and microscopical findings demonstrated cecum dilatation with edema, hemorrhage and thrombi. Despite being well known by large animal clinics, anatomical pathologists must be aware of this condition.

Key words: peritonitis, thrombi, ultrasonography.

Introduction

Cecal dilatation and distention is an important large intestine disorder of cattle due to gas and/or digesta accumulation, and may result in displacement, torsion or retroflexion of the cecum (11, 15), with higher prevalence in dairy cows, especially in early lactation, although other categories can also be affected (15). There are few reports of cecal dilatation in calves and pathological findings are seldom described (8, 16, 18).

Cecal dilatation and distention onset is still not completely elucidated, but often occurs with cecal and colonic hypomotility (11, 15). An accepted cause is ingestion of high concentrate diets, resulting in intestinal contents pH decrease that follows excessive production of volatile fatty acids in the cecum and colon (1). Another explanation comes from studies that report that cattle with cecal dilatation and distention present changes in mRNA expression of receptors related to gastrointestinal motility regulation, but evidence are still lacking to determine if it is a cause or consequence for it (9, 14).

Main clinical signs of cecal dilatation and distention in cattle are associated with cecal distention and total or partial interruption of ingesta passage, including abdominal discomfort (colic), positive succussion and percussion auscultation of the right flank (due to excessive gas and liquid), scattered feces, dehydration and vascular alterations; hyporexia, ruminal and intestinal hypomotility, tachycardia, tachypnea and rectal temperature alterations may also occur (5, 6, 15).

Finally, rectal palpation is considered the most important diagnostic tool, because it can detect cecal distension, dislocation and, sometimes, torsion (5, 6). Also, ultrasonographic evaluation of the right abdomen can detect the distended and dislocated organs, and it is particularly important when rectal palpation is inconclusive

or impracticable (3, 4). Due to scarce reports of pathological findings of cecal dilatation and distention in calves in the literature, this paper describes a case of cecal dilatation and distention in a Holstein calf, with emphasis in its clinical and anatomopathological findings.

Case report

A 5-month-old female Holstein calf was admitted at Clínica de Bovinos de Garanhuns, Universidade Federal Rural de Pernambuco (CBG/UFRPE) with a history of being found lying down and increased abdominal sensitivity. Calf was previously medicated with meloxicam and dipyrone (unknown dosage) and showed signs of improvement for a few hours, becoming apathetic after that. This calf was defecating normally and it was maintained in a pen with 7 other healthy calves of same age, fed with Tifton hay (*ad libitum*) and approximately 2 kg/day of a concentrate feed composed of corn bran, soybean meal and cottonseed.

At physical examination the animal had mild dehydration (6%), tachycardia (144 bpm), tachypnea (68 breaths per minute) with polypnea and reduced appetite. It also had bilateral ventral distension; at swinging of the right flank, it was detected the presence of liquid in the abdomen; and ruminal, intestinal and abomasal motility was compromised. There were no signs of abdominal pain and due to the patient's small size, rectal examination was not performed.

Ancillary exams were conducted: hemogram showed a mild leukocytosis of 13,350 leukocytes/μL (reference range: 4,000-12,000) (12) with neutrophilia of 6,007 segmented neutrophils/μL (reference range: 600-4,000) (12) and regenerative left shift of 668 bands/μL (reference range: 0-120) (12); also, ruminal chloride was elevated: 45,32 mEq/L (reference range: <30.0) (13).

In the following day, the patient was clinically assessed and submitted to abdominal ultrasonography. It maintained a tachycardia and tachypnea, was apathetic, with bilateral abdominal distension (more accentuated on the right abdomen) and positive succussion. Ultrasound images showed an accumulation of free liquid in the abdomen and distended hypomotile intestinal loops. The patient died a few hours later and necropsy was performed two hours after death.

Macroscopically, a moderate amount of fibrin and a small volume of turbid red free liquid was observed in the abdominal cavity with marked colonic and cecal diffuse dilatation (Fig. 1A and 1B); with lumen filled by abundant gas and viscous dark red content; the walls were severely and diffusely thinned with marked diffuse mucosal hyperemia (Fig. 2A) without signs of mechanical obstruction or torsion. Also, at caecum serosae, a focal and small red dark area with fibrin, measuring about 1 cm in diameter. Microscopically, the colon had focally extensive areas of moderate to severe hemorrhage between the layers of the muscularis externa with moderate expansion of the submucosa due to edema, vascular ectasia and occasional thrombi in large vessels. (Fig. 2B). The cecum had moderate and diffuse submucosal edema with moderate vascular ectasia and gas bubble formation with mild and focally extensive hemorrhage. Any gross or microscopic changes were observed in the gastrointestinal tract.

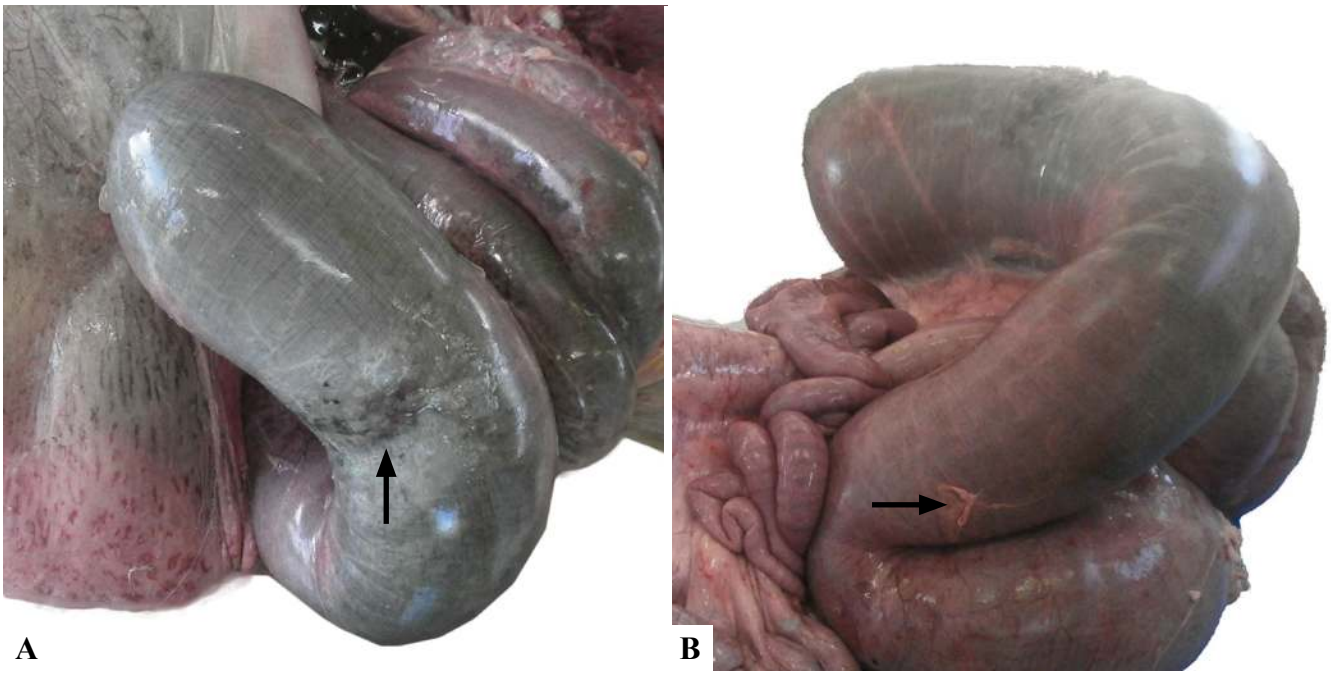

Figure 1. Cecal dilatation and distension in a Holstein calf. **A**. Diffuse and severe cecal and colonic dilatation. Notice a focally extensive area of hemorrhage in the serosa (arrow). **B.** Notice distinct fibrinous exudate in serosa (arrow).

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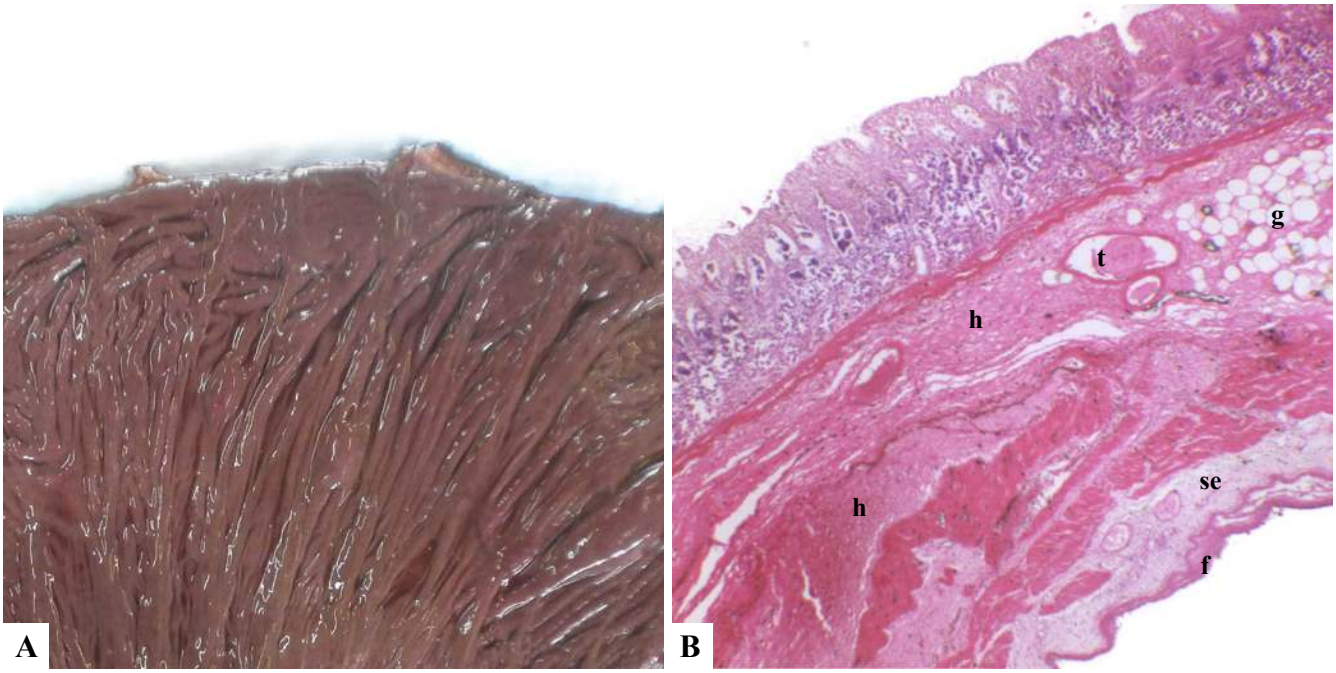

Figure 2. Cecal dilatation and distension in a Holstein calf. **A**. Colonic mucosa with diffuse and severe hyperemia. **B.** Cecum. Moderate to severe expansion of smooth muscle layers due hemorrhage **(h)** and edema with vascular ectasia, gas bubbles **(g)** and a fibrin thrombus **(t)**. Also, there is severe serosal expansion **(se)** due diffuse edema with moderate fibrinous exudate **(f)** addered. Hematoxylin and Eosin. 100x.

Discussion

Cecal dilatation and distention is described mainly in adult cattle, with the literature available reporting cases in calves nearly absent and diagnosed mainly by clinical signs (5, 6, 10). In fact, little information in anatomical pathology exists and only its consequences are cited, as peritonitis, and not with pathogenesis or intestinal lesions as a condition (17).

Intestinal distension, in general, may cause venous occlusion and lead to mucosal hypoxia, which initiate a local inflammatory response that results in gross and microscopic lesions mainly related to necrosis of the intestinal walls. Distension also results in mucosal edema and luminal fluid secretion and sequestration of water and electrolytes (17). Those are alterations compatible with our anatomical pathology findings.

Patient presented mild dehydration, positive succussion of the right abdomen and ruminal and intestinal hypomotility, which are compatible with cecum dilatation but not determinant to its diagnosis. Braun et al. (6), in a retrospective study that analyzed 111 cases of cecal dilatation and distention, reported that 95% of cases were diagnosed through rectal palpation, with succussion and percussion auscultation of the right abdomen as the second most reliable diagnostic tool for cecal dilatation and distention. These results were later corroborated by Braun et al. (5), in a report of 461 cecal dilatation and distention cases, which also pointed to ruminal hypomotility as the third most common clinical finding.

Clinical pathology findings of cecal dilatation and distention are, in general, those associated with mild dehydration and in patients with necrosis of the cecum accompanied by peritonitis, leukocytosis with neutrophilia may be present, as well as acute phase protein response (19). Concentration of chloride in the rumen is either normal or slightly elevated, indicating abomasal content reflux to the rumen as a consequence of gastrointestinal hypomotility or obstruction (7). Although our patient presented neutrophilia with regenerative left shift and elevated ruminal chloride, which were also described in previous cecal dilatation reports in calves (2, 16), those findings alone could not confirm this diagnosis or the presence of peritonitis, for that matter.

Ultrasonographic images suggested an interruption of gastrointestinal flow, which was corroborated by the elevated ruminal chloride, but it was not possible to identify the cecum as one of the distended organs, thus the diagnosis was made at necropsy. Although anatomy pathology findings of cecum dilatation are not commonly reported, pathologists must be aware of the great importance of this disease for cattle, both adults and calves, and its characteristic lesions.

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