Abomasal disease in young beef calves: Surgical findings and management factors

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Abstract

A retrospective study was performed on 46 abomasotomies in young beef calves. Clinical abomasal disease in the herds under investigation had an average incidence of 1.0% for the year of the study. The range in incidence among herds was 0.2–5.7%. In 80% (37/46) of abomasal surgeries, abomasal ulcers were found. In 76% (35/46) of the cases, hair was present in the abomasum. These findings indicate that there could be a link between abomasal ulcers and the ingestion of hair by young beef calves.

Housing appeared to be a significant factor in relation to the relative risk of abomasal disease. Calves housed in pens or on stubble fields were nearly three times as likely to receive surgery for abomasal disease than were those housed on pasture.

The results also indicated that mineral supplements may be helpful in reducing the incidence of abomasal disease.

Résumé

Problèmes de l'abomasum chez les jeunes bovins de boucherie : observations chirurgicales et facteurs de régie

Cette étude rétrospective regroupent 46 cas d'abomasotomie, effectuée chez de jeunes bovins de boucherie. L'incidence moyenne des problèmes de l'abomasum au sein des troupeaux étudiés a été de 1 % durant cette année, variant de 0,2 à 5,7 %. Des ulcères de l'abomasum ont été identifiés dans 80 % (37/46) des chirurgies. Dans 76 % (35/46) des cas, du poil était aussi présent dans l'abomasum. Ces observations indiquent qu'il y aurait peut-être un lien entre les ulcères de l'abomasum et l'ingestion de poil chez les jeunes bovins de boucherie. Le genre d'hébergement semble être un facteur important relié aux problèmes de l'abomasum. En effet, les veaux hébergés dans des parcs ou sur de la chaume étaient près de trois fois plus susceptibles de subir une chirurgie pour des problèmes de l'abomasum, comparativement à ceux gardés au pâturage. Les résultats indiquent aussi que des suppléments minéraux pourraient contribuer à diminuer l'incidence de problèmes de l'abomasum.

(Traduit par Dr Thérèse Lanthier)

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Introduction

Abomasal ulcers have long been recognized, by many practitioners, as a relatively common occurrence in young beef calves. However, few studies in current literature have dealt with their pathogenesis. Causes that have been suggested include stress (1), copper deficiency (2,3), engorgement with milk (1,3), and trauma from either creep feed (1) or hairballs (4). *Clostridium perfringens* type A (3) and fungi (5) have also been incriminated, although it is unknown if they are involved in a primary or secondary manner.

The purposes of the study reported herein were to describe, retrospectively, cases of young beef calves presented for abomasal disease which received surgery, to report on the incidence of hairballs found in these calves, and to discuss management factors related to the occurrence of abomasal disease.

Materials and methods

Forty-six cases of abomasal disease from 18 cow-calf herds, both commercial and purebred, were presented to a clinic in western Canada in the spring of 1990. Diagnosis of abomasal disease was based upon clinical signs. Calves considered to be affected were depressed and dehydrated. Many were still able to ambulate but others were presented in a moribund state. Most were bloated and had a ventrally distended abdomen. On abdominal ballottement, a large fluid-filled viscus was detected in the cranial ventral abdomen. Less than one-third of the calves exhibited outward signs of severe colic. The majority showed only subtle signs of abdominal pain after being left alone for a few minutes. These signs included occasional kicking at the ventral abdomen, backing up abruptly, and looking at their flank.

Calves were tranquilized with 0.2 mg/kg xylazine (Rompun, Haver, Bayvet Division Chemagro Ltd., Etobicoke, Ontario) and placed in left lateral recumbency. An intravenous catheter was placed in the jugular vein and 2-6 L of Ringer's solution (Lactated Ringer's, Abbott Laboratories Ltd., Montreal, Quebec) were given over the course of the surgery and recovery period (45–120 minutes). Flunixin meglumine (Banamine, Schering-Plough Animal Health, Pointe Claire, Quebec) at 1 mg/kg and trimethoprim sulfadoxine (Trivetrin, Coopers Agropharm Inc., Ajax, Ontario) at 3 mL/45 kg were administered intravenously prior to surgery. Local anesthesia was achieved using 2% lidocaine with epinephrine (Duracaine, rogar/STB, Pointe Claire-Dorval, Quebec) in a paracostal, inverted L technique.

After surgical preparation, a 20 cm paracostal incision was made on the right side approximately 5 cm caudal to the last rib. The abomasum was located, exteriorized, examined externally, and palpated for signs of ulceration. The abomasum in all cases was markedly enlarged and contained 5–10 L of ingesta. A 10 cm incision was made along the greater curvature and the contents were expelled. The entire abomasum was everted and the mucosa was examined. Any ulcers, defined as local excavations extending through the

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Table 1. Summary of abomasal contents found at the time of surgery

Number of cases	Abomasal ulcer	Hair in abomasum	"Mud" in abomasum	No abnormal contents
26	✓	✓		
6	✓		✓	
5	✓			✓
9		✓		
46	37	35	6	5

Table 2. Comparison of cases between herds providing free choice minerals and those not

	Number of calves receiving surgery for abomasal disease	Remainder of calves
No mineral mix provided	27	1892
Free choice mineral mix provided	19	2373

$\chi^2 = 3.31$ p = 0.07
Relative risk = 1.78 CI = 0.99–3.20

Table 3. Comparison of cases between herds housed on pasture and those housed on stubble or in pens

	Number of calves presented for abomasal surgery	Remainder of calves
Calves housed in pens or on stubble fields	15	628
Calves housed on pasture	31	3637

$\chi^2 = 10.45$ p = 0.001
Relative risk = 2.80 CI = 1.52–5.16

mucosa and involving underlying structures, were resected completely. The abomasum was then closed using 7 metric chromic gut (Pfrimmer-Viggo, Erlangen, West-Germany) in first a Utrecht pattern followed by a Lembert oversew. The abomasum was lavaged with a dilute (approximately 1%) povidone-iodine solution (Betadine Solution, Purdue Frederick Inc., Toronto, Ontario) and then replaced into the abdominal cavity. The abdominal incision was closed using 7 metric chromic gut (Pfrimmer-Viggo) in a three layer simple continuous fashion. The skin was closed using 6 metric Suprylon (Pfrimmer-Viggo) in a Ford-interlocking pattern.

Calves were discharged immediately postoperatively and treated daily for three to five days with intramuscular injections of either trimethoprim-sulfadoxine or ampicillin/sulbactam (Synergistin, rogar/STB).

Results

A total of 46 clinical cases from 18 different herds were evaluated, with an average incidence of 1.0% for the year of the study, and a range of 0.2–5.7%. The average age of affected calves was 3.6 weeks, with a range of 1–6 weeks. The overall survival of surgical cases was 74%. (Survival is defined as those calves that lived at least three months past the surgery date as well as those which succumbed to some condition not attributable to abomasotomy.) A summary of surgical findings is found in Table 1. Abomasal ulcers were found in 37 of 46 affected calves. The most frequent location for the ulcers was the greater curvature of the abomasum and approximate size varied from 1–4 cm in diameter. In many calves, ulcers were found that were not readily detectable on palpation or visual examination of the abomasal serosa. In four calves, the abomasal ulcers had perforated and there was evidence of acute diffuse peritonitis. Three of these animals were euthanized at the time of surgery, and the fourth died several days postoperatively.

In 35 of the 46 calves, hair was present in the abomasum. Nine of these 35 calves did not possess ulcers. The amount of hair and its form were extremely variable. In some calves, two or three 2–4 cm hairballs were found in the pyloric region. In other calves, a moderate amount of loose matted hair was found in the abomasum. In three calves, the lumen of the abomasum was completely filled with 4–5 L of hair. Twenty-six calves possessed both an ulcer and hair in the abomasal lumen. A small to moderate amount of "mud" was found in the abomasums of six calves, all of which also had abomasal ulcers. In five calves, abomasal ulcers existed with no abnormal contents present.

The incidence of surgically corrected abomasal disease was compared between those herds which offered a free choice mineral mix and those which did not. These results are shown in Table 2. Chi-square analysis revealed no statistically significant differences ($\chi^2 = 3.31$, p = 0.07). However, calves from herds not offering free choice mineral mix showed a trend in having an increased risk of developing abomasal disease and requiring surgery (relative risk 1.78; confidence interval 0.99–3.20).

Table 3 shows that the incidence of surgically corrected abomasal disease was significantly lower for calves housed on pasture as compared to those housed in pens or on stubble fields ($\chi^2 = 10.45$, p = 0.001). The relative risk was 2.80 times greater (confidence interval 1.52–5.16) for calves on stubble fields or in pens to develop abomasal disease which required surgery.

Discussion

In this study, housing appeared to play an important role in the epidemiology of abomasal disease. It is not known why this effect was apparent, but variables such as increased stocking density or an increase in the availability of dirt or hair in the environment may have played a critical role. The results suggested that there

is a significant increase in abomasal disease for those herds kept on stubble fields or in pens as compared to those housed on pasture. This would suggest that there may be confounding factors, such as housing or stocking density, that have important roles in the prevention of abomasal disease in young beef calves.

Previous reports have linked deficiencies in copper to the development of abomasal ulcers (2,4). The morbidity in those studies was much higher (5–15%) as compared to mine (0.2–5.7%). In my study, there was a trend of decreased morbidity on farms that provided a free choice mineral mix versus those which did not; these results were not statistically significant. However, as certain variables were not measured in this investigation, the role of copper should be further scrutinized. In this study, no data were available regarding the intake of mineral mix, either for individuals or herds. Similarily, no blood, tissue, or feed levels of copper were obtained.

Mycological or bacteriological studies were not performed on ulcers in this study. Therefore, the putative role of bacteria such as *Clostridium perfringens* or fungi acting as primary pathogens or as secondary opportunistic agents is unknown.

It is compelling to speculate that hair in the abomasum makes an important contribution to the pathogenesis of abomasal ulcers. Many calves in this study had hair in the lumen of their abomasums and exhibited abomasal ulcers. Others had only hair in the abomasum. It is possible that this latter group represents an incipient stage in the pathogenesis, and, without surgical intervention, may have progressed to develop ulcerative lesions. This hypothesis is difficult to corroborate and requires further study.

In conclusion, abomasal ulcers and/or abomasal hairballs are relatively common in young beef calves. Surgical treatment is routine and can be performed safely with reasonably good success. In the study reported herein, housing appeared to significantly affect the incidence of the disease. Other factors, such as the role of copper in preventing the syndrome, require further study.

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