Case Report Rapport de cas

Right flank laparotomy and abomasotomy for removal of a phytobezoar in a standing cow

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Abstract — A 4.5-year-old Holstein-Friesian cow underwent surgery because of left abomasal displacement. Intraoperative palpation of the pyloric region revealed a phytobezoar. The abomasum containing the phytobezoar was exteriorized, and an incision was made directly over the mass in the region of the greater curvature of the pyloric part of the abomasum.

Résumé — Laparatomie et abomasotomie du flanc droit pour l'ablation d'un phytobézoard chez une vache debout. Une vache Holstein âgée de 4 1/2 ans a subi une chirurgie en raison d'un déplacement abomasal gauche. Une palpation peropératoire de la région pylorique a révélé un phytobézoard. L'abomasum contenant le phytobézoard a été extériorisé et une incision a été pratiquée directement au-dessus de la masse dans la région de la plus grande courbure de la partie pylorique de l'abomasum.

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A 4.5-year-old Holstein-Friesian cow was referred to the Department of Farm Animals, University of Zurich, because of suspected left abomasal displacement. The cow (680 kg bodyweight, body condition score 3.5) had an uneventful calving 3 d before referral. At the time of admission, the general condition and demeanor of the cow were mildly abnormal.

Case description

The level of clinical hydration, heart rate, respiratory rate, and rectal temperature were within normal limits. Ruminal size was reduced, and there were no ruminal contractions in a 2-minute period. Simultaneous manual ballottement and auscultation and percussion and auscultation were positive over the left costal abdominal wall in the area of the 9th to the 13th rib. Clinical examination of the gastrointestinal tract on the right side of the cow revealed no pings or secussable fluid and was therefore unremarkable. Transrectal palpation revealed that the rumen was slightly displaced medially away from the left body wall, lacked palpable motility, and had predominantly firm content. Feces in the rectum appeared normal. Voided urine was evaluated with a urine test strip (Combur-test strips; Medical solution GmbH, Steinhausen, Switzerland), which revealed mild ketonuria. A vaginal examination revealed a slightly hemorrhagic and odorless uterine secretion.

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The hematocrit, total leukocyte count, concentration of total protein, fibrinogen, serum electrolytes, urea and creatinine, the concentrations of liver and muscle enzymes, and venous blood gas variables were determined. The results of hematological analysis were within the normal range. The serum concentrations of potassium (3.7 mmol/L, reference range: 3.9 to 5.0 mmol/L) and total calcium (2.06 mmol/L, reference range: 2.3 to 2.6 mmol/L) were lower than normal, and the chloride concentration was within the normal range (101 mmol/L, reference range: 95 to 105 mmol/L). The concentration of total bilirubin (13.2 μmol/L, reference range: 1.5 to 2.9 μmol/L) and the activities of glutamate dehydrogenase (146.5 U/L, reference range: 4 to 18.2 U/L), aspartate aminotransferase (224 U/L, reference range: 57 to 103 U/L), creatine kinase (349 U/L, reference range: 70 to 169 U/L), and sorbitol dehydrogenase (35.7 U/L, reference range: 4.0 to 7.4 U/L) were mildly to moderately elevated. The chloride concentration of a sample of ruminal fluid was 25 mmol/L (normal range: 15 to 25 mmol/L) and the base deficit of a venous blood sample was −0.7 mmol/L [normal range: (+1 to −1) mmol/L].

Based on the findings, a tentative diagnosis of left abomasal displacement and mild ketosis was made. After distal paravertebral local anesthesia, a right-flank laparotomy was carried out via a 25-cm incision placed 10 cm caudally and parallel to the last rib, and 7 cm below the costal junction. The abomasum was deflated and reduced (1); however, palpation of the pyloric region revealed a solid, non-movable mass, approximately 16 cm in diameter, which obstructed approximately 80% of the lumen. The mass was considered to be a phytobezoar, and despite concerted efforts to massage the mass in a retrograde direction, it could not be moved or broken down by manual pressure. Because the part of the abomasum containing the phytobezoar could be exteriorized and secured relatively easily, it was

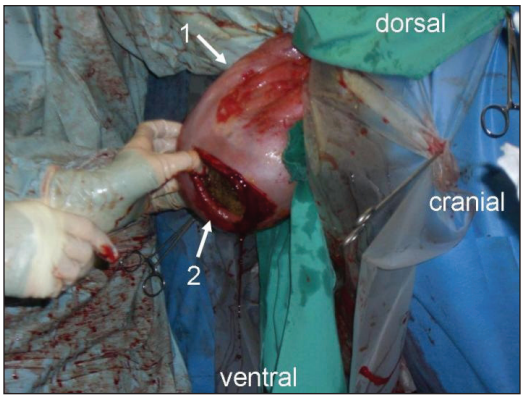

Figure 1. Exteriorized part of the abomasum with its grater curvature (1) and the incision site (2).

Figure 2. Pear-shaped phytobezoar with the tapered end (1) which was directed towards the pylorus and the rounded end (2) which was directed towards the abomasal lumen.

decided to remove the mass via an abomasotomy with the cow standing.

A surgical drape (Vi-Drape 23 cm; Medical Concepts Development, St. Paul, Minnesota, USA) was applied and the incision was packed off with saline-soaked drapes to prevent contamination of the abdominal cavity. The abomasum containing the phytobezoar was exteriorized up to about 30 cm from the pyloroduodenal juncture, and an incision (about 20-cm long) was made directly over the mass in the region of the greater curvature of the pyloric part of the abomasum (Figure 1). The phytobezoar was 24 cm × 18 cm × 9 cm, pear-shaped, composed of poorly digested feed and weighed 1.5 kg. After removal of the mass, the abomasal mucosa was closed with 2-0 monofilament glucomer suture material in a continuous appositional suture pattern. The serosa and submuscularis were closed together with 1 monofilament glucomer suture in a simple continuous suture pattern followed by a second closure using the same suture material in a Cushing pattern. The suture line was cleaned with sterile saline solution, and the abomasum was repositioned and fixed to the right abdominal wall via an omentopexy. The abdominal wall and skin were closed in routine fashion. Postoperatively, the cow received 1.5 g/100 kg calcium borogluconate intravenously and a glucose and sodium chloride [500 g glucose (5 %) and 90 g NaCl (0.9 %)/d] solution administered via an indwelling jugular vein catheter for 3 d. Additional treatment included 1 mg/kg flunixine meglumine administered intravenously once daily for 3 d and 12 000 IU/kg penicillin benzyl procaine (Procacillin; Veterinaria AG, Zurich, Switzerland) administered intramuscularly every 12 h for 5 d. The cow was discharged in good health 6 d postoperatively. A follow-up phone call 8 mo later revealed that the body condition and milk production of the cow were equal to the herd average.

Discussion

In cattle, abomasotomy is indicated for excision of abomasal ulcers or removal of phytobezoars (2), impacted feed or sand (3–5). The recommended approach is a right paramedian or right paracostal incision with the patient in lateral or dorsal recumbency (2,4,5). Abomasotomy in the standing cow is not mentioned in the literature; only a small part of the abomasum can be visualized and the risk of contaminating the abdominal cavity with abomasal contents is high in the standing cow (2,4).

To our knowledge, this is the first report of abomasotomy via a right flank approach in the standing cow. We were able to exteriorize and manually secure the abomasum such that its pyloric part could be incised for removal of the phytobezoar. A possible reason why a large part could be exteriorized is that the small omentum, the area of the tightest suspension of the abomasum, was stretched during left displacement and thereby allowed increased mobility. The risk of contamination of the abdominal cavity with abomasal contents was reduced by the use of a surgical drape and saline-soaked drapes used to pack off the abdomen. A crucial criterion for proceeding with abomasotomy in our patient was being able to exteriorize and manipulate the abomasum without causing discomfort or pain. The length of the incision in the right flank was the same as that used for a routine exploratory laparotomy and did not require extension for abomasotomy and removal of the phytobezoar (1).

It is doubtful that the phytobezoar, which resulted in partial obstruction of the pyloric part of the abomasum, was the cause of the left abomasal displacement. It is more likely that obstruction and impaction of the abomasum would have lead to dilatation and increased weight of the organ, thereby preventing left displacement (4). However, the degree of fill and the consistency of the contents of the abomasum after repositioning were considered normal. To our knowledge, there are no reports describing abomasal displacement attributable to a phytobezoar (6). The center of the phytobezoar was very compact and almost dry, indicating that it had probably been present in the abomasum for some time. The amount of time required to produce a phytobezoar of this size (24 cm × 18 cm × 9 cm) is not known, but we estimate several days to weeks. The phytobezoar was probably located in the most ventral part of the abomasum, which is the greater curvature, because of its size and weight. With displacement of the abomasum, the greater curvature moved dorsally and to the left, which resulted in movement of the phytobezoar to the most ventral area, the pyloric part. It then became lodged and remained in this position until its surgical removal. Partial obstruction of the pyloric part of the abomasum by the phytobezoar probably did not occur until the

abomasum had become displaced. Further evidence for this was the good general condition of the cow and the occurrence of only a mild abomasal reflux syndrome. In our experience, both these parameters would have been more severely affected with long-standing pyloric obstruction (7).

In conclusion, abomasotomy via a right flank approach in the standing cow is feasible in principle. It depends, however, on whether or not the abomasum can be adequately exteriorized and secured and if the patient tolerates these manipulations. CVJ

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