PEER REVIEWED

Case Report–Small Intestinal Tears associated with Sudden Death in Two Heifers and One Cow with Posterior Presentation of the Offspring

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Abstract

Two heifers and one cow died shortly after calving: all three calved with the calf in posterior presentation. The first heifer was examined for recumbency and shock, and died despite therapy, while the second heifer died acutely without being examined premortem. The adult cow died from acute peritonitis three days after an uncomplicated standing left-flank cesarean-section. At necropsy, all animals had ruptured intestines and hyperacute peritonitis with digestive content free in the abdominal cavity. No signs of trauma were seen in the uterus and vagina of the two heifers. The uterine suture and uterine involution were considered normal in the cow that underwent the C-section. This is the first report of perforated intestines secondary to posterior presentation during calving without trauma of the reproductive tract. Although the precise physiopathology of this abnormality is still unknown, entrapment of the small intestine between the uterus and the pubis of the cow, and falling down during expulsion of the calf, might explain the cause.

Keywords: bovine, dystocia, peritonitis

Résumé

Deux taures et une vache meurent rapidement après le vêlage : les trois avaient eu une dystocie avec un veau en présentation postérieure. La première taure a été examiné en décubitus et en état de choc et est morte malgré les traitements ; pendant que la seconde taure est morte subitement sans avoir eu d'examen premortem. La vache adulte est morte d'une péritonite aigüe trois jours après une césarienne non compliquée qui a été effectuée debout par le flanc gauche. À l'autopsie tous les animaux présentaient une rupture intestinale et une péritonite suraigüe avec du contenu digestif libre dans la cavité abdominale. Aucune marque de traumatisme n'était visible sur l'utérus ou le vagin des deux taures. La plaie utérine et l'involution de l'utérus de la vache ayant subit la césarienne était considérée comme normale. Ce rapport est le premier concernant des cas de perforation intestinale secondairement à une présentation postérieure au vêlage et sans lésion du tractus reproducteur. Même si la physiopathologie exacte de cette anomalie reste non élucidée, une compression de l'intestin grêle entre l'utérus et le bassin et une chute de l'animal durant l'expulsion du veau pourraient expliquer cette complication.

Introduction

Intestinal tears associated with calving are infrequent in cattle.[6,14] Information about these cases is rare regarding the calving facility and position of the fetus, except in one case which mentions a traumatic delivery associated with rectal and jejunal tears.[14] Posterior presentation is relatively common in late bovine pregnancy.[7,9] In contrast to this report, no association has been made between the presentation of the fetus, dystocia and the presence of intestinal rupture without genital lesions.

Clinical Findings and Case Management

Two heifers and a cow from three different herds were examined on the farm by the bovine ambulatory clinic, Faculty of Veterinary Medicine, University of Montreal. The first case was a two-year-old Holstein heifer in a tie-stall that calved eight hours prior to examination. The calf was delivered in posterior presentation, hand-assisted by the owner. The dystocia score was 4 of 5 (considerable force needed).[3] The heifer fell during delivery, and the calf was dead. The owner's complaint was decubitus, depression and anorexia since calving. The owner had administered ceftiofur[a] because the calv-

ing was difficult (2 mg/lb [4.4 mg/kg], IM). The placenta was expelled a few hours after calving.

Upon examination, the heifer was in lateral recumbency, depressed and estimated to be 5% dehydrated. Rectal temperature was 102.6°F (39.2°C), the animal was tachypneic (70 breaths per minute) and the heart rate was 120 beats per minute with muffled heart sounds. Increased capillary refill time (more than 2 seconds) and decreased perfusion of the extremities were also noted. Ballottement of the abdomen did not reveal any splashing sounds. Vaginal, cervical and uterine examination revealed no anomalies; secretions were odorless and tainted with a small quantity of blood. Transrectal examination was normal. The heifer was treated with intravenous 23% calcium borogluconate[b] (500 mL) and 2 liters of homemade 7.2% NaCl solution. Because of the possibility of a trauma secondary to delivery, dexamethasone[c] (100 mg, IV) was also administered. The heifer died eight hours after treatment.

Macroscopic findings at necropsy included diffuse mildly exudative peritonitis, and fecal material in the abdominal cavity. A four-inch (10-cm) intestinal tear on the mesenteric aspect of the jejunum was observed (Figure 1). A two-inch (5-cm) area of hemorrhage was seen in the mesentery near the defect. The genital tract was normal; no trauma, petechia or hemorrhages were observed on the uterus, the uterine broad ligament or the vagina. A moderate amount of pleural fluid was also observed. Histopathologic examination of the disrupted intestine was compatible with a traumatic tear of the jejunum and the mesentery.

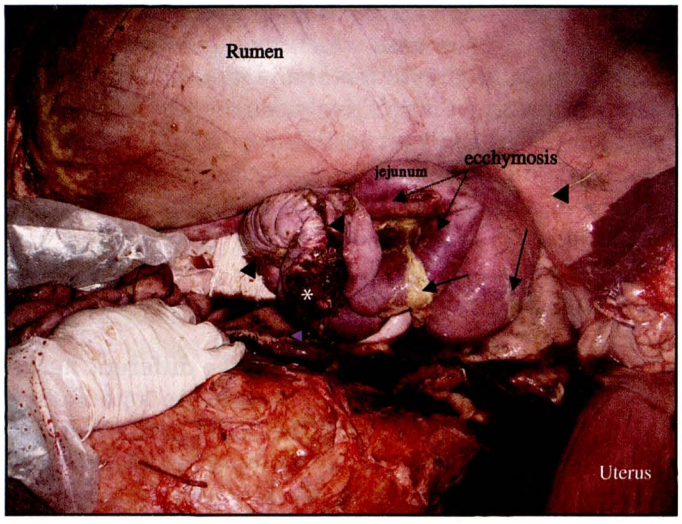

Figure 1. The macroscopic findings in a heifer showing diffuse peritonitis with fibrin clots (arrow) and free ingesta in the abdominal cavity (arrowhead). The intestinal laceration (asterisk) is seen in the mid-jejunum. Ecchymoses are also seen at the level of the affected intestine portion.

The second heifer was a two-year-old Holstein that calved in a tie-stall with forced, hand-assisted extraction by the owner (dystocia score of 3 out of 5, needed assistance)[3] of a viable calf in posterior presentation. The heifer fell during the dystocia. Fetal membranes were expelled normally after delivery, and the heifer was able to stand after calving. The heifer developed dyspnea shortly after calving. She was treated by the owner ten hours after delivery of the calf with 500 mL of intravenous calcium borogluconate solution[b] and 500 mL of a 50% dextrose solution[d] because she was down and depressed. The heifer died 13 hours after calving.

The heifer was submitted for necropsy at the veterinary teaching hospital. Necropsy findings were compatible with acute, septic peritonitis. Free feedstuff was observed in the abdomen. Serous surfaces of the abdominal viscera were severely congested with multiple petechiae. Small intestinal loops were adhered with reducible fibrinous adhesions. A 12-inch (30-cm) tear was found at the end of the ileum after careful dissection of the adhered intestine, one meter proximal to the ileocecal junction, with a tear of the mesentery in the affected area. The uterine serous layer was covered with multifocal areas of hemorrhage without any change in the uterine wall or mucosa. Histopathologic examination revealed severe congestion of the liver, kidney and lung. Focal subendocardial and myocardial hemorrhages were also observed. In addition, histopathologic examination of the traumatized intestine revealed transmural coagulation necrosis with fibrinosuppurative and hemorrhagic exudate. The traumatized mesentery in the area of the intestinal tear had large hemorrhagic areas with multifocal steatonecrosis and neutrophilic infiltration.

In the third case, the farmer was unable to deliver a full-term fetus from a six-year-old Holstein cow using manual traction. While the farmer attempted to deliver the fetus in a tie-stall, the cow fell down violently a few times. The farmer contacted the bovine ambulatory clinic for assistance. Due to relative fetal oversize, the veterinarian did not attempt to deliver the calf vaginally. Instead, a live 187 lb (85 kg) calf in posterior presentation was delivered by standard standing left flank C-section performed in the farm. Surgery was uncomplicated with minimal abdominal contamination.

Two days later, the cow was anorexic and had significant abdominal distension. She died within 24 hours despite aggressive supportive therapy. Necropsy was performed on-farm. Gross findings were compatible with acute septic peritonitis, with at least 20 liters of abdominal fluid and fibrin present. The only macroscopic anomaly was an eight-inch (20-cm) torn and necrotic area of the jejunum covered with fibrin. The uterus was normal with no adhesions, and the uterine suture line was intact and secure. No other abnormalities were found.

Discussion

Diffuse peritonitis is an infrequent event in cows that can be secondary to uterine tears or torsion,[11] gastrointestinal perforated ulcer,[1] or rupture of an intra-abdominal abscess.[5] Intestinal anomalies without rupture of the gastrointestinal tract have been described in late pregnancy and postpartum in large animals, including strangulation of the duodenum in two cows[8] and ischemic necrosis of the small intestine or colon in four mares within a few days following foaling.[12,16] Intestinal laceration secondary to calving has also been mentioned as a cause of colic a few days following calving.[6] Rectal lacerations with secondary peritonitis and prolapse of small intestines through the rectal defect have also been reported as an infrequent complication of calving.[11,14]

Perforation of the gastrointestinal tract secondary to calving or foaling is typically manifested by various degrees of colic that appear within a few days of parturition,[6,12,16] in contrast to few clinical signs caused by perineal laceration with rectovaginal fistulae.[4] Signs of abdominal pain have been attributed to ischemia of the affected parts of the intestines. The rapid deterioration and death of the first two cases reported here is unusual because no signs of colic or abdominal distension were seen by the owner (or maybe not detected in heifer 2) or the veterinarian. Such acute evolution secondary to calving has only been mentioned in one cow, with rectal rupture without any genital anomaly secondary to parturition with anterior presentation of its fetus.[15] That cow had bilateral abdominal distention, which was not present in the two heifers in this case report, but was present in the cow case. In rare instances, various degrees of hypovolemic or septic shock can be observed.[15] However, the clinical signs are not characteristic of a diffuse peritoneal disorder which classically consists of fever, peritoneal pain and abdominal distention.[5]

The cattle in this study had posterior, dorsolumbar presentation of the fetus and dystocia. It has not been proven by evidence-based medicine that this presentation is associated with higher risk of intestinal damage. The only published case series with small intestine and mesenteric tears in postparturient cows did not mention the difficulty of calving nor presentation of the calves.[6] However, posterior presentation was mentioned as frequently as anterior presentation in the literature review in one published case of rectal and jejunal mesenteric tears in a postparturient cow.[14] The posterior position has also been found more frequently associated with uterine lacerations,[10] and has been reported in a cow with jejunal avulsion and vaginal evisceration.[13] The posterior presentation could be associated more frequently with intestinal incarceration between the fetus and the pelvis during the expulsive stage of the calving, leading to increased risk of intestinal damage.

Necropsy findings included acute intestinal tears with various degrees of necrosis along the border of affected small intestine. These findings and the absence of previous history of illness in affected cows before parturition make the possibility of intestinal ischemia in late pregnancy and intestinal rupture before dystocia unlikely. Because the genital tracts of the cattle in these three cases were not perforated or traumatized (the C-section uterine wound of cow 3 was normal), the etiology of the intestinal damage may be associated with severe compression ischemia of the affected part of the intestine, or rupture of the mesenteric blood supply of the intestine, leading to severe ischemia of the jejunum. Clinical signs appeared within a few hours following parturition in both heifers, and not days after calving, contrary to a previous case series.[6] A more logical hypothesis could be direct blunt trauma of an intestinal loop in the pelvis secondary to fetal movements and uterine contractions during delivery, and the dam falling down during expulsion, leading to intestinal rupture. However, the absence of vaginal or uterine lesions does not allow precise conclusions concerning the pathophysiology of such an injury. Although genital laceration is frequently associated with retroperitoneal rectal laceration,[4] this appears not to be the case when intestinal trauma occurs.[2,6,16]

Conclusions

Intestinal tear and diffuse peritonitis should be included in the differential diagnosis of sudden illness of a postparturient cow, even if no genital anomaly is present. Various signs of hypovolemic and septic shock, with rapid degradation secondary to calving, leading to sudden death can be observed. Dystocia with the fetus in posterior presentation, especially if the parturient cow falls down, may be risk factors for this unusual acute postpartum complication. This situation may allow entrapment of an intestinal segment between the uterus and pubis of the cow, leading rapidly to an acute and fatal peritonitis despite supportive treatments.

Footnotes

[a]Excenel, Pfizer, London, Ontario, Canada
[b]Calcium borogluconate, 23%, Vétoquinol, Lavaltrie, Québec, Canada
[c]Dexamethasone 5, Vétoquinol, Lavaltrie, Québec, Canada
[d]Dextrose 50%, Vétoquinol, Lavaltrie, Québec, Canada

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FUTURE MEETINGS

American Association of Bovine Practitioners

2009	Omaha	September 10-12
2010	Albuquerque	August 19-21
2011	St. Louis	September 22-24
2012	Montreal	September 20-22

World Buiatrics Congress

2010	Santiago de Chile, Chile	November 14-18