Uterine for a Treat: Uterine Torsion Dystocia in the Dairy Cow

Jessica N. Wilson

Clinicopathologic Conference

May 26, 2017

Advisor

Kevin Walters, DVM, DACT

INTRODUCTION:

Uterine torsion is a very important cause for dystocia, occurring most often in dairy cattle during parturition. The frequency of uterine torsion related to all other parturitions, both normal and abnormal, appears to be between 0.5 - 1.0%; the frequency of uterine torsion related to all bovine dystocia cases presented to a veterinarian appears to be much more varied, ranging between 2.7 - 65.0% [1]. One retrospective study using cases presented to veterinary schools across North America found that most cows suffering uterine torsion were at term (81%) [14]. It has been suggested that the incidence of uterine torsion may be increasing; however, this may be biased due to the fact that veterinarians are being called upon less to assist with the more routine, common types of dystocia due to the increasing obstetrical competencies of farmers [9].

HISTORY AND PRESENTATION:

4517 is an approximately 9 year old Holstein cow who presented to MSU-CVM Large Animal Emergency Service on November 29, 2016 for uterine torsion. She was at term with her pregnancy. On presentation, 4517 was somewhat agitated with normal temperature, elevated pulse (112 beats per minute), and normal respiratory rate. She had decreased rumen motility and mildly injected sclera bilaterally. The calf was not visible externally at the vulvar orifice. We restrained her by using a swing panel and placed her into a head catch for physical examination and palpation.

PATHOPHYSIOLOGY:

There are three stages of parturition. Stage I is the onset of myometrial contractions and removal of the progesterone hormonal effect, which is to promote gestation and delay fetal

delivery. Stage II is the expulsion of the fetus. Stage III is the expulsion of the fetal membranes [2].

The fetus initiates stage I of parturition by increasing fetal cortisol, which leads to removal of the progesterone block that inhibits myometrial activity. It is believed that approaching the end of gestation, fetal mass approaches the space limitation of the uterus. This causes the fetus to become stressed and stimulate the fetal anterior pituitary to release adrenal corticotropin hormone (ACTH), which acts to increase fetal cortisol. This response is known as the Ferguson Reflex. The progesterone block to myometrial activity is then removed by the corticoids produced by the fetus which activates three enzymes: 17α Hydroxylase, 17-20 Desmolase, and Aromatase; these enzymes act to convert progesterone to estradiol [2]. This cascade of events is responsible for preparing the urogenital tract for parturition, inducing myometrial contractions, and moving into stage 2 of parturition, which is expulsion of the fetus.

There are several different types of uterine torsions in cattle. There is post-cervical torsion, intra-cervical torsion, and pre-cervical torsion. Post-cervical torsion, which is combined uterine and vaginal torsion, is much more commonly diagnosed than the other two types. Uterine torsions to the left (counter-clockwise) appear to occur more frequently than to the right (clockwise) [1, 14].

The pathogenesis of bovine uterine torsion is still unclear [8, 9]. Uterine torsion typically occurs during 1st stage or early 2nd stage parturition, but there are some reports of pre-partum cases happening during gestation [6, 11]. The most widely accepted existing theory is that the cow is predisposed to uterine torsion due to its anatomy, specifically, through variations in uterine and broad ligament anatomy [1, 6, 8, 9]. Cattle and buffaloes are the most commonly afflicted of the domestic species. It appears that dairy cattle are more predisposed to uterine

torsion compared to beef cattle, and that *Bos indicus* is the least likely of all cattle to undergo uterine torsion. It has also been demonstrated that uterine torsion occurs most commonly in pluriparous dairy cows giving birth to a bull calf fetus. It is thought that pluriparous cows are at increased risk due to the decrease in myometrial tone and decrease in broad ligament stability that occurs through multiple pregnancies [4]. The etiology behind the correlations regarding fetal sex is currently unknown; however, it is likely due to the relationship between male calves and larger calf size, as larger, heavier calves seem to undergo uterine torsion dystocia more frequently [5]. Additional predispositions include sudden dam movement (especially on hilly terrain) or fetal movement (during stage I of parturition), decreased rumen volume during parturition, a small non-gravid horn, increased fetal weight, and decreased fetal fluid volume [4, 6]. Typically, the uterus rotates over the non-gravid horn. 60% of bovine pregnancies occur in the right uterine horn; this may be the underlying predisposition of counter-clockwise uterine torsions occurring more frequently [14]. It appears that twin pregnancies prevent uterine torsion, likely by stabilizing the uterus between the two gravid horns [6].

There are many different severities to degree of uterine torsion cases and their associated frequencies of occurrence. 45-90° uterine torsions are mild and rare. 90-180° torsions comprise approximately 20% of cases presented to veterinarians. 180-270° torsions are the most common, accounting for 57% of these cases. The remaining 22% of uterine torsions are 270-360° [14].

The Brown Swiss dairy breed is over-represented in uterine torsion cases, suggesting there may be an increased risk for Brown Swiss cows to experience uterine torsion dystocia [1]. One study found that there was a high incidence of uterine torsion in Holstein-Friesians in the pasture environment, and that 20% of these cases had incomplete cervical dilation that later resolved and allowed for vaginal delivery [7].

DIFFERENTIAL DIAGNOSES:

Several differential diagnoses for bovine dystocia exist. These include:

- Calf that is too large and/or dam that is too small
- Dam with excessive body condition
- Malpresentation of the fetus and/or deformed fetus and/or twins
- Uterine torsion
- Lack of uterine contractions (such as with "Milk Fever" – Hypocalcemia)

DIAGNOSTIC APPROACH/CONSIDERATIONS:

Rectal and vaginal palpation are used in order to diagnose the type of dystocia, along with the direction and approximate degree of the uterine torsion, if present [9, 12]. Rectal palpation as a diagnostic is only recommended in a few specific cases of dystocia, such as uterine torsion. When a stenosis of the vaginal canal is detected during vaginal palpation, rectal palpation is required to confirm if it is due to uterine torsion and rule out other causes of vaginal stenosis, such as pelvic deformities and exostoses [13]. The degree of torsion is also approximated during palpation and while using the uterine detorsion bar to untwist the uterus. Clinical signs vary dependent on the degree of uterine torsion. Abdominal pain and discomfort, straining, lethargy, tachycardia, anorexia, and decreased rumen motility are some of the more common clinical signs [9, 14].

Heifers should deliver their calf within 60-90 minutes after onset of active labor or when the feet are visible externally at the vulvar orifice. Likewise, cows should deliver their calf within 30-60 minutes under the same conditions. If these timelines are not met, then the cow is

undergoing one of the differential types of dystocia, and assistance is required to deliver the calf [12].

Upon physical examination, 4517 weighed 1450 pounds. She was tachycardic (112 beats per minute) with moderately injected, hyperemic sclera bilaterally. She appeared mildly dehydrated with a skin tent on her eyelid; her dehydration status was approximated at 5% dehydrated with pink mucous membranes and capillary refill time of 2.5 seconds. She had weak, decreased ruminal contractions (1 every 2 minutes). After initial physical examination, 4517 was administered an epidural of 2% lidocaine (6.5 mLs).

4517 was diagnosed using both rectal and vaginal palpation with an approximately 180 degree counter-clockwise intra-cervical uterine torsion with the calf in posterior presentation, dorso-sacral position, and hind limbs extended bilaterally. 95% of calves are delivered in anterior presentation; out of the 5% of calves that are delivered in posterior presentation, only half are born without assistance [14]. Both hind limbs of the calf were felt upon vaginal palpation. The bull calf was diagnosed as dead on arrival to MSU-CVM Large Animal Service using vaginal palpation. The uterus was detorsed using OB chains and a uterine detorsion bar; the calf was pulled using OB chains, fetal extractor, and manual manipulation. The calf was weighed at 98 pounds after delivery.

TREATMENT AND MANAGEMENT OPTIONS:

Therapy involves rotating the uterus back to its normal, anatomical position. Direct and indirect methods of detorsion are available and applied during various case conditions. Treatment method selection depends on the experience of the veterinarian, degree of torsion, and condition of the dam. Treatment options for uterine torsion include vaginal rotation of the fetus,

mechanical rolling of the dam, or caesarean section (C-Section) [4, 5]. Fetotomy is contraindicated in cases where the birth canal is either obstructed or stenotic, such as is the case during uterine torsion dystocia [13]. Extraction of the calf may occur by C-Section or vaginal delivery, as the uterine torsion always leads to dystocia [3]. If a C-Section is required, the most commonly utilized surgical approach is the standing left flank incision. However, the standing right flank surgical approach has limited indications where it should be preferred, including uncorrected uterine torsion, hydrops allantois or hydrops amnii, ruminal distension, or adhesions on the left side from a previous C-Section. The incision should be made approximately 25% longer than a routine C-Section. After the uterine torsion is corrected during abdominal surgery, vaginal delivery is preferred over hysterotomy. Fetal viability, uterine health, and cervical dilation are the three deciding factors on which technique to utilize. If cervical dilation is appropriate, proceed with vaginal delivery and close the flank incision. If cervical dilation is insufficient or calf vitality is undetermined, perform hysterotomy [14].

OB chains were placed around and above both hocks of the calf. The uterine torsion was then de-rotated using a uterine detorsion bar in the clockwise direction until the uterus was back to its normal anatomical position. The calf was diagnosed as deceased. The calf was pulled in caudal presentation by extending the hind limbs and hocks through the birth canal using a fetal extractor and OB chains. After delivery of the calf, the uterus was palpated to determine the presence of a twin and to detect any trauma. 4517 was diagnosed with a mild superficial uterine tear near the left side of the cervix that was not full thickness. She was administered 5 gallons of oral fluids (Hostetler's solution, calcium drench, and propylene glycol).

During her hospitalization at MSU-CVM, 4517 recovered well after her dystocia and was healthy enough for discharge within a couple of days. She was monitored for any signs of

systemic infection, specifically any changes in appetite, activity, attitude, and temperature. Until her discharge from MSU-CVM, all of these parameters were normal, except for pyrexia the following day (102.9°F). She had retained fetal membranes, which were discharged over the next couple of days. She was considered to be at an increased risk of metritis due to her traumatic birth and retained fetal membranes. Much of her care at MSU-CVM was supportive. Her hydration status was monitored frequently to see if she required any further oral fluid solutions, which she did not. She was milked out every 12 hours using a portable milking claw. She was given 4 flakes of bermudagrass every 6 hours, 1 small bucket of total mixed ration (TMR) every 12 hours, alfalfa hay as needed, and free access to fresh water. She was given Excede® (ceftiofur crystalline free acid) 4400 mg (22 mLs) subcutaneously in the fat pad behind her left ear on November 29, 2016 (slaughter withdrawal time - 13 days, December 12, 2016; milk withdrawal time 0 days).

EXPECTED OUTCOME AND PROGNOSIS:

Following successful uterine detorsion, the prognosis, varying from good to unsuccessful, is much dependent on the time and degree of the torsion. This is due to the increased risk of extensive vascular compromise, which may lead to a friable uterus prone to uterine rupture [14]. One retrospective study across cases presented to several North American veterinary schools demonstrated 20% of cases allowed for vaginal delivery after manual correction and 18% were delivered vaginally after rolling the dam. C-Section was performed immediately in 35%. C-Section was performed after detorsion attempts were unsuccessful (7%) and due to failure of the cervix to dilate after successful detorsion (20%) [14]. Calf vitality has been demonstrated with great variation in the current literature, ranging from 14 - 90%. It appears that calf vitality is greater under field rather than clinical conditions. Post-partum, the cow may suffer mild

irritations of the uterus to fatal complications [3]. One retrospective case study showed that fetal survival rate was 24% and dam survival rate was 78% [14]. The influence on the cow's future fertility depends on the progress of the birth and any secondary complications during delivery of the calf [3, 10]. Future fertility has been shown to be negatively correlated with increasing degree and duration of the uterine torsion [4]. There is an increased risk for electrolyte disturbances (approximately 50%), birth-associated injuries (approximately 20 %), and placental retention (varying between 3-52%) [3].

4517 was discharged from MSU-CVM Large Animal Service and returned to her farm on December 1, 2016. The following day at her farm, she received a second dose of Excede® and IV fluids over the next several days. On December 14, 2016, she received a dose of Lutalyse® (dinoprost tromethamine) for her ongoing metritis. MSU-CVM Ambulatory Service went to her farm on January 2, 2017. She was palpated at this visit and determined to be doing well by an ambulatory clinician. The farm sold 4517 on January 19, 2017.

CONCLUSION:

Uterine torsion is a common cause of dairy cattle dystocia correlated with a high calf mortality and dam culling rate [9]. More research is required to further investigate the suspected predispositions in order to produce and implement management methods to decrease this condition's occurrence on the farm. Careful and expedient case management is vital for successful outcome and improved prognoses for both the calf and the dam [10].

REFERENCES:

[1] Erteld E, Wehrend A, Goericke-Pesch S. Uterine torsion in cattle – frequency, clinical symptoms and theories about the pathogenesis. Tierarztl Prax Ausg G Grosstiere Nutztiere 2012; 40(3):167-175.

[2] Senger PL. Pathways to pregnancy and parturition. 2nd ed. Redmond: Current Conceptions, 2003.

[3] Erteld E, Krohn J, Dzhakupov IT, Wehrend A. Uterine torsion in cattle – Therapy and consequences for calf and cow. Tierarztl Prax Ausg G Grosstiere Nutztiere 2014; 42(5):297-303.

[4] Ghosh SK, Singh M, Prasad JK, Kumar A, Rajoriya JS. Uterine torsion in bovines – A review. Intas Polivet 2013; 14(I): 16-20.

[5] Lyons NA, Knight-Jones TJD, Aldridge BM, Gordon PJ. Incidence, management and outcomes of uterine torsion in UK dairy cows. Cattle Practice 2013; 21:1-6.

[6] Aubry P, Warnick LD, DesCôteaux L, Bouchard E. A study of 55 field cases of uterine torsion in dairy cattle. Can Vet J 2008; 49(4): 366-372.

[7] Faria N, Simões J. Incidence of uterine torsion during veterinary-assisted dystocia and singleton live births after vaginal delivery in Holstein-Friesian cows at pasture. Asian Pacific Journal of Reproduction 2015; 4(4): 309-312.

[8] Bai T, Diraviyam T, Zhou Z, Jiang Z, Zhang X. A comparative study of two uterine torsion correction methods in parturient cows. Veterinarski Arhiv 2016; 86(6): 787-793.

[9] Lyons N, Gordon P, et al. Clinical forum: Bovine uterine torsion: a review. Livestock, Blackwell Publishing Ltd 2013; 18: 18-24.

[10] Mane PM, Bhangre RD. Outcome of different regimes of treatment for uterine torsion in bovine at field level – A clinical study. Indian J Anim Res 2015; 49(6): 819-822.

[11] Jayakumar C, Sudha G, Lakshmikanth TR, Kantharaj S. Uterine torsion in cattle – A study of 16 referral cases. Intas Polivet 2014; 15(II): 228-232.

[12] Javic K, Conroy CN. Dairy, reproduction, obstetrics, dystocia. Penn Veterinary Medicine Computer Aided Learning – Field Service. Web 2017. research.vet.upenn.edu. Accessed 05/10/2017.

[13] Youngquist RS, Threlfall WR. Current therapy in large animal theriogenology. 2nd ed. St. Louis: Saunders Elsevier, 2007.

[14] Hopper RM. Bovine reproduction. Ames: John Wiley & Sons Inc., 2015.