

A comparative study of two uterine torsion correction methods in parturient cows

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ABSTRACT

Uterine torsion is a common form of dystocia in cattle often associated with an oversized fetus. Cows are considered to be more susceptible to this condition than other domestic animals. On the basis of our current clinical practices, a novel retorsion method called "Ball rolling" has been developed to correct uterine torsion. In order to evaluate the effect of this new method, a total of 263 uterine torsion cases admitted to our animal hospital in the past 5 years were investigated, of which 79 cases were treated with the conventional rolling method and 184 cases were subjected to the "Ball rolling" method. In our "Ball rolling" method, the animals were immobilized by tying their forelegs, whereas their hind legs are left loosened, and are rolled like a ball towards the torsion direction to bring the uterus back into its physiological position. Then the clinical symptoms of the animals were recorded using basic physiological indicators, such as pulse, the degree of amniotic fluid choke rate and respiratory rate, pulse, and cervical injury bleeding. On the basis of the evaluation of the outcome, the parturient cows subjected to the "Ball rolling" method recovered faster with higher fetus survival rate.

Key words: uterine torsion, "Ball rolling" method, detorsion, dystocia

Introduction

Uterine torsion is the rotation of a pregnant uterus on its longitudinal axis, which leads to narrowing of the birth canal, causing dystocia. In bovine, it is a common condition encountered by field veterinarians, and is considered to be the major causes of bovine dystocia (JEENGAR et al., 2015). It is categorized into left- or right torsion according to the direction of rotation; mild, moderate or severe on the basis of degree; and pre-cervical, cervical or post-cervical in terms of position (AMER et al., 2008). The exact

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etiology of uterine torsion is not clearly known. It has been noted that instability of the uterus during a single horn pregnancy and excessive movements of the fetus or dam are the basic reasons for rotation of the uterus on its own axis (PUROHIT et al., 2011).

Cows are thought to be more susceptible to uterine torsion than many other domestic animals due to their uterine instability resulting from the broad ligament attachments (SLOSS and DUFTY, 1980). It has also been considered that the way the cow stands up from lying in sterna recumbency may contribute to the occurrence of torsion (NOAKES et al., 2009b). The routine treatment is rotating the uterus back into its physiological position. Direct and indirect methods of re-torsion are available and used in accordance with the conditions of clinical cases, in order to deliver the calf through vaginal delivery or caesarean section (ERTELD et al., 2014). The surgical treatment of uterine torsion by laparohysterotomy (caesarean section) present numerous inconveniences, including risk of infection, damage to the internal organs and bleeding, as well as needing more time for recovery. Hence, the non-surgical treatment by the “rolling method” is one of the most popular methods of detorsion (NOAKES et al., 2001a). Nevertheless, as the severity of the torsion increases, the success rates of the rolling method and delivering a live fetus are decreased (FRAZER et al., 1996). On the basis of our long clinical practice and experience, particularly for treating uterine torsion by the rolling method, we have adapted a novel method called “Ball Rolling”. The present long term clinical study was designed to evaluate the effect of this novel method on correcting uterine torsion in cows.

Materials and methods

Uterine torsion cases. A total of 263 clinical cases of parturient cows suffering from uterine torsion were included in this study. They were presented for treatment over a period of 5 years at the Animal Hospital, Northwest A&F University, Yangling, Shaanxi province, China. All cases of uterine torsion were diagnosed by clinical signs and examination.

Clinical signs. Animals exhibited uneasiness, restlessness (digging the ground with forelegs), kicking at their abdomenn signs of first stage of labor and straining without the appearance of fetal membranes at the valve; the vaginal lumen was typically dry, lacking mucus, depending on the degree of torsion.

Clinical Examination. External examination: The temperature, respiration and pulse rate, mucous membrane color, ruminal movements, appetite, body condition and dehydration level were recorded for each animal on arrival at the hospital.

Vaginal and rectal examination: Examination was performed by palpation and insertion of a lubricated hand into the vagina and rectum. Vaginal examination revealed the spiral twisting of vaginal walls and labia invagination, shrinkage of the front part of the vagina. Upon rectal examination, the twisted horn could be palpated, one side of

the broad ligament was pulled strongly downward and under the twisted uterine body, whereas the cervix and the opposite broad ligament were pulled tightly across over the uterine body and cervix.

Determination of severity of uterine torsion. If the degree of torsion is 0-90°, the spiral twisting (heliform) can be observed in the vaginal tract, and the forelegs and head of the fetus may pass through the cervix under this condition. A degree of torsion from 90° to 180° could further obstruct the birth canal and there might be difficulty in inserting the lubricated hand into the channel (by the obstetrician). When the cervix is constricted from 180° to 360° of uterine torsion, only a finger or two can be inserted. Even fetal membranes cannot pass through the cervix, if the twist angle is 270° and more.

Treatment. The traditional “Rolling” method: this is a simple and conventional method in the treatment of uterine torsion in cows and buffaloes. A total of 79 cases were treated by this method in our clinic in two years (2010 and 2011). The cow was laid down in lateral recumbence on the same side towards which the torsion was directed. The two hind legs were tied together by a rope. Both the forelegs were also tied together using a separate rope. The animal was rolled suddenly in the same direction as the torsion of the uterus to the other side. After the animal was rolled to 180°, her body had to be brought back to the original position. Then the birth canal was examined to determine whether the torsion had been corrected, and the rolling procedure was repeated 3 or 4 times to confirm the correction in case further torsions were required (PUROHIT et al., 2011)

The “Ball rolling” method: this is the novel method developed by our team, based on years of clinical practice. A total of 184 uterine torsion cases were treated by this method in a 3- year (2012-2014) clinic trial.

In order to protect the animals from skin and bone damage, a soft grass petate was essential for this method. Both forelegs were tied together at the ankle by rope and the hind legs were stretched behind the hypogastrium, naturally. Then the direction of uterine torsion was confirmed by internal examination and the “Ball rolling” was performed in the same direction. Three veterinary practitioners were involved to roll the animal to 360° (as compared to 180° in the traditional “Rolling” method), of which two persons assisted in rolling the animal by pushing its hind legs and keeping them behind the hypogastrium naturally and the other person assisted rolling the parturient cow by pulling the rope tied to the forelegs. During this process one person was involved in protecting the cow’s head from injury. The animal was evaluated by vaginal examination after the rolling to confirm the torsion correction. The “Ball rolling” could be repeated in case further detorsion was needed. In our practice, rolling was preferably performed twice, (Fig. 1).

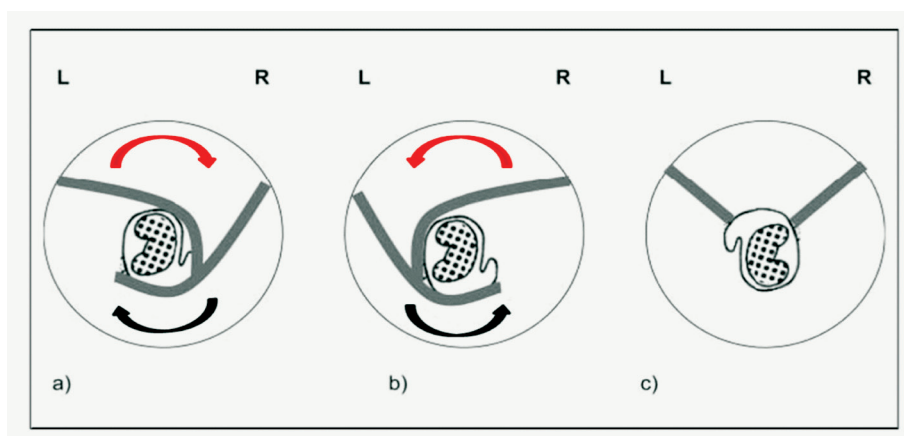


Fig. 1. Scheme of uterine torsion occurrence in relation to the direction of the torsion

Notes: To left (a), to right (b) and physiological (c) direction of the broad ligaments. The broad ligaments (grey) are important for diagnostics of the direction of the torsion. Upper arrows represent the “Ball rolling” method, whereas upper and lower arrows represent the traditional “Rolling” method.

Confirmation of detorsion (torsion correction) and documentation of physical signs: Animals were examined for the disappearance of the spiral twisting in the vagina; the birth canal should have become accessible for internal examination and the fetus could be easily palpated. All these were considered as confirmation of torsion correction. In order to compare the outcome of both methods, the following physical signs were documented for each case: 1) the number of times animals were subjected to rolling; 2) The time required for fetus delivery after detorsion; 3) General examination of the fetus including respiratory and pulse rate, coughing frequency (to confirm the intake of amniotic fluid), survival of the dam as well (respiration and pulse rate, severity of uterus injury and bleeding).

Statistical methods. All statistical analysis was performed using SAS software (version 9.1, SAS Institute Inc., Cary, NC, USA). Experimental data were presented in the form of mean \pm SD.

Results

Detorsion efficiency of correction methods. Under the same degree of uterine torsion angle (Table 1), 6 times rolling were required using the “traditional rolling” method, in contrast to 2 times rolling using the “Ball rolling” method on average. The “Ball rolling” method had a significantly shorter duration ($P < 0.01$) as well as better recovery rate ($P < 0.01$) for fetal discharge.

Table 1. Efficiency of the traditional “Rolling” and the new “Ball rolling” methods (± SD)

Group	Angle	Rolling (times)	Fetal discharge time (min)	Cure rate (%)
Traditional “Rolling”	270 ± 90°	6 ± 5 ^a	55 ± 18 ^a	90.0
“Ball rolling”	270 ± 90°	2 ± 1 ^b	23 ± 6 ^b	100.0

Notes: Values presented as mean ± SD. Values in the same parameter with different superscript were significantly different (P<0.01).

Physical signs of fetus after discharge. There was no significant difference between the two methods in terms of fetus physical signs recorded after general examination (P>0.05). However, the fetus survival rate was higher using the “Ball rolling” method compared with the traditional method (P<0.05, Table 2).

Table 2. Physical signs of fetus delivered after traditional “Rolling” and “Ball rolling” (± SD)

Group	Respiratory rate	Pulse	The degree of amniotic fluid choke number			Survival rate (%)
			Non-injury	Mild-injury	Severe-injury	
Traditional “Rolling”	46 ± 6 ^a	87 ± 15 ^a	17	3	0	95.0 ^b
“Ball rolling”	45 ± 8 ^a	86 ± 19 ^a	18	2	0	100.0 ^a

Notes: Values are presented as mean ± SD. Values in the same parameter with different superscript were significantly different (P<0.05).

Changes in clinical symptoms of postpartum cows after rolling. There was no considerable difference in clinical symptoms, or cervical injury and bleeding between cases treated by the two methods (P>0.05; Table 3) and the recovery statistics of the cases treated over 5 years of period are shown in Table 4, the “Ball rolling” method significantly increased the cure rate compared with the traditional rolling method (P<0.05).

Table 3. Clinical symptoms of dam after rolling (± SD)

Group	Respiratory rate pulse cervical injury bleeding								
	Time/min		Time/min		Number			Number	
	Before	After	Before	After	Non-injury	Mild-injury	Severe-injury	Mild-injury	Severe-injury
Traditional “Rolling”	31 ± 6 ^a	32 ± 5 ^a	61 ± 14 ^a	62 ± 13 ^a	15	3	2	20	0
“Ball rolling”	33 ± 5 ^a	34 ± 4 ^a	63 ± 16 ^a	62 ± 15 ^a	15	4	1	20	0

Table 4. Cure rates of traditional “Rolling” and “Ball rolling” (2010 - 2014)

Method	Number of cases	Number of successes	Cure rate (%)
Traditional “Rolling”	79	56	67.8
“Ball rolling”	184	182	98.9

Discussion

Uterine torsion is a common condition causing dystocia in bovines. Simple twisting (90° - 180°) is easily corrected under field conditions, but some cases referred to special clinics tend to represent the more extreme forms of the condition (ARTHUR et al., 1989). The angle ($>180^{\circ}$) of uterine torsion is considered as an emergency and surgery should be instituted as early as possible. It is necessary specifically to evaluate the patients for their general condition before starting the treatment. Particularly, the angle of twisting must be recognized. (PUROHIT et al., 2011). In this study, the efficiency of the traditional “Rolling” method and the “Ball rolling” method was compared in treating cases of uterine torsion. The results indicated a significant difference between the two methods in terms of correction of torsion (detorsion), there was around 30% increase in recovery when using “Ball rolling”. Besides, the fetal delivery time was shorter, with increased survival rate using “Ball rolling” compared to the traditional “Rolling” method. The advantages of this novel method are: i) only the forelegs of cows are tied, thus preventing pressure on the fetus when tying hind legs in traditional methods, further it makes it easier to roll the animals; ii) Animals are rolled in a single direction, thus it is easier to avoid further damage or aggravation; iii) The traditional method is less effective when the twisting angle is 180° - 270° .

Conclusions

The “Ball rolling” method may be a better alternative for treating uterine torsion in cows.

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SAŽETAK

Torzija maternice čest je uzrok teškog teljenja krava, nerijetko povezan s prevelikim plodom. U krava su teški porodaji češći nego u drugih domaćih životinja. Na osnovi vlastite kliničke prakse razvijena je nova metoda retorzije nazvana „valjanje poput lopte“. Radi procjene učinka te nove metode ukupno su bila analizirana 263 slučaja torzije maternice bolnički obrađena u proteklih pet godina. Od toga je 79 slučajeva bilo obrađeno uobičajenom metodom valjanja, a 184 krave bile su podvrgnute novoj metodi „valjanja poput lopte“. U toj su metodi životinje bile imobilizirane vezanjem prednjih nogu dok su stražnje bile slobodne i valjane kao lopta prema smjeru torzije kako bi se maternica dovela u fiziološki položaj. Nakon toga klinički su znakovi bili procijenjeni na osnovi fizioloških pokazatelja kao što su: bilo, stupanj gušenja u amnionskoj tekućini, frekvencija disanja i krvarenje zbog ozljeda cerviksa. Na osnovi prosudbe ishoda, krave pri teljenju podvrgnute „valjanju“ oporavile su se brže i s većom stopom preživljavanja teladi.

Ključne riječi: maternica, torzija, valjanje poput lopte, detorzija, distocija
