# Uterine Torsion in Bovines

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Uterine torsion, is rotation of the pregnant uterus on its longitudinal axis. Uterine torsion cases in buffaloes and cattle are 67–83% and 4–28% of the dystocia respectively. Bovines are at a higher risk of uterine torsion around the start of parturition process. Uterine torsion typically happens before or late in the cervical dilatation (first) stage of parturition. Duration and degree of torsion is taken into account while deciding about the survival unborn calf and prognosis of dam as well as the future reproductive health of dam. Prognosis is best when duration of torsion is less than 36 hrs and worsens with the further elapse of time.

**Factors responsible for torsion**

A number of maternal and the fetal destabilizing factors exist for explaining the predisposition of bovine uterus to torsion;

**Maternal destabilizing factors**

Attachment of the broad ligaments- In mares, torsion of uterus is less frequent because the attachment of broad ligaments is sub-lumbar and the ovaries are fixed in the lumbar region, thus the mobility of uterine horns is minimized. However, bovine uterus is conducive to torsion due to the facts that: (a) bovines have sub-ilial attachment of broad ligaments, (b) broad ligaments are attached along the lesser (ventral) curvature of uterus, thus leaving the greater (dorsal) curvature free, (c) uterine horns are not fixed by the broad ligaments but are lying free, and (d) as the pregnancy advances in bovines, there is a relatively small increase in the length of the broad ligaments but the pregnant horn extends massively beyond the area of attachment. Higher incidence of uterine torsion in buffaloes than cattle is partly due to the big length of broad ligaments in buffaloes which makes the pregnant uterus less stable. Location of the pregnant uterine horn: For stability, the pregnant uterine horn is usually located inside bursa supraomentalis. However, in uterine torsion, pregnant horn is usually present outside bursa supraomentalis. Unfilled rumen: Presence of rumen on left side increases the incidence of right side uterine torsion. If rumen is unfilled, space in the abdominal cavity is increased and the relatively unstable pregnant uterus gets predisposed to torsion. Type of housing: Confinement of animals in stables for long periods may lead to weakness of the abdominal muscles due to lack of exercise and thus may support the occurrence of uterine torsion. Stall fed pregnant cattle housed in a group is at the risk of torsion of uterus due to the chance of being bumped on its side by the accompanying cattle. Age of the dam: torsion occurs frequently in pluriparous then the primiparous cattle and buffaloes. The proposed reasons include larger abdominal cavity, stretching of pelvic ligaments, loose and long broad ligaments together with loosening of uterine tissue and decreased uterine tone in old aged bovines. Plasma hormonal profiles: high progesterone and low estradiol during pre-partum period may make the uterus flaccid, and hence increases risk of its torsion.

**Fetal destabilizing factors**

Calf birth weight - oversized fetal limbs may get entangled in the uterine wall and the continued

vigorous movements of fetus may lead to rotation of uterus. Fetal presentation- calves from uterine torsion-affected bovines usually deliver in anterior presentation with majority in dorso-ilial (17%) or dorso-pubic (43%) position. Reduced amount of the amniotic fluid: This leads to decrease in distance between the fetus and the uterine wall. Hence, the fetus feels abrupt movements of dam as a painful stimulus and in response, performs strong reflexive movements which may cause the rotation of uterus. Uterine tone: About 90% uterine torsions are encountered during the late first stage of parturition process at this stage, uterine muscles are not in much tone, thus relaxed and unstable uterus may be a cause for the occurrence of uterine torsion. In fact, uterine instability may induce torsion only up to 180°, whereas torsions of ≥360° require active fetal movements (Fig 1).

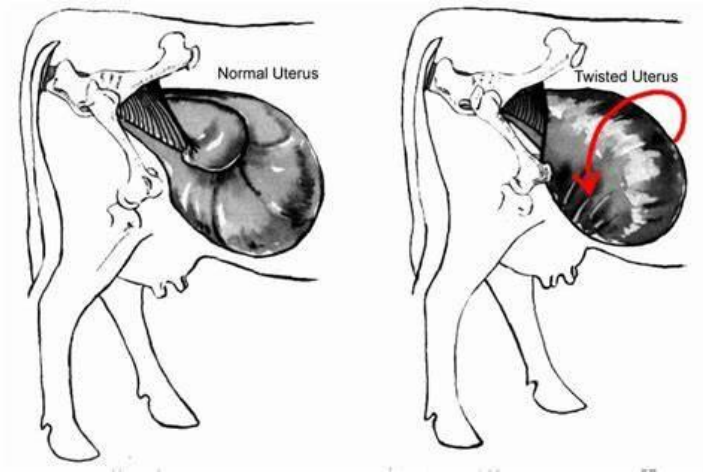


**Fig 1: Uterine torsion; rotation of the gravid uterus on its longitudinal axis**

**Patho-Physiopathological alterations following uterine torsion**

Rotation of uterus compresses middle uterine vein which results in disturbances in venous circulation and increases carbon dioxide tension in the fetal blood. Consequently, uncomfortable fetus makes vigorous movements that may further increase the degree of uterine torsion. With the increase in degree of torsion, there is compression of middle uterine artery and oxygen going to the fetus is decreased. Limited arterial perfusion and venous outflow in the twisted uterus leads to ischemia, hypoxia and cell death causing irreversible damage to the endometrium, myometrium and ultimately death of the fetus. Continued failure of blood supply results in loss of uterine wall elasticity and viability, and hence the uterine wall becomes necrosed, brittle, fragile and prone to rupture. Inflammatory changes can cause adhesions of uterus with surrounding abdominal tissues. Ultimately, delay in correction of uterine torsion causes death of the dam due to generalized bacteremia, endotoxemia or cardiovascular failure. Cervical condition of uterine torsion-affected animals is categorized as- Class-A cervix has soft and smooth cervical texture without any lobulations. Histopathology of this type of cervix reveals hemorrhage, congestion, edema, occasional patches of necrosis and intact cervical wall. Class-B cervix is moderately soft and partially lobulated with marked necrosis, fibrosis and tearing of cervical wall. Class-C cervix is described as very hard and completely lobulated. Necrotic changes in cervical epithelium and musculature of class-B and class-C cervix are responsible for their failure to dilate following successful detorsion of uterus. In fact, early correction of torsion may prevent cervical fibrosis.

Uterine-torsion affected buffaloes suffer from normocytic normochromic anaemia due to accumulation of metabolic waste products or relatively large loss of blood during abnormal parturition. The leukogram of these buffaloes reveals lymphocytopaenia, neutrophilia and monocytosis in association with eosinopenia, which continues till day third postpartum in surgically corrected cases of uterine torsion. Following uterine torsion and after

its correction by detorsion or surgical treatment, the activities of AST, ALT, GLDH, CK and GGT are increased, which usually gets stabilized within 10 days after surgical treatment of uterine torsion. Substantial increase in plasma urea and creatinine indicates poor prognosis. In uterine torsion, ureters lying in the broad uterine ligaments are constricted thus the urine output reduces and renal functions may get affected. This hypoproteinemia is associated with liver malfunction and negative nitrogen balance because of reduced protein intake. Occurrence of torsion of uterus is a highly stressful event as revealed by the huge increase in plasma cortisol which increases further by 15–30% following detorsion of uterus through the rolling of dam. Persistently elevated plasma cortisol during post-detorsion period suggesting that continued presence of stress is detrimental for the dam survivability. Presence of low plasma magnesium during post-detorsion period indicates poor prognosis. Hypomagnesaemia leads to decrease in activity of various tissues like heart and skeletal muscle, nerve tissue, brain and spinal fluid and liver, which explains muscle tremor, decreased movement, pain and recumbency following obstetrical interventions.

**Diagnosis**

Typical history of a case of uterine torsion will indicate that animal was about to calve, as exhibited by milk letdown and relaxation of pelvic ligaments, but adequate time has passed and still there is neither the rupture of fetal water bags nor the appearance of fetus from vulvar lips. Dam is suffering from tachycardia, tachypnoea, restlessness (frequently gets up and down), and severe abdominal pain, manifested by kicking of the abdomen with her hind legs. If the uterus is not detorted during this period, then the history will indicate that the straining ceased followed by the tightening of pelvic ligaments and reabsorption of milk, appetite diminishes, rumination ceases and faeces become hard. External signs of uterine torsion like displacement of upper commissure of vulva towards inward, left or right, vulvar edema.

During pre-cervical torsion, the twist of rotated uterus lies on the body of uterus and does not extend beyond the cervix, thus folds on vaginal wall are absent and cervix is approachable during vaginal examination. Side of torsion needs confirmation by rectal examination. In normal pregnant animal, the broad ligaments can be palpated on the sides of uterus, whereas in torsion the broad ligaments are crossed and twisted around uterus. Accurate determination of the direction of torsion through rectal examination is necessary prior to making attempts at correction. The direction of post- or pre-cervical torsion is clockwise (right) or counter-clockwise (left). The broad ligament ipsilateral to the side of torsion is pulled vertically downward beneath the uterus, whereas the contralateral broad ligament is tightly stretched diagonally above the uterus, thus the examiner's hand will move in a pouch formed at either right or left side of uterus. In delayed cases, if adhesions are present, the examiner will not be able to move his hand on the either side of uterus during rectal examination. Degree of uterine torsion is determined by the number of twists present on the body of uterus.

**Treatment**

The technique to be selected for detorsion of uterus in bovines varies with expertise of veterinarian, stage of pregnancy, severity of torsion as well as condition of dam, uterus and fetus. The most commonly used techniques are per-vaginal rotation of fetus, rolling of dam and caesarean section.

Sympathomimetic compounds like clenbuterol selectively block smooth muscle contraction, can induce uterine relaxation (tocolytic) and helps in better assessment of the direction of torsion, easier passage of hand through the vaginal folds, easier rotation of fetus through the vagina and easy detorsion of the uterus.

**Per-vaginal rotation of the fetus**

With rotations of ≤90°, the fetus is easily rocked manually into a normal dorso-sacral position. Success rate is high if dam is standing, cervix is sufficiently dilated to grasp the fetus and the fetus is live.

**Rolling of the dam**

Rolling is indicated if the dam is recumbent, the fetus is not approachable due to the severity of torsion, or if the torsion has occurred before the expected time of parturition. However, success rate is 84–90% using Schaffer's method of rolling in which a plank (12 feet long and 10 inches wide) is placed on the upper paralumbar fossa at the time of rolling. In Schaffer's method, theory is to rotate the dam to the same degree and direction to which the uterus has rotated, keeping the fetus fixed by fixing uterus with a plank. Animal is casted carefully in lateral recumbency on the side of direction of torsion and the front and hind legs are secured separately. The plank is placed on the upper paralumbar fossa of dam in an inclined manner with lower end on ground. Next step is to slowly roll over the dam on to its back. At the same time, an assistant stands on the plank to modulate pressure. After each roll, effectiveness of roll is judged by vaginal or rectal examination. If the roll is successful, disappearance of the vaginal spirals or rectal pouch can be immediately palpated by the examiner. If the roll is not successful, then the dam is returned slowly to her original position and the whole procedure needs to be repeated. However, thick skin of Indian buffaloes causes skidding of the plank at the time of rolling. Moreover, pendulous abdomen of Indian buffalo warrants greater pressure for the fixation of pregnant uterus. Therefore, modifications were made in Schaffer's method and the method is termed as Sharma's modified Schaffer's method (Fig 2). Alteration in the dimensions of plank (length: 11.9 feet, width: 9 inch and thickness: 2 inch) to suite the buffaloes, using this method, the detorsion rate in Indian buffaloes was 90% in comparison to 40% success rate achieved by Schaffer's method. In long standing cases of torsion (>72 h), attempts to achieve detorsion of uterus are usually unsuccessful due to development of adhesions between the uterus and the adjoining abdominal organs. Detorsion of the uterus in these cases is not possible even after detachment of adhesions.

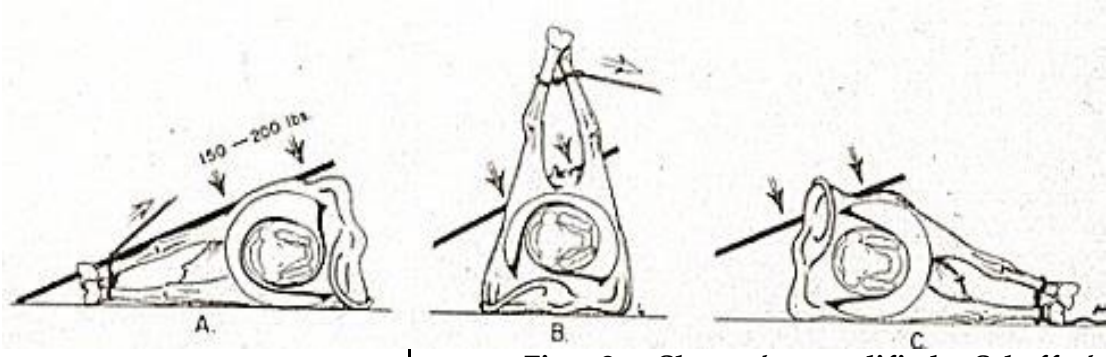


**Fig 2: Sharma's modified Schaffer's method: an assistant stands on the plank to modulate pressure first on A) left side (when animal is casted on right side), followed by B) ventral abdomen and C) lastly on right side.**

**Caesarean section**

caesarean is usually attempted in which all other methods of detorsion had failed or there is

failure of complete cervical dilatation subsequent to successful detorsion.

Dexamethasone and antioxidants like Vitamin E and Selenium administration during post-partum period of successfully detorted animals decreases stress and thus increases the chances of survival of dam. With the increase in duration of uterine torsion, plasma and blood volume decreases and animal progresses towards dehydration and toxaemia, this suggests the requirement of immediate fluid and electrolyte therapy.

**Prognosis**

Survival of a torsion affected bovine depends upon the severity of vascular compromise that makes uterus friable, duration of uterine torsion and correct diagnosis followed by judicious manipulation. Subsequent fertility is negatively correlated with both the degree and duration of torsion. Bovines with uterine elasticity have better prognosis and bovines with bulging tense and inelastic uterus have a greater casualty rate and lower fertility. Uterine rupture usually occurs when torsion is >270°. This is due to vascular compromise and resulting edematous changes which weakens myometrial fibers. Following uterine rupture, animals can be euthanized or subjected to corrective surgery depending upon the viability of uterus.

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