

Factors Affecting Incidence of Uterine Torsion in Egyptian Buffaloes (*Bubalus bubalis*) and its Response for Rolling

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Abstract: *Objective:* The present work was planned to study the incidence of uterine torsion in Egyptian buffaloes as well as its prognosis after mechanical treatment.

Methods: A total number of 35 buffaloes of different ages, parities and stage of pregnancy with complain of colic and anorexia were included in the present study. These animals were examined rectally to detect stage of pregnancy, degree, direction, duration, location of uterine torsion. Mechanical handling of torsion cases and prognosis of recovered cases was performed. After birth, sex of new born was also recorded.

Results: The torsion of uterus mostly occurred in pleuriparous buffaloes (100%) in right side (85.7%) during second half of pregnancy (100%). Most cases were postcervical (85.7%) during the early stage (7 and 8 months). Torsion also may occur during labour (17.4%) where the cervix was dilated after correction. Most cases of uterine torsion occur in stabled animals for long period (97%). The uterine torsion associated with male calves (65.7%) as well as with large size calves (40-50kg) and majority of the calves were in normal position. The first foetal sac expelled in majority of cases was amniotic sac (97%) with few cases of placental retention. Uterine torsion with short duration (1-6 h) usually needs 1-2 rolls only for correction and usually takes 0-6h (100%) for cervical dilatation. Occurrence of uterine torsion for above three days usually did not respond for rolling.

Conclusion: Uterine torsion usually occurs in old stabled animal with good BCS during green season at last month of pregnancy. The right sever and post cervical torsion were the most common type of torsion. Rapid diagnosis of uterine torsion within 6 h usually results in good prognosis even in severe cases.

Keywords: Uterine Torsion, Egypt, Buffalo, *Bubalus bubalis*.

INTRODUCTION

Uterine torsion causes heavy economic losses due to the death of the fetus and/or dam with impaired lactation [1]. The blood biochemistry was greatly altered during uterine torsion [1,2]. The exact cause of uterine torsion is not fully understood and therefore warrants further investigation. Pregnancy stages affect the incidence of uterine torsion [3]. A high incidence is recorded during advanced pregnancy, immediately before parturition [4], and mostly during the second stage of labour [5], although uterine torsion occasionally diagnosed at 5th to 8th month of pregnancy [6]. Higher incidence of straining was observed in more severe torsion. The high degree of tension may stimulate stretch receptor in the vagina invoking reflex abdominal straining [7]. However, absence of straining in the majority of the cases is due to failure of either foetal membranes or foetal limbs to enter in the anterior vagina [6, 8]. Ultrasonic studies of uterine torsion

revealed an extreme interstitial oedema of the muscular tissue; thickened uterine wall as well as blocked lymphatic vessels [2, 9]. The method of correction of uterine torsion depended upon the stage of gestation, the severity of torsion and the condition of uterus and foetus [10]. Successful rolling of the buffaloes around the longitudinal axis and vaginal delivery was significantly higher in the cases suffering from uterine torsion with <90° and 90°-180° than with 180°-270° and >270°. With increasing the severity of torsion, the successful trials to roll the buffalo and deliver a foetus were decreased [7]. Our study was planned to study the incidence of uterine torsion in Egyptian buffaloes as well as its prognosis after mechanical treatment.

MATERIALS AND METHODS

Animals

A total number of 35 Egyptian buffaloes (with 4-9 years old and 2-6 parities) affected with uterine torsion was brought to Veterinary Clinic, Faculty of Veterinary Medicine, Zagazig University for examination. These animals belong to Egyptian farmers at different villages of Sharkia Governorate, and also coming from other

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countries outside the Governorate. The owner complains are colic, different degrees of anorexia, depression, tympani or the animal may brought in recumbent states. These animals may be treated symptomatically without through diagnosis by veterinarian. Some animals may show disappearance of signs of labour or labour may be interrupted.

Clinical Examination

Vaginal and Rectal Examination

Regarding the temperature, respiratory, heart and pulse rate, colour of the mucous membranes, ruminal movement, appetite, body condition score (BCS) and presence of dehydration were recorded. After taking the history, the external genitalia were thoroughly washed with water and soap. A lubricated gloved hand was inserted through the vaginal canal to check the presence of twist (torsion) as well as the degree (mild, moderate or sever) and direction (right or left) of twist were ascertained. Rectal examination was carried out in absence of vaginal narrowness or twist (pre cervical torsion). The middle uterine artery of the gravid side was followed to confirm that it is changed to the opposite side. The incidence of uterine torsion in relation to age of the dams, as well as, weight and sex of the foeti was examined.

Classification of Cases

After clinical examination, the cases of uterine torsion were classified according to:

1. Location of uterine torsion: precervical or postcervical
2. Direction of uterine torsion (Right or left)
3. Degree of uterine torsion; mild (90 to 180), moderate (180 to 270) and sever (270 to 360).
4. Duration of uterine torsion (1-6 h, 6-12 h, 12-24 h, 24-48 h, 48-72 h, and 72 h to 96 h) after occurrence (from history).
5. Months of pregnancy (stage of pregnancy) - 7th, 8th, 9th, 10th, at full term or during labour (from history or records).
6. Liveability: live or dead foetus.
7. Months of the year (season)

After labour, liveability and sex as well as the weight of the calf was also determined.

Treatment Procedure

Mechanical treatment was performed by rolling of the dam with external fixation of the uterus. The dam was rotating to the same degree and in the same direction as the uterus had rotated, keeping the fetus fixed by fixing the uterus with a wide plank of wood (30 – 40 cm wide and 3– 4 m long) placed over the flank of the cast animal. In brief, after ascertaining the side of torsion, the animal was cast carefully in lateral recumbency on the side of the direction of the torsion and the front and hind legs were secured separately. The plank was placed on the upper paralumbar fossa of the dam in an inclined manner with the lower end on ground. Next, the dam was slowly rolled over on her back by pulling the front and hind legs up and over the recumbent animal. At the same time, an assistant pressed on the plank to modulate pressure first on the left side (when the animal was casted on the right side), followed by the ventral abdomen and, lastly, on the right side, and then the effectiveness of each roll was judged by vaginal or rectal examination. If the roll was successful, the vaginal spirals or rectal pouch disappeared, which could be immediately palpated by the examiner, but if it was not then the dam was returned slowly to her original position and the whole procedure repeated [1].

Statistical Analysis

Data were collected, arranged, summarized and then analyzed using the computer program SPSS/PC+(2001). Statistical method used to estimate the difference between the groups was two way ANOVA test (Factorial design) and LSD (Least significant difference). Data were presented as mean±SD and significance was declared at (P<0.05).

RESULTS

Table 1 revealed that the torsion of the uterus usually occurs in the pleuriparous buffalo cows (4-7 years old, 93.4%) but in aged cows it was 5.7%. Meanwhile all cases of uterine torsion brought to our clinic had good body condition score (2.5 to 4, 91.6%) except 3 cases was emaciated (2-2.5, 8.57). All cases of uterine torsion occurred in green season (November to March, 100%), while no cases presented in dry season (April –September). Most cases of uterine torsion occurred in second half of pregnancy (7 m to full term, 87.86%), and during the last month of pregnancy (51.42%) especially at full term (20%) and some cases occur during the stage of labour (17.14%), where the cervix is dilated after correction of uterine

torsion. It was found also that no foetal membrane retention was observed in all cases of uterine torsion. Moreover, the foetal membrane may descend with dead foetus where each case in our study was injected with calcium and oxytocin preparation after labour. Uterine torsion usually occurred in stabling animals (97%), where the animals belong to the farmers were in stabling except one case which was from farm (free yard system).

Table 1: The Incidence of Uterine Torsion in Relation to Age, Body Condition Score, Season, Month of Pregnancy, Placental Retention and Stabling Condition of the Animal

Item	Properties	NO. (%)
Age (years)	4-5	12 (42.0) ^a
	6-7	18 (51.30) ^a
	8-9	2 (5.70) ^b
BCS	2-2.5	3 (8.57) ^b
	2.5-3	8 (22.80) ^b
	3-4	24 (68.60) ^a
Season	Green	35 (100) ^a
	Dry	0 (0.0) ^b
Month of pregnancy	7	3 (8.57) ^b
	8	3 (8.57) ^b
	9	5 (14.28) ^{ab}
	10	11(31.42) ^a
	Full term	7 (20.0) ^{ab}
	During labour	6 (17.14) ^{ab}
Placental retention	Retained	0(0.0) ^b
	Not retained	35(100) ^a
Stabling	Stabled	34 (97.0) ^a
	Free	1(3.0) ^b

The proportions are compared with fisher exact probability test and significant differences were set at P<0.05.

Table 2 showed that majority of uterine torsion are on right side (85.7%) with severe degree (71.5%) where the hand cannot reach the cervix, while some cases were moderate (17.1%) and few cases were mild (11.4%). Most cases of uterine torsion were postcervical (85.7%) which usually occurs in the late stage of pregnancy and the torsion may be right or left while the precervical was 14.3% which usually occurs in the 7th and 8th month of pregnancy mainly of right side. Mostly, the pregnancy occurred in right horn with male foeti. The majority of uterine torsion accompanied with calves with large size ranging from 30 to 50 kg according to the stage of pregnancy (30 kg at 7

pregnancy and 50 kg at full term) and the calves were in normal disposition except one case in which the foetus has lateral deviation of the head and neck. The first foetal sac during dilatation stage was amniotic sac in majority of uterine torsion cases presented to our clinic, except in one case in which allantoic sac expelled first and this case has mild degree of uterine torsion.

Table 2: The Incidence of Uterine Torsion in Relation to Different Direction, Degree, Position of Uterine Torsion, Foetal Weight and Position, Foetal Sac, Sex of the Calf and Site of Pregnancy

Item	Properties	NO. (%)
Direction	Right	30 (85.7) ^a
	Left	5 (14.3) ^b
Degree	Mild1 <80°	4 (11.4) ^b
	Moderate 180° to 270°	6 (17.1) ^b
	Severe 270° to 360°	25 (71.5) ^a
Position	Precervical	5 (14.3) ^b
	Postcervical	30 (85.7) ^a
Foetal weight	30-40Kg	12 (34.3) ^b
	40-50kg	23 (65.7) ^a
Foetal disposition	Normal	34 (97) ^a
	Abnormal	1 (3) ^b
First sac	Allantoic sac	1(3) ^b
	Amniotic sac	34 (97) ^a
Site of pregnancy	Right horn	29(83.7) ^a
	Left horn	6(17.3) ^b
Sex	Male	23 (65.7) ^a
	Female	12 (34.3) ^b

The proportions are compared with fisher exact probability test and significant differences were set at P<0.05.

As shown in Table 3, 43.3% of right uterine torsion required 1-2 rolls to be corrected, 50% required 3-4 rolls and 6.7% fail to be rolled. While in left uterine torsion, 60% need 1-2 rolls and the other need 3-4 rolls to be corrected. The time required for cervical dilatation in left torsion is less than right one. The live foetus usually obtained from left side torsion (20%). Uterine rupture usually occurs in the right torsion (13.3%). All cases of mild and moderate degree of uterine torsion usually corrected after 1-2 rolls (100%) but in severe degree (24%) corrected only after 1-2 rolls, and 68% need 3-4 rolls for correction and 8% failed to be corrected. The results revealed that, 80% of precervical torsion needs 3-4 rolls, while 53.3% of postcervical need 1-2 rolls to be corrected and 100% of precervical

Table 3: The Relationship between the Direction, Degree, Position, Month of Pregnancy and Duration of Uterine Torsion and the Prognosis after Mechanical Treatment

Item	Character	NO of animal (%) respond for rolling		NO of animal (%) did not respond for rolling
		3-4 rolls	1-2 rolls	
Direction	Right	15(50) ^c	13(43.3) ^c	2(6.67) ^d
	Left	2(40)	3(60)	0(0)
Degree	Mild	0(0) ^{bd}	4(100) ^{ac}	0(0) ^d
	Moderate	0(0) ^{bd}	6(100) ^{ac}	0(0) ^d
	Severe	17(68) ^{ac}	6(24) ^{bd}	2(8) ^d
Position	Precervical	4(80) ^c	0(0) ^{bd}	1(20) ^{cd}
	Postcervical	13(43.3) ^c	16(53.3) ^{ac}	1(3.3) ^d
Month of pregnancy	7,8,9 month	7(63.6)	2(18.2) ^b	2(18.2)
	10-full term	9(50) ^c	9(50) ^{bc}	0(0) ^d
	At labour	1(16.7) ^d	5(83.3) ^{ac}	0(0) ^d
Duration (h)	1-6	0(0) ^{bd}	4(100) ^{ac}	0(0) ^{abd}
	6-24	5(45.4) ^{abc}	6(54.5) ^{abc}	0(0) ^{bd}
	24-48	6(54.6) ^{abc}	5(45.4) ^{abc}	0(0) ^{bd}
	48-72	6(85.7) ^{ac}	1(14.2) ^{bd}	0(0) ^{bd}
	72 -96	0(0) ^{ab}	0(0) ^{ab}	2(100) ^a

The proportions are compared with fisher exact probability test and significant differences were set at $P < 0.05$.

torsion results in dead foetus and uterine rupture (60%). The majority of cases occurred at 7-9 m of pregnancy and usually required 3-4 rolls to be corrected and take long time (6-12 h) for dilatation. While few cases (18.2%) not respond to rolling and usually resulted in a dead foetus. In the same time 50% of cases occurred at 10 m of pregnancy and required 1-2 rolls for correction. In 66.7% of cases need 0-6 h for cervical dilatation and usually result in dead foetus. When uterine torsion occurred during labour (usually in dilatation stage) the cervix is fully dilated after 1-2 rolls and usually results in live foetus (66.7%). The duration of uterine torsion (1-6 h) usually need 1-2 rolls only and take 0-6 h (100%) for cervical dilatation and resulting in a live foetus (100%), while longer duration torsion usually resulted in dead foetus, long time for cervical dilatation and need more number of rolls (2-3). Duration of uterine torsion for above of three days usually resulted in uterine rupture (85.7%), but duration above 3 days the cases usually not respond for rolling procedure.

DISCUSSION

Torsion of the uterus means rotation of the gravid horn around its long axis [4]. It inflicts heavy economical loss to the farmers due to death of either foetus or dam or both beside impaired lactation [11]. Also, uterine torsion was considered as a major cause

of dystocia which is more common in buffalo cows [6, 12].

This study revealed that torsion of the uterus usually occurs in the pleuriparous buffaloes while heifers are of lower risk for uterine torsion. These results were provided by Amer *et al.* [10] and Pascale *et al.* [13] who observed that the majority of uterine torsion was occurred in buffaloes while heifers are of lower risk for uterine torsion. This may be attributed to large abdominal cavity in pleuriparous buffaloes than in heifers, decrease uterine tone and stretched mesometrium [6]. Moreover, the abdominal muscle becomes weaker than in heifers [7]. Body condition of the animal is the best indicator of combined effect of diet formulation and feeding management. It was found in our study that the majority of uterine torsion cases (32/35) brought to our clinic had good condition score (3 to 4). This may be due to that the rumen usually small in size with weak abdominal muscle in emaciated animals. The majority of uterine torsion cases were seen in green season (November to March) because higher number of females calved during this period. Our study was supported by Roberts [3] and Frazer *et al.*, [7] who reported that higher number of uterine torsion was seen during early spring. On the other hand, Pascale *et al.* [13] reported that there was a tendency for more uterine torsion to occur in summer

and winter as compared with spring but the effect of season was not significant on the risk of uterine torsion.

In this study all cases (35) of uterine torsion occur in second half of pregnancy (7 m to full term). Most of these cases occur in the last month of pregnancy especially at full term (18/35). Moreover, some cases in our study occur during the stages of labour (6/35), where the cervix is completely dilated after correction. These results were coincided with that obtained by Singh *et al.* [14], Sharma *et al.* [11] and Kolla *et al.* [15] who cited that uterine torsion usually occur at the end of gestation or during the process of parturition. Moreover, Arthur *et al.* [16] and Rakuljic [4] mentioned that uterine torsion usually occurs immediately before parturition and mostly during the second stage of labour. These finding may be attributed to some degree of stress and alteration in body metabolism at the end gestation and during the process of labour. In the same time Roberts [6] and Amer *et al.* [10] found that uterine torsion was common in advanced pregnancy. No cases were found at early and mid-pregnancy as that obtained by Sloss and Dufty [17] and Roberts [6] who mentioned that uterine torsion may occasionally be diagnosed at 5-8 m of pregnancy and may occur as early as 70 days of gestation [6]. Most cases of uterine torsion occur in stabling animal that belong to the farmers (97%) except one case which was from farm (free yard system). These results were in agreement with that obtained by Hazzaa *et al.* [12], Frazer *et al.*, [7] and Pascal *et al.* [13] who mentioned that uterine torsion was more frequent in animals confined in stable for long period and hypothesized that insufficient exercise lead to slackness of the abdominal muscle which may increase the risk of uterine torsion. On the other side our results disagreed with Wright [18] who mentioned that there is no significant difference in the rate of occurrence of uterine torsion between housed and these at pasture. No foetal membrane retention associated with uterine torsion. The foetal membrane may descend with the dead foetus that indicates sure signs of foetal death. This may be due to injection of calcium and oxytocin preparation intravenous after correction that enhanced uterine contractility and rapid placental separation.

These results were consistent with that obtained by Pearson [8] who stated that the foetal membranes were either delivered with foetus in uterine torsion or were passed within 12 hrs after caesarean section. Moreover, Abdel-Ghaffar and Abou-El-Roos [19] mentioned that the placenta of torsion affected buffaloes dropped rapidly than in normal parturient

females. This may be due to extensive degeneration or absence of basement membrane and uterine glands, in addition degeneration of the properia, congestion, haemorrhage and thrombi in the properia and fragmentation of the myometrium [20]. On the other hand, our results disagreed with Frazer *et al.* [7] who mentioned that 57 of cases with uterine torsion had foetal membrane retention following correction of torsion. They explained this variation due to vascular compromise induced and inflammatory oedema of the foetal cotolydons that extend to the tips of chorionic villi and lock them into cruncular crypt, thereby delaying placental separation.

Majority of the cases in our study were right side torsion (85.7%) while few cases were left side torsion (14.3%). this result was in agreement with that obtained by Zaki *et al.* [21] who mentioned that right torsion in buffaloes was more frequent. Moreover, Frazer *et al.* [7] and Pascale *et al.* [13] concluded that left torsion is very rare in both cows and buffaloes. On the contrary Fouad and El sawaf [22] reported that uterine torsion in Egyptian buffaloes is mostly of left side. The high incidence of right side torsion may be attributed to presence of rumen in the left side would be expected to prevent rotation of the right horn over the left one. In the same time right torsion usually occur in right horn pregnancy [13, 17]. The majority of uterine torsion cases (25/35) in our study were sever degree of torsion (270 to 360) while some cases (6) were moderate (180 to 270) and few cases (4) were mild (less than 180). Our results were nearly as that obtained by Williams [23] who noticed that 66% of uterine torsion was 360 degree, but higher than that obtained by Frazer *et al.* [7] who mentioned that 75% of uterine torsion was 180- 270 degree, while torsion more than 270 degree is extremity rare and greater than 360 degree (9%). Moreover, Pascale *et al.* [13] reported that most uterine torsion cases (57%) were 180 degree or less. On the other hand, Wright [18] stated that the degree of uterine torsion (90- 180) is considered to be the most common.

It was observed that the degree of uterine torsion varies considerably from one study to another and there is a marked difference between the case and animal species. This may be attributed to inordinate foetal movement that occur during the first stage of labour [7, 16] or increase mobility of the uterus or big size of the foetus [7], sudden slip or fall of the animal could be the cause of different degree of uterine torsion of the unstable gravid uterus. Moreover, Amer *et al.* [10] mentioned that the anatomical arrangement of the

gravid uterus between the rumen, intestine and abdominal wall in addition to slight increase of the length of broad ligament may cause different degree of uterine torsion. Additionally, the amount of the tension on the broad ligaments help to determine the severity of uterine torsion [6], imbalance between the two horn [10], amount of the foetal fluid may have a role in the severity of uterine torsion [24]. Moreover, buffaloes have larger abdominal size and weak abdominal muscles giving space for the rotation of the uterus [7, 25]. Moreover, the length of the broad ligament attached to the ventral surface of the uterus, so the greater dorsal curvature is away from attachment [17].

Most cases of uterine torsion in our study were postcervical torsion (30/35) and only few cases were precervical torsion (5/35) this result was in agreement with that obtained by Sharma *et al.* [11] and Pascale *et al.* [13] who found that the majority of the cases were postcervical meanwhile, Frazer *et al.*, [7] mentioned that precervical torsion are more likely to occur during the last trimester. On the contrary, Singh *et al.* [14] reported equal frequency of pre and post cervical torsion. This study revealed that 65.7% of the calves associated with uterine torsion were of large size (more than 40kg). These results were provided by Rakuljic [4] and Frazer *et al.* [7] who reported that the majority of uterine torsion was associated with the presence of heavy foetus. Moreover, Amer *et al.* [10] mentioned that the asymmetry between the gravid horn (heavy foetus) and non-gravid one play a role in the occurrence of uterine torsion due to imbalance between two horns.

In this study, the calves were in normal disposition in 97% of uterine torsion. These results were in agreement with the studies of Prabhaker *et al.* [26] and Prasad and Murty [27] who reported that foetus usually present in anterior longitudinal presentation in 99% of uterine torsion cases. On the other hand, Pascal *et al.* [13] mentioned that more calves in uterine torsion were in dorso-iliac or dorso-pubic position. Moreover, study showed that male calves were more than female one in buffaloes suffered from uterine torsion. This result was in agreement with the study of Pattabiraman *et al.* [28], Prasad and Murty [27] and Rakuljic [4] who found a more number of male calves in uterine torsion. This difference may be related to hormonal changes that occurred during the last stage of labour and vigorous movement of the male foetus than female one. On the other hand, Prabhaker [26] found equal frequency between male and female calves.

In conclusion, uterine torsion usually occurs in old stabled animal with good BCS during green season at last month of pregnancy. The right sever and post cervical torsion were the most common type of torsion. Rapid diagnosis of uterine torsion within 6 h usually results in good prognosis even in severe cases.

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