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A retrospected studies on the incidence, type of uterine torsion in surti buffaloes (*Bubalus bubalis*)

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Abstract
The incidence of uterine torsion in buffaloes was calculated by retrospective analysis of the records of dystocia in buffaloes presented in 2 years and 6 months i.e. Feb, 2015 to July, 2017. Out of the 78 total cases of dystocia in buffaloes 66 (84.62%) were of maternal and 12 (15.38%) were of fetal origin. Uterine torsion was a major cause (70.51%) of the total dystocia cases in buffaloes. Torsion affected buffaloes were grouped under three categories viz. 3-6 years: 19/55 (34.54%), 6-9 years: 22/55 (40.00%) and 9-12 years: 14/55 (25.45%). The age of the animals had no affect on incidence of uterine torsion. In the present study, 96.36% (53/55) buffaloes suffered from right side uterine torsion. Post cervical location of uterine torsion was observed in 96.36% (53/55) cases whereas only 3.63% (2/55) cases of pre-cervical location of uterine torsion were reported. Only one case was reported pre-cervical with left sided torsion. In the current study, 27 of the 55 buffaloes (49.09%) had suffered from 90° to 180° torsion. Similarly the same numbers of animals viz. 27 out of the 55 buffaloes (49.09%) were reported with torsion of 180° to 360° and only a single case (1.81%) was affected with a highest degree of viz. 360° of uterine torsion.

Keywords: Uterine torsion, right side, post cervical

Introduction
In view of most bovine practitioners worldwide, uterine torsion was found common cause of dystocia. The bovines are at a high risk of torsion of uterus around last trimester of pregnancy, mostly the start of parturition process. Incidence of uterine torsion is more in bovine species (Srinivas *et al.* 2007) [32]. Torsion of the uterus reportedly constitutes about 53-83% of the dystocia in buffaloes presented at the clinic (Purohit *et al.* 2012) [23]. Uterine torsion occurs in a pregnant uterine horn and is defined as the twisting of the uterus on its longitudinal axis (Purohit *et al.* 2011a) [22]. Uterine torsion is major cause of bovine dystocia (Jeengar *et al*., 2015) [11]. Pregnancy stages affect the incidence of uterine torsion (Roberts 1971) [27]. A high incidence is recorded during advanced pregnancy, immediately before parturition (Rakuljic-Zelov S. 2002) [25] and mostly during the second stage of labour (Aurther *et al.,* 1989) [3], although uterine torsion occasionally diagnosed at 5th to 8th month of pregnancy (Roberts 1986) [26]. 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 (Frazer 1996) [9]. 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 (Roberts 1986, Pearson1975) [26, 20]. The present work was planned to study the incidence and types of uterine torsion in surti buffaloes from February 2015 to July, 2017.

Materials and Methods
Incidence of Uterine Torsion
The incidence of uterine torsion in buffaloes was calculated by retrospective analysis of the records of dystocia in buffaloes presented to the Teaching Veterinary Clinical Complex CVAS, Navania (Udaipur) Rajasthan for the period of 2 years and 6 months i.e. Feb, 2015 to July, 2017. The incidence was calculated in relation to maternal and fetal factors of dystocia.

Type of Uterine Torsion

Animals were divided in two groups viz. at full term (310±10 days) and pre term (less than 290 days). The parity of the affected buffaloes were classified in three groups i.e.1st, 2nd and >2 parity. The animals were also grouped age wise in 3 groups viz.3-6 yrs, 6 -9 yrs and 9-12 yrs. The stage of gestation was ascertained as per the clinical signs and history provided. The type of uterine torsion was recorded by clinical examination for direction of torsion (right or left side), location of torsion (pre-cervical or post-cervical) and degree of torsion (90-180°, 180--360° and >360°). The location (pre-cervical or post-cervical), direction (right or left) and degree (90-180°, 180-360° and >360°) of uterine torsion was determined by per-rectal as well as per-vaginal examination.

Clinical examination

The twist in the vagina or the location of broad ligaments was the basis to determine the location, the degree and direction of uterine torsion as described previously (Ghuman, 2010) [10].

Results and Discussion

During the present study on clinical cases in Surti buffaloes, the incidence of dystocia due to maternal origin accounted for about 84.62% (66/78) and uterine torsion was recorded as 70.51% (55/78), (Figure 1). which supports the previous findings (Purohit and Gaur, 2014; Jeengar *et al.,* 2015a; Karthick *et al.,* 2015; Kumar *et al.,* 2015) [24, 11, 12, 14] that maternal dystocia is common in buffaloes and uterine torsion is primary aspect in these. The incidence of uterine torsion in surti buffaloes were also compared year wise. What are the other possible causes of dystocia were also reported as shown in figure 2, 3 and table 1. Incidence of dystocia were found of more than 80% of maternal origin while very least i.e. less than 20% of foetal origin. Incidence of dystocia were found more than 70% of uterine torsion, 12.82% of malposition, 2.56% of emphysema, approximately 9% other types and 5.13% of cervical indilatation. A sudden slip or fall of the animal could be the cause of different incidences of uterine torsion of the unstable gravid uterus. Moreover, buffalo have a larger abdominal size and weak abdominal muscles giving space for the rotation of the uterus (Ahmed *et al.,* 1980) [1] and the length of the broad ligament attached to the ventral surface of the uterus, so the greater dorsal curvature is away from attachment (Roberts, 1986) [26]. In addition weak broad ligaments in buffaloes render them more prone to uterine torsion (Brar *et al.,* 2008a; Brar *et al.,* 2008b) [5, 6]. In buffaloes, pregnant uterus is unstable due to attachment of broad ligament only on the ventro-lateral side of uterus (Noakes *et al.,* 2009) [18]. The higher incidence of uterine torsion in primiparous buffaloes than cows might be attributed to the weak broad ligament, heavier fetus, less fetal fluids at the end of gestation, weak uterine tone and wallowing habits (Purohit *et al.,* 2011b) [21]. Based on published data, it appears that uterine torsion is the single largest cause of dystocia in buffaloes during terminal gestation (Purohit and Gaur 2014, Jeengar *et al.,* 2015a) [24, 11].

The majority of animals 48/55 (87.27%) (Table 2) in the present study were at full term pregnancy which is in agreement with the studies of Krishanamurty *et al.,* 2014, Jeengar *et al.,* 2015a, Karthick *et al.,* 2015, [13, 11, 12] observing cases of uterine torsion in cows and buffaloes at term. Uterine torsion may occasionally be diagnosed at 5 to 8 months of gestation (DeBruin, 1910; Craig, 1930; Arthur and Jenner, 1960; Pearson, 1975; Sloss and Dufty, 1980; Roberts, 1986; Ruegg, 1988) [8, 7, 2, 20, 31, 26, 28].

It was also found in this study that the incidence of uterine torsion had no apparent relation with the age of the buffaloes. Of the total 55 cases, 19 (34.54%) was of 3-6 years, 22 (40.00%) was of 6-9 years and 14 (25.45%) was of 9-12 years; (Figure 4 and Table 2) which is in agreement with the studies of Manning *et al,* 1982, Ghuman 2010, Purohit and Gaur 2014 [15, 10, 24] that the influence of age on occurrence of uterine torsion remains controversial, as there is no age predisposition in torsion affected buffaloes and cattle of 2-18 years age.

As the parity increased the incidence of uterine torsion was observed to be higher. In first parity it was 14/55 (25.45%), in second parity 20/55 (36.36%) and in more than second parity, 21/55 (38.18%) (Figure 5 and Table 2) was observed. The result does not support the finding of previous studies by Jeengar *et al.* (2015a) and Pearson (1975) [11, 20]. The present study also does not agree with the postulations of Mochow and Olds, 1966 [16] that increased thickness of uterine muscles in multiparous bovines may stabilizes the uterine issues. Whereas some authors claim that the number of previous pregnancies does not appear to influence the incidence of uterine torsions (Arthur *et al.,* 1989) [3].

The majority cases of uterine torsion in the present study were of post-cervical torsion (96.36%) and only a few cases were of pre-cervical torsion (3.63%) (Figure 6 and Table 2). These results were similar to that obtained by other authors (Krishanamurty *et al.,* 2014, Jeengar *et al.,* 2015a, Karthick *et al.,* 2015, Kumar *et al.,* 2015,) [13, 11, 12, 14] who found that most of the cases were post-cervical. The possible reason for this could be because the anterior vagina is weakest point of the bovine genital tract or due to the absence of the muscles in the cervical area of broad ligaments (Singh, 1991) [29]. Although Singh *et al.,* (1992) [30] reported equal frequency of pre and post-cervical torsion.

The present study revealed that there was a tendency toward right sided uterine torsion (96.36%) (Figure 7and Table 2). A lot of earlier studies on buffaloes (Purohit and Gaur 2014, Krishanamurty *et al.,* 2014, Jeengar *et al.,* 2015a, Karthick *et al.,* 2015, Kumar *et al.,* 2015) [24, 13, 11, 12, 14] also recorded similar results in their studies. It is suggested that the rumen prevents rotation of the uterus to the left side and absence of a muscular fold on right broad ligament increases the possibility of right torsion (Singh, 1991) [29].

During the present study 49.09% (27/55) animals evidenced uterine torsion of 90-180° and same number of animals 49.09%(27/55) (Table 2) of 180- 360° degree. These results are in agreement with Krishanamurty *et al.,* 2014 [13], Jeengar *et al.,* (2015a) [11] and Karthick *et al.,* (2015) [12] Tripathi *et al.,* (2016) [33]. Wright (1958) [34] stated that the degree of uterine torsion (90°-180°) was considered the most common. Torsion of greater than 45° may result in dystocia (Sloss and Dufty, 1980) [31].Torsions of less than 180° are generally managed in the field and account for only 6 to 15% of referral cases (Pearson, 1971; Sloss ans Dufty, 1980; Manning *et al.,* 1982) [19, 31, 15]. Proportion of above 360° torsion (1.81%) was less than others which was also seen in the studies of Pearson (1971, Sloss and Dufty 1980, Manning *et al.,* 1982, Ruegg 1988, Frazer *et al.,* 1996, Noakes *et al.,* 2001 and Aubry *et al.,* 2008) [19, 31, 15, 28, 9, 17, 4].

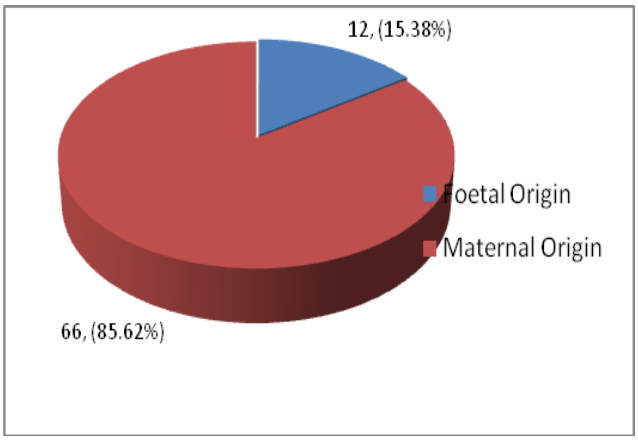

Fig 1: Incidence of dystocia

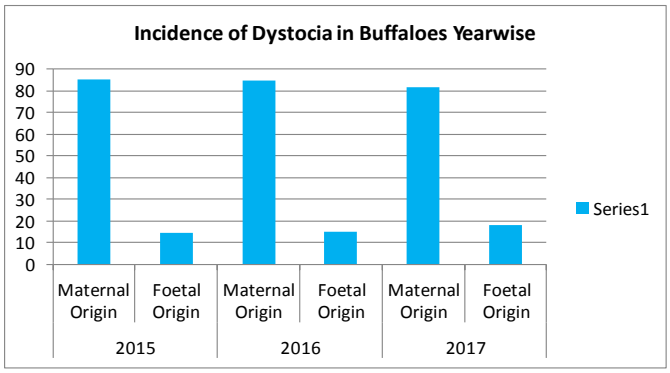

Fig 2: Incidence of dystocia in buffaloes during two years six months (Feb. 2015 to July 2017) X: Types of dystocia Y: Incidence of dystocia (in percent).

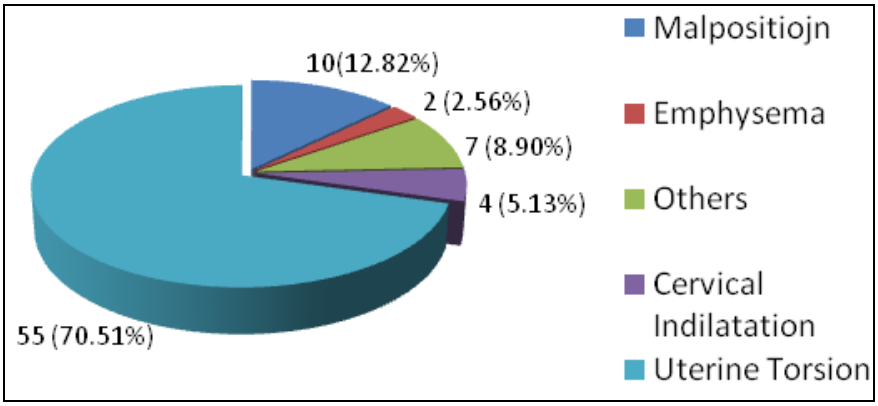

Fig 3: Incidence of uterine torsion in buffaloes during two years six month (Feb. 2015 to July 2017)

Table 1: Summary of Incidence of dystocia in buffaloes

Cause	Maternal				Fetal			Grand Total
	Uterine torsion	Cervical In dilation	Others	Total	Malposition	Emphysema	Total	
n	55	4	7	66	10	2	12	78
Percentage	70.51%	5.13%	8.97%	84.62%	12.82%	2.56%	15.38%	100%

Table 2: Relationship of type and extent of torsion, with the age and parity of the dam and the stage of gestation in uterine torsion affected buffaloes (n=55).

1	Direction of uterine torsion	a)	Right side	53 (96.36%)
		b)	Left side	2 (3.63%)
2	Location of torsion	a)	Pre-cervical	2 (3.63%)
		b)	Post-cervical	53 (96.36%)
3	Degree of torsion	a)	90°-180°	27 (49.09%)
		b)	180°-360°	27 (49.09%)
		c)	>360°	1 (1.81%)
4	Age of dam	a)	3-6 yrs	19 (34.54%)
		b)	6 -9 yrs	22 (40.00%)
		c)	9-12 yrs	14 (25.45%)
5	Parity of animal	a)	1st parity	14 (25.45%)
		b)	2nd parity	20 (36.36%)
		c)	>2nd parity	21 (38.18%)
6	Stage of gestation	a)	Pre term	7 (12.72%)
		b)	Full term	48 (87.27%)

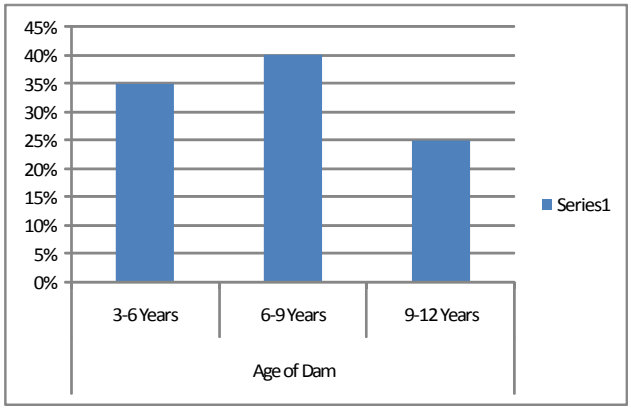

Fig 4: Percent incidence of uterine torsion in relation to age of dam X: showing age of dam Y: Incidence of uterine torsion (in percent).

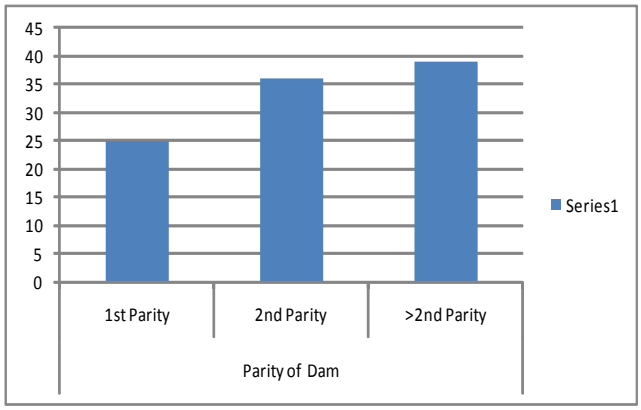

Fig 5: Percent incidence of uterine torsion in relation to parity of dam X: showing parity of dam Y: Incidence of uterine torsion (in percent).

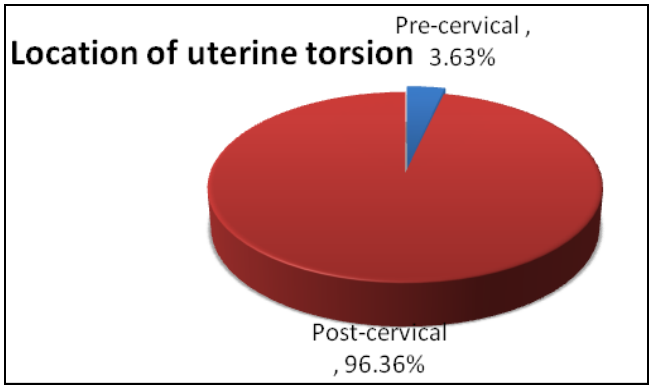

Fig 6: Location of uterine torsion

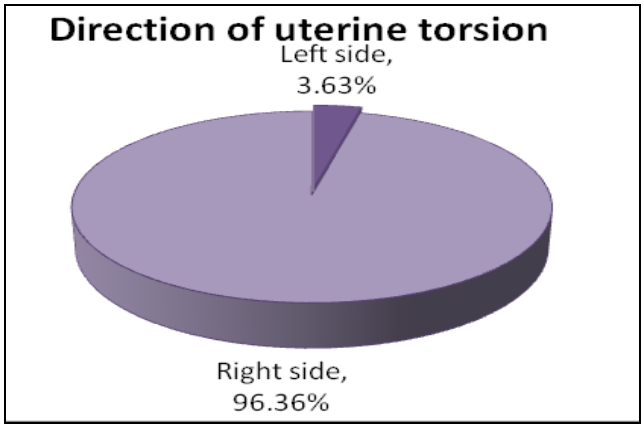

Fig 7: Direction of uterine torsion

Conclusion

In our study, the more incidences of the cases of uterine torsion were found of right side, post cervical, full term. No correlation of uterine torsion found with the parity and age of dam.

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