Research Article

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CLINICO-OBSTETRICAL ATTRIBUTES AND DEVELOPMENT OF ADHESIONS IN MEHSANA BUFFALOES SUFFERING FROM UTERINE TORSION

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ABSTRACT

The clinico-obstetrical attributes included location, direction and degree of uterine torsion studied in 78 Mehsana buffaloes revealed significantly higher occurrence of right side and post cervical type uterine torsion (93.59 and 82.05 %) as compared to left side and pre-cervical torsion (6.41 and 17.95 %). The degree of uterine rotation (>270-360) also prevailed higher (43.59%) to differ significantly than other degrees upto 90, >90-180 and >180-270 which included 6.41, 23.06 and 26.92 percent buffaloes, respectively. The development of uterine adhesions by transrectal and intra-operative techniques was recorded in 20.51 and 33.33 percent buffaloes; of these; maximum adhesions of moderate (9/16, 56.20 %) and severe type (11/19, 57.90 %) were graded by these two techniques, respectively. The adhesion formation was apparently more when buffaloes had right side, pre-cervical type uterine torsion with its degree >180-270 (26.02, 42.86 and 28.57 %) while it was significantly higher with duration of illness exceeded >72 hours (42.85 %). It is concluded that the buffaloes suffered more from right side, post-cervical type torsion with its degree of >270-360^0, and the prolonged duration of dystocia culminated into more adhesion formation and their detection was possible by transrectal and intra-operative techniques but the severe type adhesions were assessed accurately by intra-operative technique.

Key words: Adhesions, Mehsana buffalo, Pre-cervical, Post-cervical, Uterine torsion

Among obstetrical disorders, uterine torsion poses a serious threat to life of both dam and fetus. It also curtails the future fertility of affected animals due to development of adhesions between uterus and the visceral organs. This malady is characterized clinically by twisting of gravid uterus on its longitudinal axis leading to narrowing of the birth canal which makes difficult birth of fetus (Arthur *et al.,* 2001). However, the point of uterine torsion; time; direction and degree of rotation varied widely and have been studied in Murrah, Marathawadi, Egyptian buffaloes apart from non-descript breeds (Krishnamurty *et al.,* 1999; Singla *et al.,* 1992; Amin *et al.,* 2011; Kumbhar *et al.,* 2011; Mahajan, 2003). Since variations in clinical attributes of uterine torsion are of major concern to affect the clinical prognosis of dam survival, the present study therefore was under taken in Mehsana buffaloes suffering from uterine torsion.

MATERIALS AND METHODS

Seventy eight Mehsana buffaloes between the age group of 3 to 12 years suffering from dystocia due to uterine torsion were included in the present study. The majority of buffaloes were full term pregnant except few which pertained between 6-10 months of gestation. The clinico-obstetrical examination of all affected buffaloes was carried out at Teaching Veterinary Clinical Complex (TVCC) to find out the direction, location and degree of uterine torsion on the basis of vaginal twist in the birth canal and per-rectal examination of broad ligament as described previously (Roberts, 1971). Based on vaginal and broad ligament findings, the affected buffaloes were categorized to suffer from torsion of pre- and post-cervical, right /or left side with degree of rotation from 90^0-360^0. The duration of torsion was estimated from the time lapsed between onset of labour pain and the first examination of affected dam. The study also comprised the assessment of adhesion development by transrectal and intra-operative techniques. The observations on free greater curvature of gravid uterus by per-rectal examination of all torsion affected buffaloes (n=78) were recorded during the pre-operative technique whereas intra-operative technique included the gross examination of uterus during the caesarean (n=57) to detect and classify the uterine adhesions into moderate and severe types according to Fredericks *et al.* (1986). The data were analyzed statistically by applying chi-square test (Snedecor and Cochran, 1994).

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RESULTS AND DISCUSSION

A. Clinico-obstetrical attributes

The data pertaining to various clinical attributes of uterine torsion have been shown in Table 1. The findings revealed that the point of torsion was located posterior to the cervix in majority of buffaloes than its anterior location which accounted to occurrence of post- and pre- cervical type uterine torsion in 82.05 and 17.95 percent buffaloes, respectively. The difference was statistically ($p<0.01$) significant. A higher percentage of post-cervical uterine torsion almost similar to the present findings has been also reported earlier (Prasad *et al.,* 2000; Sathya *et al.,* 2004; Amin *et al.,* 2011; Karthick *et al.,* 2015). However, Singh *et al.* (1978) reported equal proportion of pre- and post-cervical torsion whereas Manju and Verma (1985), Prabhakar *et al.* (1997), Krishnamurty *et al.* (1999), Matharu and Prabhakar (2001), Kumbhar *et al.* (2011) and Krishnamurthy and Ramakrishna (2014) documented 90-100 percent incidence of post-cervical torsion in comparison to the present findings. The variation in size of pelvic cavity is quite obvious in earlier studies. Therefore, it might be associated with variable incidences of post-cervical torsion as reported by different workers. Further,

Table 1:
Clinico-obstetrical attributes of uterine torsion in Mehsana buffaloes

Sr. No.	Groups	Clinico-obstetrical attributes		No. of buffaloes	Percent (%)	Significance
1	I	Direction of torsion	Right side	73	93.59**	$\chi^2 df_1$= 59.282 *P*= 0.00001 'S'
			Left Side	05	6.41	
2	II	Location of twist	Pre-cervical	14	17.95	$\chi^2 df_1$= 32.051 *P*= 0.0001 'S'
			Post-cervical	64	82.05**	
3	III	Degree of torsion	Up to 90 degree	05	6.41	$\chi^2 df_3$= 49.897 *P*= 0.00001 'S'
			> 90 - up to 180 degree	18	23.08	
			> 180 - up to 270 degree	21	26.92	
			> 270 - 360 degree	34	43.59**	
4	IV	Duration of illness/torsion	Up to 24 hours	11	14.10	$\chi^2 df_3$= 59.358 *P*= 0.00001 'S'
			> 24 - 48 hours	13	16.86	
			> 48 - 72 hours	12	15.38	
			> 72 hours	42	53.84**	

**Figures in column differed significantly (p<0.01), 'S' denotes level of significance

Dhaliwal *et al.* (1991) also reported a dominance of post-cervical torsion in buffaloes having large size pelvic cavity. In the present study, the anterior part of longitudinal vagina was found to be involved in post-cervical torsion which is in accordance with that of Pearson (1971). It might be due to absence of the muscles in the cervical area of the broad ligament which weaken the anterior vagina and make it more prone for rotation (Singh, 1991; Brar *et al.,* 2008). The attachment of broad ligament was further reported to be associated with more occurrence of post-cervical torsion by Singh (1991).

The occurrence of right side uterine torsion was found significantly higher as compared to the left side (73/78, 93.59 % vs 5/78, 6.41 %), which is in accordance to the earlier findings (Siddiquee, 1988; Matharu and Prabhakar, 2001; Jeengar *et al.,* 2015; Karthick *et al.,* 2015; Mane and Bhangre, 2015). In comparison to the present findings, slightly higher incidence of the right side uterine torsion was reported by Manju and Verma (1985) and Purohit *et al.* (2011) whereas a very high occurrence (100 %) in Murrah and Marathawadi buffaloes by Singla *et al.* (1992), Krishnamurty *et al.* (1999), Mahajan (2003) and Kumbhar *et al.* (2011). The anatomical location of rumen which prevents the rotation of uterus to the left side and the absence of a muscular fold on the right side broad ligament have been reported (Singh, 1991;Brar *et al.*, 2008) to increase the possibility of right side uterine torsion. This clue might also be true to support the present

Table 2:
Adhesion formation in reference to clinico-obstetrical attributes of uterine torsion in Mehsana buffaloes

Sr. No.	Clinico-obstetrical attributes		No. of buffaloes	Uterine adhesions (%)		χ^2 value
				Present	Absent	
1	Direction of torsion	Right side	73	26.02 (19)	73.97 (54)	$\chi^2 df_1$= 0.597 *P*= 0.439 'NS'
		Left Side	05	0.00 (0)	100 (5)	
2	Location of twist	Pre-cervical	14	42.86 (6)	57.14 (8)	$\chi^2 df_1$= 1.729 *P*= 0.188 'NS'
		Post-cervical	64	20.31 (13)	79.69 (51)	
3	Degree of torsion	Up to 90 degree	05	0.00 (0)	100 (5)	$\chi^2 df_3$= 1.939 *P*= 0.585 'NS'
		> 90 - up to 180 degree	18	27.78 (5)	72.22 (13)	
		> 180 - up to 270 degree	21	28.57 (6)	71.43 (15)	
		> 270 - 360 degree	34	23.53 (8)	76.47 (26)	
4	Duration of illness/torsion	Up to 24 hours	11	0.00 (0)	100 (11)	$\chi^2 df_3$= 15.38 *P*= 0.002 'S'
		> 24 - 48 hours	13	0.00 (0)	100 (13)	
		> 48 - 72 hours	12	8.33 (1)	91.67 (11)	
		> 72 hours	42	42.85 (18)	57.15 (24)	

Figures in parenthesis denote number of buffaloes, 'S' = Significant (p<0.01), 'NS' = Non-significant

findings of higher incidence of right side uterine torsion

The rotation of uterus at different degrees up to 90 ,>90-180 , >180-270 and >270 to 360 was found to be of 6.41, 23.08, 26.92 and 43.59 percent, respectively in the present study which differed significantly from each other (p<0.01). However, the rotation of uterus at >270 to 360 was abundant among other degrees which is in close agreement with those reported by Amin *et al.* (2011), whereas lower incidence of uterine rotation up to 90 is corroborates by earlier findings of Singla (1998), Siddiquee (1988) and Jayakumar *et al.* (2014). There have been other reports on abundance of uterine rotation most commonly at 180 (Manju and Verma, 1985; Prasad *et al.,* 2000; Matharu and Prabhakar, 2001) and 90 or even less degree in different breeds (Mannari and Tadkod, 1976;Karthick *et al.,* 2015). Such a variation might be attributed to hormonal status of dam and the movements of fetus as reported earlier by Bhatol (2007).

The maximum buffaloes (42/78, 53.84 %) were adjudged to suffer uterine torsion of >72 h which differed significantly (p<0.01) than other durations of >24-48 and >48-72 h (13/78, 16.86 % and 12/78, 15.38 %). The dystocia of variable durations 1-24; 24-48, 48-72 and 72-98 h, with percentage of 42.46; 31.43; 20.00 and 5.71, respectively has been reported in Egyptian buffaloes (Amin *et al.,* 2011) which differed from the present findings. Although, dystocia of longer duration is fetal to the dam (Kumar *et al.,* 2015) but it is difficult to rule out and justify such a variation in duration of dystocia. However, geographical conditions and owners' awareness to the prompt transport of animal might be contributing factors to cause variation in duration of dystocia.

B. Uterine adhesions

It is apparent from the results (Fig. 1) that 20.51 per cent torsion affected buffaloes (16/78) were found to develop uterine adhesions by transrectal technique whereas intra-operative technique revealed 33.33 percent buffaloes (19/57) to suffer from adhesions. Although, slightly higher number of buffaloes were diagnosed to suffer from uterine adhesions by intra-operative technique but the difference between two techniques was non-significant (p<0.1389). The present findings are in close proximation to earlier study of Bhatol (2007) wherein 22.72 per cent buffaloes were reportedto develop uterine adhesions by transrectal technique. Matharuand Prabhakar (2001) also reported lower percentage of utero-omental adhesions. However, Luthra and Khar (1999) documented a high percentage of adhesions (61.54 %) intra-operatively in fresh cases of 24-72 hours duration which failed to detort by rolling. Such a variation in development of adhesions might be attributable to extended duration of dystocia as reported by Mahajan (2003). In delayed cases of dystocia, uterus and peritoneum after becoming ischemic looses their spontaneous ability to lyse fibrin and also inhibit fibrinolysis, thus, leads to fibrin deposition and adhesion formation (Buckman *et al.,* 1976).

Further, the uterine adhesions detected by two techniques in the present study were graded to moderate and severe types (Fig 2, Plate 1a, b and c). The findings revealed a higher percentage of severe type adhesions (11/19, 57.90 %) by intra-operative technique as compared to transrectal technique (6/16, 37.50 %). On the other hand, the development of moderate type adhesions were detected to be vice-versa as inferred from its higher percentage (9/16, 56.20 %) by transrectal than the intra-operative technique (8/19, 42.11 %).

The findings of uterine adhesion formation in relation to various clinico-obstetrical attributes (Table 2) showed that 26.02 percent buffaloes had adhesions when torsion was of right side while none of the buffaloes developed adhesions with left side torsion. Further, the adhesion formation was more with pre-cervical torsion of >180-270 rotation (42.86 and 28.57 %) in comparison to post-cervical type with its degree >90-180 and >270-360 (27.78 and 23.53 %). The differences were non-significant. Prabhakar *et al.* (1997) reported that pre-cervical torsion affected buffaloes when suffered with dystocia of 36 hours duration had no utero-omental adhesions which differed from the present findings of adhesion formation in 42.86 percent buffaloes having pre-cervical torsion. Such a variation in the present study might be attributable to the fact that majority of buffaloes suffered from prolonged dystocia of >72 hours duration (Table 1). It was also apparent that duration of illness/torsion (>72 h) had significant (p<0.01) effect on adhesion formation as reflected from the findings of 42.85 percent buffaloes in this category than those of only 8.33 percent buffaloes having dystocia of >48-72 h duration. The increased duration of illness was also reported to result into more development of adhesions in buffaloes (Luthra and Khar, 1999). In the present study, the shorter duration of torsion up to 24 and >24-48 h did not cause development of adhesions which is corroborated by earlier findings of Ghuman *et al.* (1997). The overall findings of present study revealed that the right side, post-cervical type uterine torsion with degree >270-360 prevailed more in Mehsana buffaloes and it caused formation of adhesions which were associated with prolonged duration of dystocia. The detection of adhesions was possible by transrectal and intra-operative techniques but the severity of adhesion was better assessed by intra-operative techniques.

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