FACTORS AFFECTING THE OUTCOME OF UTERINE TORSION IN BUFFALOES: A RETROSPECTIVE STUDY

Navdeep Singh[1,*], Vinod Kumar Gandotra[2], Sarvpreet Singh Ghuman[3] and Rajsukhbir Singh[3]

ABSTRACT

Out of the 290 uterine torsion affected buffaloes presented to the Teaching Veterinary Clinical Complex Hospital, GADVASU, Ludhiana, gestation period was complete in 88.6% buffaloes and its most (66.2%) frequent occurrence was observed second to fourth parity. Most of the uterine torsion were post cervical (95.1%), on right side (93.4%), of >180^{o} (82%) and presented within 36 h from the occurrence of uterine torsion. Sharma's modified Schaffer's method was attempted to detort 87.9% uterine torsion affected buffaloes. There were no significant (P>0.05) association of successful detorsion with gestation period, parity, side of torsion, position of torsion and degree of torsion. However, the duration of torsion were significantly (P<0.05) associated with successful detorsions. The overall survival rate of uterine torsion affected buffaloes presented at TVCC hospital was 63.4%, whereas the survival rate among the successfully detorted buffaloes was about 91%.The survival rate of the calves delivered was 18.96% and most (59.9%) of calves delivered were male. Calf survival and dam survival rate decreased with increase in duration of occurrence. The future fertility decreased with increase in duration of torsion. It is concluded that the increased duration from the occurrence of uterine torsion to its treatment decreases the chances of successful detorsion, dam survival and calf survival.

Keywords: *Bubalus bubalis*, buffaloes, uterine torsion, degree, duration, calf survival, dam survival, future fertility

INTRODUCTION

Uterine torsion is the rotation of gravid uterus along its longitudinal axis. It has been reported as a common cause of dystocia among dairy buffaloes (Ahmed *et al*., 1980). The incidence of uterine torsion as well as the time of its occurrence in buffaloes emphasizes its impact on dam's health, fetal survivability, future fertility and thus the dairy herd profitability (Ghuman, 2010; Uttam *et al*., 2015). Although some of the

[1]Directorate of Livestock Farms, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India, *E-mail: navdeep1987@gmail.com

[2]Department of Veterinary Gynaecology and Obstetrics, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India

[3]Department of Teaching Veterinary Clinical Complex, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India

predisposing factors (parity, stage of gestation, fetal gender) along with clinical observations have been pointed out in previous studies (Ghuman, 2010; Jeenger *et al*., 2015). So keeping in view the importance and severity of outcomes a lot more contribution is required in the direction of predisposing factors leading to torsion and their effects on outcome. So that ameliorative measures can be implemented to put down the incidences and improvement in outcome of uterine torsion. So the present study deals with the relation of various factors with the outcome of uterine torsion affected buffaloes.

MATERIALS AND METHODS

A retrospective analysis was conducted on 290 uterine torsion affected buffaloes that were presented to teaching veterinary clinical complex, GADVASU, Ludhiana during January 2013 to December 2015. Impact of various parameters (parity, gestation period, duration from occurrence of uterine torsion, degree of torsion, position of torsion and side of torsion, number of rolls given) on success of achieving detorsion was evaluated. Furthermore, the outcomes of uterine torsion affected buffaloes *viz*. dam survival, calf survival, calf sex and future conception after treatment were evaluated. The data of future conception of the buffaloes treated was collected on available phone numbers.

Statistical analysis

Data were analysed by using MINITAB statistical software (release 14.2). Descriptive statistics were calculated to establish frequencies and percentage distribution of various parameters included in the study. Data were first analysed by Chisquare test (χ^2) to determine the significance of associations between independent variable and outcome variable. P-values were given. All variables with $P<0.05$ in the initial univariable analysis were considered in a logistic regression analysis. Successful detorsion were considered as outcome variable. Standard error coefficients, z values, and 95% confidence limits were mentioned, and significance of results was declared at $P<0.05$.

RESULTS AND DISCUSSION

Out of 290 uterine torsion affected buffaloes presented, most (88.6%) of the buffaloes had completed their gestation period, as reported earlier (Jeengar *et al*., 2015; Karthick *et al*., 2015). However, gestation period had no association with success of achieving detorsion ($P>0.05$, Figure 1). In fact, at the end of gestation, the vigorous fetal movements increase instability of the uterus (Arthur *et al*., 1966), thus predisposing the animal to uterine torsion (Ghuman, 2010). It was revealed that the most frequent occurrence (66.2%) of uterine torsion was observed in the buffaloes between second to fourth parity (Table 1). Similarly, the previous studies also claimed that pleuriparous buffaloes were prone to uterine torsion (Matharu and Prabhakar, 2001; Karthick *et al*., 2015), with maximum frequency during second and third parity (Nanda *et al*., 1991). However, parity of buffaloes had no association with success of achieving detorsion ($P>0.05$, Figure 1). About 55.86% buffalo presented at TVCC hospital were within 36 h of occurrence of torsion for the treatment of uterine torsion (Table 1). The lack of awareness among farmers or lack of appropriate services at local level could be the reasons for delay in presentation of remaining buffalo after 36 h of the occurrence of

uterine torsion. Similar observation was reported earlier (Prabhakar *et al*., 1995). The success rate for achieving uterine detorsion was higher when the buffalo was presented <36 h, whereas the success rate decreased following detorsion of buffalo presented >36 h after the occurrence of uterine torsion (Table 2). As the duration of occurrence of uterine torsion increases beyond 72 h, most of the attempts to achieve detorsion of the uterus were unsuccessful (Figure 1). This could be due to development of adhesions between the uterus and the adjoining abdominal organs (Dhaliwal *et al*., 1991).

Calf survival rate was 43.62 %, 14.71%, 4.17% and 0% at 0 to 12 h, 12 to 36 h, 36 to 72 h and >72 h, respectively from the time of visible signs of uterine torsion (Figure 2). The chances of calf survival was higher (P<0.05) when the buffalo was detorted within 12 h from the occurrence of uterine torsion (Table 3). In previous studies, higher calf survival rate (44 to 58%) was observed in buffaloes where timely diagnosis and correction of torsion was done (Sloss and Dufty, 1980; Manning *et al*., 1982). Once uterine torsion is corrected, the delay in achieving complete cervical dilation may further compromise calf viability (Sloss and Dufty, 1980).

The position of uterine torsion was post cervical in 95.1% buffaloes presented at TVCC hospital (Table 1). The post cervical uterine torsions of similar range (80 to 98%) were reported earlier (Ali *et al*., 2011; Jeengar *et al*., 2015; Kumar *et al*., 2015; Karthick *et al*., 2015). The reason for higher incidence of post-cervical uterine torsion was suggested as the absence of muscles in cervical area of broad ligaments. Moreover, the anterior vagina is the weaker point of the bovine genital tract (Singh, 1991). However, position of torsion had no association (P>0.05) with success of achieving detorsion (Figure 1). The rotation of uterus was towards right side in 93.4% uterine torsion affected buffaloes (Table 1). This was in concurrence with previous studies (Jeenger *et al*., 2015; Karthick *et al*., 2015; Zaher *et al*., 2017). An increased possibility of right side uterine torsion in buffaloes could be the presence of rumen on left side and the absence of muscular fold on right broad ligament (Frazer *et al*., 1996; Brar *et al*., 2008). However, side of uterine torsion had no association (P>0.05) with success of achieving detorsion (Figure 1).

The degree of uterine torsion was >180^{o} in 82% buffaloes (Table 1), as reported earlier inuterine torsion affected buffaloes presented at referral hospitals (Jeengar *et al*., 2015; Zaheer *et al*., 2017). On the contrary, others suggested that uterine torsions of <180^{o} (Pascale *et al*., 2008; Karthick *et al*., 2015). Furthermore, detorsion of lesser degree uterine torsion in buffaloes was more (P<0.05) successful as compared to their counterparts having more degree of torsion (Figure 1). In previous studies, decreased vaginal delivery was observed in buffaloes with higher degree uterine torsions (Amer and Hashem, 2008). Calf survival rate was higher (P<0.05) in buffaloes with lesser degree of uterine torsion (Figure 2) as compared to their counterparts. However, in MLR analysis, there was no significant impact of degree on success of achieving detorsion and calf survival (Table 3). Increasing degree of torsion has impact on uterine vascular compromise and hence calf survival (Amer and Hashem, 2008).

Sharma's modified Schaffer's method was attempted to detort uterine torsion affected buffaloes in 87.9% case presented at TVCC hospital, whereas rest was directly subjected to cesearean section due to presence of uterine adhesions (Table 1). In fact, successful detortion was achieved

in 77.3% buffaloes was either one (36.7%), two (49.7%) or > two rolls (14.6%, Table 1). According to a previous study, the number of rolls required for achieving detorsion were associated with the degree of uterine torsion in buffaloes (Amer and Hashem, 2008).

The survival rate of the calves delivered in the present study was 18.96% (Table 1). A wide was variation (4 to 56%) was reported in the survival rate of calves delivered from bovines with uterine torsion presented at the referral hospitals (Ali *et al*., 2011; Purohit *et al*., 2011; Kumar *et al*., 2015; Jeengar *et al*., 2015). An increasing degree of torsion had impact on uterine vascular compromise and hence calf survival (Ghuman, 2010). In the present study, a higher percentage (59.9%) of male calves (59.89%) were delivered after successful detorsion of uterine torsion affected buffaloes (Table 1), as reported (Jeenger *et al*., 2015; Karthick *et al*., 2015; Tripathi and Mehta, 2015). The difference might be related to hormonal changes that occurred during the last stage of labor and vigorous movement of the male relative to female fetus (Tripathi and Mehta, 2015).

The overall survival rate of uterine torsion affected buffaloes presented at TVCC hospital was 63.4%, whereas the **s**urvival rate among the successfully detorted buffaloes was about 91% (Table 1). Most of the buffaloes with unsuccessful and unattempted uterine detorsions were sent to slaughter house by the owners and only in 9% cases, cesarean section was performed. When durations of occurrence of torsion was 0 to 12, 12 to 36, 36 to 72 and >72, the rate of dam survival was 93.6%, 92.6%, 57.1% and 6.3%, respectively (Table 4).

A similar decline in survival rate from 96 to 35% with an increase in duration of torsion was reported earlier (Prabhakar *et al*., 1995; Srinivas *et al*., 2007). The higher duration of uterine torsion may lead to uterine adhesions, uterine necrosis, fetal putrefaction, maternal toxemia, dehydration, shock and peritonitis (Dhaliwal *et al*., 1991; Matharu and Prabhakar, 2001; Noakes *et al*., 2001). The data of future fertility of 99 out of 180 successfully detorted survived buffaloes was available in the present study. Among buffaloes presented till 12 h of occurrence of uterine torsion, 91.8% buffaloes conceived successfully whereas conception rate was 90.6% in buffaloes presented between 12 to 36 h. None of the buffaloes conceived which were treated for uterine torsion after >36 h of occurrence of uterine torsion (Figure 3). The degree of uterine torsion had no impact on future fertility of buffaloes. In previous studies, delay in diagnosis of uterine torsion decreased the conception rate and subsequent fertility was negatively correlated with both the degree and duration of torsion (Schönfelder *et al*., 2005a; Ghuman, 2010; Purohit and Gaur, 2014). The congestion of uterus resulting from long standing torsion of uterine vessels causes fetal death and subsequent autolytic and bacterial changes in fetus which lead to a bulged, tense, inelastic and fragile uterine wall with an immovable uterus (Schönfelder *et al*., 2005).

It is concluded that the increased duration from the occurrence of uterine torsion to its treatment decreases the chances of successful detorsion, dam survival,calf survival and future fertility.

REFERENCES

Ahmed, M., R.A. Chauhry and I.H. Ham. 1980. Torsion of the uterus as a cause of dystocia in the buffaloes. *Pak. Vet. J*., **1**: 22-24.

Ali, A., R. Derar, H.A. Hussein, M.R. Abd Ellah

Table 1. History, clinical observations and outcome of various parameters in uterine torsion affected buffaloes (n=290) at Teaching Veterinary Clinical Complex, GADVASU, Ludhiana.

Parameter	n	%
Duration of torsion (n=290)		
0 - 12 h	94	32.41
12 - 36 h	68	23.45
36 - 72 h	49	16.90
>72	79	27.24
Rolls attempted for detorsion (n=290)		
No rolls	34	11.72
1	94	32.41
2	126	43.45
3 above	36	12.42
Detorsion outcome (n=256)		
Successful	198	77.34
Unsuccessful	58	22.66
Dam fate (n=290)		
Dead	106	36.55
Alive	184	63.45
Calf fate(n=290)		
Dead	235	81.03
Alive	55	18.96
Calf sex (n=187)	187	
Male	112	59.89
Female	75	40.01

Table 2. Multivariate logistic regression results with respect to the success rate of uterine detorsion in buffaloes (n=290).

Variables	Coef.	SE Coef.	95% CI		P-Value
			Lower	Upper	
Degree of torsion					
<180	Reference				
>180	-1.401	-3.245	-3.350	0.443	0.136
Duration of torsion					
0 - 12 h	Reference				
12 - 36 h	-0.468	0.782	-2.000	1.064	0.550
36 - 72 h	-1.550	0.702	-2.926	-0.174	0.027
72 and above	-5.641	0.836	-7.279	-4.002	0.000
12 - 36 h	Reference				
36 - 72 h	-1.082	0.675	-2.405	0.241	0.109
72 and above	-5.172	0.783	-6.708	-3.637	0.0001
36 - 72 h	Reference				
72 and above	-4.091	0.719	-5.500	-2.681	0.000

Table 3. Multivariate logistic regression results with respect to the livability of calf in uterine torsion affected buffaloes (n=210).

Variables	Coef.		SE Coef. Lower	95% CI		P-Value
				Upper		
Duration of torsion						
0 - 12 h	Reference					
12 - 36 h	-1.468	0.410	-2.272	-0.664		0.000
36 - 72 h	-2.859	0.763	-4.355	-1.364		0.000
12 - 36 h	Reference					
0 - 12 h	1.468		0.410	0.664	2.272	0.000
36 - 72 h	-1.391		0.804	-2.966	0.184	0.083
Degree of torsion						
<180	Reference					
>180	-0.752		0.407	-1.551	0.046	0.065

Table 4. Survival rate of uterine torsion affected buffaloes in relation to the duration of torsion.

Parameter	Buffalo survived (%)
Duration	
0 - 12 h	93.6
12 - 36 h	92.64
36 - 72 h	57.1
>72 h	6.3

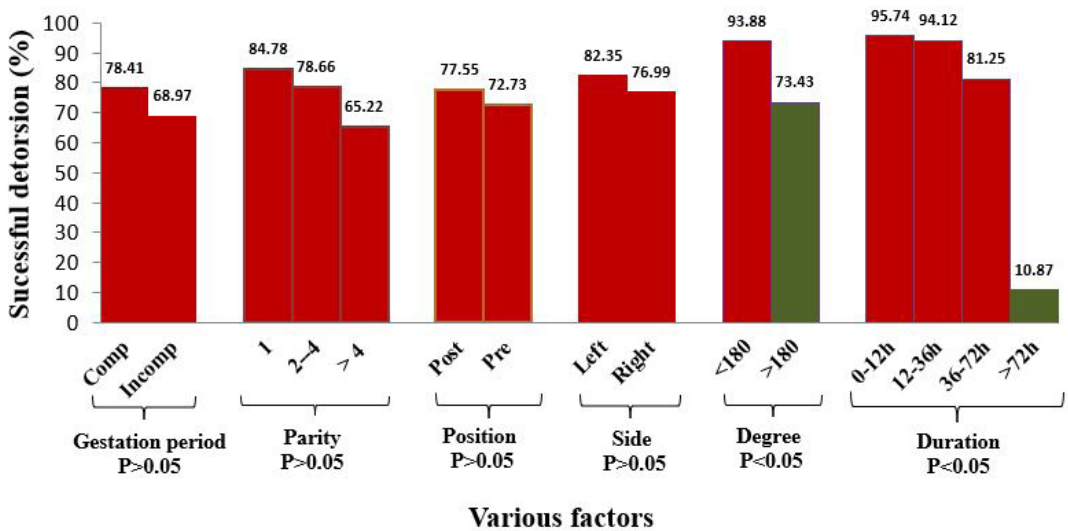

Figure 1. The association of various management factors with successful detorsion of uterine torsion affected buffaloes (n=290). P<0.05 (Chi-square analysis).

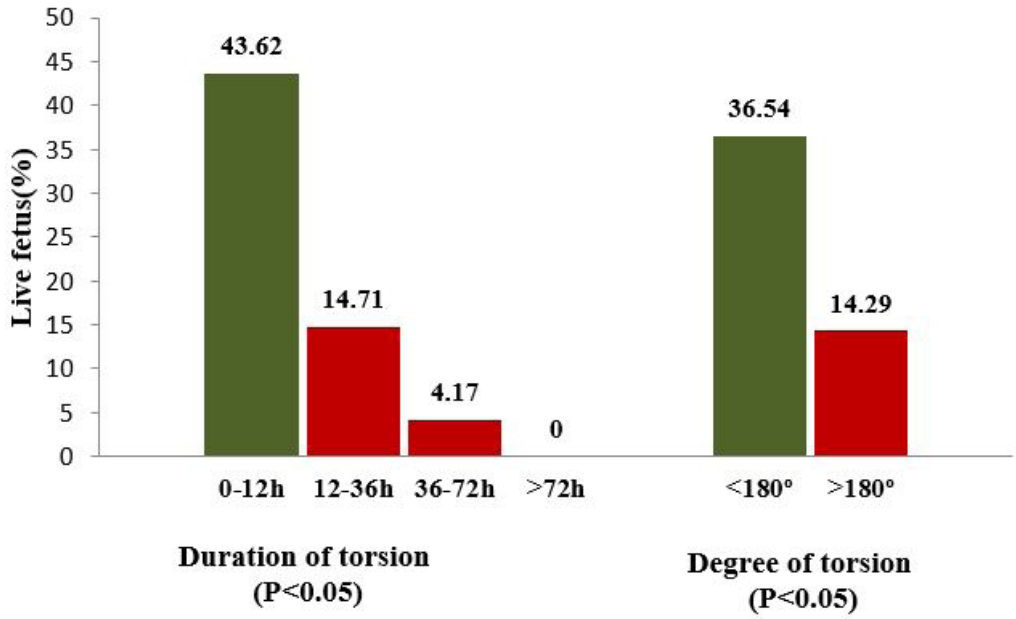

Figure 2. The effect of degree and duration of uterine torsion affected buffalo (n=210) on the survivability of calf.

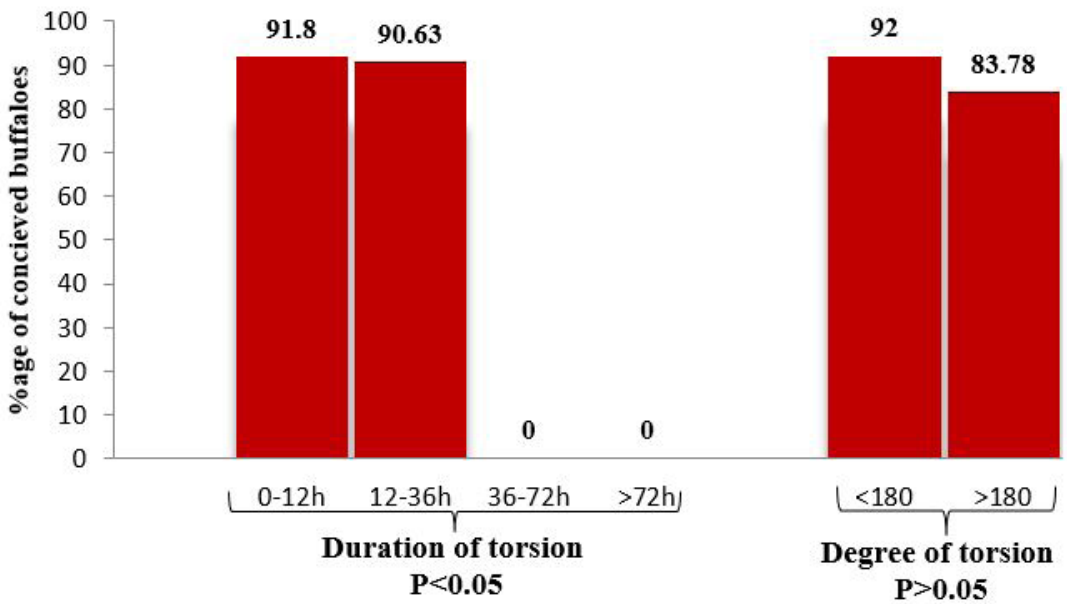

Figure 3. Future fertility rate of uterine torsion affected buffaloes in relation to the duration degree of torsion.

and A.K. Abdel-Razek. 2011. Clinical, hematological and biochemical findings of uterine torsion in buffaloes (*Bubalus bubalis*). *Anim. Reprod. Sci*., **126**(3-4): 168-172. DOI: 10.1016/j.anireprosci.2011.05.005

Amer, H.A. and M.A. Hashem. 2008. Relationship between clinical and biochemical picture of uterine torsion in Egyptian buffaloes (*Bubalus bubalis*). *The Internet Journal of Veterinary Medicine*, **4**(1): 1-11. DOI:10.5580/1157

Amin, S.M., H.A. Amer, A.E. Hussein and A.M. Hazzaa. 2011. Creatine phosphokinase and aspartate aminotransferase profiles and its relation to the severity of uterine torsion in Egyptian buffalo. *Anim. Reprod. Sci*., **123**(3-4): 163-168. DOI: 10.1016/j.anireprosci.2010.12.002

Arthur, G.H. 1966. Recent advances in bovine obstetrics. *Vet. Rec*., **79**(22): 630-644. DOI: 10.1136/vr.79.22.630

Brar, P.S., R.P. Saigal, R.D. Sharma and A.S. Nanda. 2008. Histology and histochemistry of broad ligaments in buffaloes. *Indian J. Anim. Sci*., **78**(5): 464-467.

Dhaliwal, G.S., S. Prabhakar, P. Singh and R.D. Sharma. 1991. Effects of injudicious handling of uterine torsion on survival rate of dam in buffaloes (*Bubalis bubalis*). *Pak. Vet. J*., **11**: 117-119.

Frazer, G., N. Perkins and P. Constable. 1996. Bovine uterine torsion: 164 hospital referral cases. *Theriogenology*, **46**(5): 739-758. DOI: 10.1016/S0093-691X(96)00233-6

Ghuman, S.P.S. 2010. Uterine torsion in bovines: A review. *Indian J. Anim. Sci*., **80**(4): 289-305.

Jeengar, K., G.N. Purohit, J.S. Mehta, V. Choudhary, S. Ruhil and A. Tripathi. 2015. Prevalence of Uterine Torsion and Its Management in buffaloes. *Theriogenology Insight*, **5**(3): 203-211. DOI: 10.5958/2277-3371.2015.00022.4

Karthick, C., M. Selvaraju, R.E. Napolean and K.A. Doraisamy. 2015. Incidence of uterine torsion and its occurrence in relation to various factors in cows and buffaloes. *Indian J. Anim. Reprod*., **36**(2): 60-63.

Kumar, L., R.A. Luthra, A.K. Pandey, J.B. Phogat, P. Kumar, G. Singh, S. Kumar and M. Paeek. 2015. A Retrospective study on incidence on uterine torsion in bovines. *Haryana Veterinarian*, **54**: 135-137.

Manning, J., P. Marsh, F. Marshall and R. McCorkell. 1982. Bovine uterine torsion: A review illustrated by cases from the Western College of Veterinary Medicine Large Animal Clinic. *Bovine Pr*., **17**: 94-98.

Matharu, S.S. and S. Prabhakar. 2001.Clinical observations andsuccess of treatment of uterine torsion in buffaloes. *Indian J. Anim. Reprod*., **22**: 45-48.

Nanda, A.S., R.D. Sharma and M.A. Nowshehri. 1991. Outcome of various regimes of treatment of uterine torsion in buffaloes. *Indian J. Anim. Reprod*., **12**: 197-200.

Noakes, D.E., D.J. Parkinson and G.C.W. England. 2001. Maternal dystocias. *In* Noakes, D.E. (edn.) *Arthurs Veterinary Reproduction and Obstetrics*, Saunders Harcourt, India.

Pascale, A., L.D. Warnick, L. DesCoteaux and E. Bouchard. 2008. Astudy of 55 field cases of uterine torsion in dairy cattle. *Can. Vet. J*., **49**: 366-372.

Prabhakar, S., G.S. Dhaliwal, R.D. Sharma and A.S. Nanda. 1995. Success of treatment in relation to milk letdown and pelvic relaxation in bovines with torsion of uterus. *Indian J. Dairy Sci*., **48**: 323-325.

Purohit, G.N. and M. Gaur. 2014. Uterine torsion in buffaloes: A critical analysis. *Buffalo Bull*., **33**(4): 363-378. Available on: https://ibic.lib.ku.ac.th/e-Bulletin/IBBU201404004.pdf

Purohit, G.N., Y. Baroli, C. Shekher and P. Kumar. 2011. Maternal Dystocia in cows and buffaloes: A review. *Open Journal of Animal Sciences*, **1**(2): 41-53. DOI: 10.4236/ojas.2011.12006

Schönfelder, A., A. Richter and A. Sobiraj. 2005. Doppler ultrasound studies of the uterine arteries in cows with spontaneous parturition and with uterine torsion intra partum. *Wien. Tierarztl. Monat*., **92**(3): 74-80.

Singh, P. 1991. *Studies on broad ligament in relation to uterine torsion in buffaloes*. M.V.Sc. Thesis, Punjab Agriculture University, Ludhiana, India.

Sloss, V. and J.H. Dufty. 1980. Obstetrical physiology. Obstetrical pathology. Obstetrical procedures. p. 39, 105, 108-111, 180-183. *In Handbook of Bovine Obstetrics*. (eds.) Williams and Wilkins, Pennsylvania, USA.

Srinivas, M., M. Sreenu, L.N. Rani, K.N. Subramanyam and V.D. Prasad. 2007. Studies on dystocia in graded murrah buffaloes: A retrospective study. *Buffalo Bull*., **26**(2): 40-45. Available on: http://ibic.lib.ku.ac.th/e-Bulletin/IBBU200700010.pdf

Tripathi, A. and J.S. Mehta. 2015. Factors associated with uterine torsion in cattle: A retrospective study. *The Bioscan*, **10**: 1135-1137.

Uttam, S., B. Singh, J.K. Chaudhary, S. Bassan, S. kumar and G. Neha. 2015. Analysis of morbidity and mortalityrate in bovine under village conditions of uttarpradesh. *The Bioscan*, **10**: 585-591.

Zaher, H.A., A.A. Swelum, S. Amin, A. Eidaroos, A.M. Hazzaa and S.A. Sharifi. 2017. Factors affecting incidence of uterine torsion in Egyptian buffaloes (*Bubalus bubalis*) and its response for rolling. *Journal of Buffalo Science*, **6**(1): 28-34. DOI: 10.6000/1927-520X.2017.06.01.4