Theriogenology Insight: 5(1): 33-40, April, 2015
DOI Number: 10.5958/2277-3371.2015.00003.0

Prognostic tests for uterine torsion affected buffaloes

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Abstract

Twenty-five female buffaloes suffering from uterine torsion were presented to the clinic of Veterinary Gynaecology and Obstetrics, CVAS, Bikaner for treatment. Three times blood samples were obtained from 25 buffaloes with uterine torsion (at the time of presentation of the animal, 1 h and 24 h after fetal delivery) and 5 healthy buffaloes to investigate the relationship between concentrations of SGOT (serum glutamic oxaloacetic transaminase), SGPT (serum glutamic-pyruvic transaminase), Bilirubin, serum creatinine and blood urea nitrogen (BUN). The aim of this study was to investigate related alterations in these blood constituents. There were significant ($P < 0.01$) increases in SGOT, SGPT, Bilirubin, serum creatinine and BUN in the affected buffaloes, possibly due to high uterine tissue damage. It may be inferred that torsion may lead to imbalance in biochemical profiles that affect the proper functioning of the uterine musculature. Buffaloes subjected to uterine torsion are associated with hepatic and renal dysfunction. In conclusion, concentration of above parameters can be used as a prognostic indicator for the occurrence of uterine torsion in buffaloes.

Keywords: SGOT, SGPT, Bilirubin, Creatinine, BUN

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). It is a major condition affecting buffaloes during late pregnancy (Foud and El-Sawaf , 1964; Verma *et al.,*

1974; Gupta *et al.,* 1981) and it has been reported as a serious cause of dystocia in buffaloes (Murty *et al.,* 1999; Nanda *et al.,* 2003; Amin *et al.,* 2011), threatening the lives of both fetus and dam. Torsion of the uterus reportedly constitutes about 53-83% of the dystocia in buffaloes presented at the referral hospitals (Vasishta, 1983; Malhotra, 1990; Singh, 1991; Prabhakar *et al.,* 1994; Purohit and Mehta, 2006; Srinivas *et al.,* 2007; Purohit *et al.,* 2011a; Purohit et al 2011b; Purohit *et al.,* 2012).

A diverse list of contributing causes has been proposed, including the anatomy, slipping, the manner in which the animal rises, and the strong movements of the fetus during the first stage of labor (Roberts, 1986; Kolla *et al.,* 1999; Noakes *et al.,* 2009). Factors such as duration of the condition and severity of the torsion have been suggested as determinants of the outcome (Frazer *et al.,* 1996; Amer *et al.,* 2008; Amin *et al.,* 2011).

When physical examination fails to yield a diagnosis or prognosis in difficult cases, blood analysis may help to identify the problem. Biochemical parameters can exclude some diseases, and if there are abnormalities, they might aid in establishing a prognosis and developing a therapeutic plan (Amer *et al.,* 2008; Hussein and Abd Ellah, 2008; Amin *et al.,* 2011). The aim of this study was to investigate alterations in blood parameters.

Materials and Methods

Clinical examination

The present investigation was conducted on 25 buffaloes presented with uterine torsion at Clinics of Veterinary Gynaecology and Obstetrics, CVAS, Bikaner with a history of dystocia or due to a general medical problem like colic, straining or reduced food intake. Clinical examination included transvaginal followed by transrectal examination of buffaloes to determine the torsion.

Five normal parturient buffaloes presented at the Clinic of Veterinary Gynaecology and Obstetrics, CVAS, Bikaner, were included as control.

Blood analysis

Blood was collected in sterile test tubes from buffaloes with uterine torsion (n=25) at the time of presentation and 1 hr and 24 hr after fetal delivery. Serum was separated and stored at -20° C till further assay. Blood was also collected from normal parturient buffaloes (n=5) immediately after parturition and separated

serum was stored at -20° C till further assay. Serum activities of GOT, GPT, bilirubin, creatinine and BUN were analysed using Kinetic UV test employing commercially available test kits (Precision Biotech, India)

Statistical analysis

Data were collected, arranged, summarized and then statistically analyzed. Analysis included mean values, standard error and analysis of variance (ANOVA) using F-test. The data were analysed using conventional statistical procedures as described by Snedecor and Cocharan, (1989). Data are presented as Mean ± SE.

Result and Discussion

Table 1: Mean values of Liver and Renal function parameters in the serum of torsion affected and normal parturient buffaloes (Mean ± S.E.)

Parameters		Normal parturient buffaloes (Control) (n=5)	Torsion affected buffaloes (n=25)		
			At presentation	I hr after fetal delivery	24 hr after fetal delivery
Liver function test	SGOT (U/L)	63.73 ± 0.54a	87.86 ± 1.19c	82.67 ± 1.25b	79.71 ± 1.35b
	SGPT (U/L)	35.49 ± 0.69a	45.33 ± 0.71c	41.12 ± 0.92b	38.53 ± 1.06a
	Bilirubin (mg/dl)	0.92 ± 0.08a	1.93 ± 0.14b	1.59 ± 0.12b	1.21 ± 0.12a
Renal function test	Creatinine (mg/dl)	0.94 ± 0.01a	2.73 ± 0.26c	1.59 ± 0.1b	1.48 ± 0.06ab
	BUN (mg/dl)	18.38 ± 0.74a	28.02 ± 1.57c	25.01 ± 1.18bc	21.63 ± 1.32ab

Mean values within the same row with different superscriptions are significantly different ($P<0.01$)

The evaluation of liver and renal function tests performed on blood collected from buffaloes with uterine torsion (n=25) and normal parturient buffaloes (n=5) are presented in the table. The liver and kidney function parameters were significantly higher than the normal buffaloes and they gradually decreased and were found to be normal after detorsion and fetal delivery.

Normal parturition in bovines has negligible influence on the plasma enzymes (Schonfelder *et al.,* 2007; Hussein and Abd Ellah, 2008). SGOT, SGPT and Billirubin were recommended as part of a metabolic profile test to monitor the health status of the liver (Mullen, 1976; Bouda *et al.,* 1980; Lotthammer, 1982; Pearson, 1990).

In the present study, SGOT levels were found elevated at the time of presentation of buffaloes with uterine torsion (87.86 ± 1.19 U/L) compared to normal parturient buffaloes (63.73 ± 0.54 U/L). Similar elevated level of SGOT was also seen in previous findings in uterine torsion cases (Pattabiraman and Pandit, 1980; Prabhakaran *et al.,* 2006; Singh *et al.,* 2006; Schonfelder *et al.,* 2007; Hussein and Abd Ellah, 2008; Amin *et al.,* 2011). Significant increases in SGOT activities may be attributed to muscle exhaustion produced by strong abdominal contractions due to uterine torsion (Hussein and Abd Ellah, 2008) and are often a reflection of cellular destruction or diseases (Oliveira *et al.,* 1998; Hoeben *et al.,* 2000). Great muscular effort or damage results in leakage of such enzymes due to necrosis or damage of uterine cells (Coles, 1986; Malik, 1986; Kraft and Dürr, 2005). SGOT level decreased 24 hr after fetal delivery (79.71 ± 1.35 U/L). Similar findings were seen in previous studies (Singla *et al.,* 1992; Amer *et al.,* 2008). It was indicated that uterine torsion affects the liver of the animal due to endotoxins resulting from muscle damage (Farrag *et al.,* 1984).

In the present study, SGPT levels were found elevated at the time of presentation of uterine torsion affected buffaloes (45.33 ± 0.71U/L) compared to normal parturient buffaloes (35.49 ± 0.69 U/L). Similar elevated levels of SGPT were also seen in previous findings in uterine torsion cases (Bostedt, 1973; Singla *et al.,* 1992). Uterine hypoxia and increased release of catecholamines from the adrenal medulla associated with uterine torsion and its stress could be responsible for the significantly higher levels of SGPT, noticed in torsion affected buffaloes as compared to normal parturient buffaloes. This is also encountered in other stressful conditions causing the release of catecholamines from adrenal medulla (Altland and Highman, 1961) and tissue hypoxia which have been demonstrated to be responsible for increased circulating level of SGPT by increasing the permeability of cell membrane (Highman *et al.,* 1959; Highman and Altland, 1960). SGPT values decreased subsequently and found normal after 24 hr of fetal delivery (38.53 ± 1.06 U/L) which supports the previous findings (Prabhakaran *et al.,* 2006; Singh *et al.,* 2009). Results of the present study showed that there were elevated concentration of total serum billirubin in uterine torsion affected buffaloes (1.93 ± 0.14 mg/dl) compared to normal parturient buffaloes (0.92 ± 0.08 mg/dl). The possible causes may be attributed to stress on animals which

influenced the concentration of bilirubin in serum. Bilirubin level decreased subsequently in serum and found normal after 24 hr of fetal delivery (1.21 ± 0.12 mg/dl). Similar findings were seen in previous studies (Schonfelder *et al.,* 2007; Hussein and Abd Ellah, 2008).

The results of the present study showed that there were increased concentrations of serum creatinine in buffaloes with uterine torsion (2.73 ± 0.26 mg/dl) compared to normal parturient buffaloes (0.94 ± 0.01 mg/dl). Serum creatinine subsequently decreased after fetal delivery and found to near normal level after 24 hr of fetal delivery (1.48 ± 0.06 mg/dl). The present result supports the previous findings (Amer *et al.,* 2008; Singh *et al.,* 2009; Swelum *et al.,* 2012). The increased levels of serum creatinine could be related to stress conditions exerted on the affected buffaloes with concomitantly reduced blood flow to the kidneys and reproductive tract. At the same time, these results might be attributed to nephropathy resulting from toxic substances liberated from the dead fetus in some cases of uterine torsion (Arthur *et al.,* 1989).

Increased concentrations of blood urea nitrogen (BUN) in uterine torsion affected buffaloes (28.02 ± 1.57 mg/dl) compared to normal parturient buffaloes (18.38 ± 0.74 mg/dl) were recorded during the present study which decreased 24 hr after fetal delivery (21.63 ± 1.32 mg/dl) similar findings have been previously recorded in cattle and buffaloes (Deosi and Dhaliwal, 2004; Schonfelder *et al.,* 2007; Amer *et al.,* 2008; Singh *et al.,* 2009). The increased levels of BUN, in uterine torsion affected buffaloes, could be related to dehydration status, stress condition exerted on the affected buffaloes with concomitantly reduced blood flow to kidneys, and nephropathy resulted from toxic substances liberated from dead fetuses (Payne, 1987). In addition, it has been recorded that an elevation of BUN and creatinine might be due to concomitant breakdown of tissues during gluconeogenesis under effect of increased cortisol level (Payne, 1987).

Conclusion

Uterine torsion can cause serious outcomes in buffaloes. It seems that buffalo subjected to uterine torsion are associated with hepatic and renal dysfunction. The level of SGOT, SGPT, Bilirubin, Serum Creatinine and BUN can be used as an indicator for occurrence and prognosis of mechanical treatment of uterine torsion in buffaloes.

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