

XYLAZINE SEDATION: A GOOD HELP DURING ROLLING OF BUFFALOES FOR CORRECTION OF FRESH UTERINE TORSION

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ABSTRACT

Sixteen buffaloes suffering from uterine torsion were divided into two groups so as to monitor the level of stress in xylazine sedated detorsion without using plank and to compare it with Modified Schaffer's method. One group (group A; n=8) was subjected to ground rolling using plank (Modified Schaffer's method) and the second group (group B; n=8) was subjected to rolling without plank with prior administration of xylazine (@0.05 mg/kg b. wt., intravenously. Stress was assessed by estimating the activities of enzymatic antioxidants such as superoxide dismutase (SOD) and plasma cortisol level. There was a significant ($P<0.05$) increase in plasma cortisol level and marginal increase in erythrocytic SOD level after rolling as compared to before rolling in group A. In group B, mean plasma cortisol and erythrocytic SOD levels did not increase, rather marginally decreased after rolling as compared to before rolling. It is concluded that xylazine can be used during rolling in uncomplicated, light degree fresh cases of uterine torsion as compared to plank method.

Key words: Buffalo, cortisol, superoxide dismutase, uterine torsion, xylazine

Uterine torsion or rotation of the gravid horn around its longitudinal axis (Purohit *et al.*, 2011) inflicts heavy economic losses to farmers due to the death of the fetus, dam or both and also lead to reduced milk yield. Uterine torsion has been reported as one of serious cause of dystocia in buffaloes (Murty *et al.*, 1999; Nanda *et al.*, 2003; Amin *et al.*, 2011). The rolling of the buffalo by Modified Schaffer's method is the most popular method of correction (Noakes *et al.*, 2001). The act of dropping the buffalo suddenly on to the side of torsion may correct the condition (Roberts, 1986) but, in case of severe torsion the sudden falling of the buffalo during casting may cause uterine rupture. The process of parturition, though physiological, is a stressful event, however, abnormal parturition (dystocia) further adds stress to the normal process of calving (Nakao and Grunert, 1990). Estimating the activities of enzymatic antioxidants, such as superoxide dismutase (SOD) is used to evaluate oxidative stress (Kleczkowski *et al.*, 2003). Cortisol is a steroid hormone, more specifically a glucocorticoid, produced in response to stress. Its primary functions are to increase blood sugar through gluconeogenesis; suppress the immune system and aid in fat, protein and carbohydrate metabolism.

Xylazine is an alpha-2 agonists used in large animals for analgesia and sedation. This drug is generally regarded as a relatively safe agent in bovines (Doherty *et al.*, 1987). It also has muscle relaxing properties and this effect is based on inhibitions of the

intraneural transmission of impulses in the central nervous system (Dart, 1999). The principle pharmacological activities develop within three to five minutes following its intravenous administration (Perez *et al.*, 1994). When physical examination fails to yield a diagnosis or prognosis, then stress parameters might aid in establishing a prognosis and developing a therapeutic plan (Amin *et al.*, 2011). Therefore, the objectives of current study was to investigate the level of stress in xylazine sedated detorsion without using plank and compare it with Modified Schaffer's method.

MATERIALS AND METHODS

The present study was conducted on 16 buffaloes suffering from uterine torsion that were presented to the Teaching Veterinary Clinical Complex (TVCC), Hisar with the history of no progress in the parturition process and clinical symptoms such as anorexia, severe abdominal pain, restlessness (frequently gets up and down) as manifested by kicking of the abdomen with hind legs. The case history for each animal was recorded which included the age of the animal, parity, stage of gestation, duration of the condition, and previous intervention and its nature, and retained until analysis. The buffaloes were then subjected to general clinical examinations. Diagnosis of uterine torsion was confirmed by careful rectal and vaginal examinations after checking the broad ligament status.

These buffaloes were subdivided into two groups. One group (group A; n=8) was subjected to

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ground rolling using plank (Modified Schaffer's method) and the second group (group B; n=8) was subjected to rolling without plank with prior administration of xylazine at standard recommended doses (0.05 mg/kg b. wt., intravenously). From each group, blood samples were collected in sterilized and heparinized vials before and after rolling. Heparinized blood samples were centrifuged at 3000 rpm for 15 min; plasma was separated and stored at -20°C till analysis. After collection of plasma from sample, three washing of sediment RBC with normal saline solution were done. After third washing, distilled water was added to prepare hemolysate for estimation of biomarker of oxidative stress i.e. SOD. SOD was estimated as per the method described by Madesh and Balsubramaniam (1998). Plasma cortisol was estimated by implying solid phase ELISA immune assay technique using goat anti mouse IgG coated EIA kit supplied by Cayman Company, USA. Sample was diluted (1:10) and the procedure followed for assay was as suggested by manufacturer of the kit. The readings were taken using Multiscan-FC thermo scientific microplate reader. The data was analysed statistically by paired 't' test by software SPSS version 16.

RESULTS AND DISCUSSION

Mean concentration of plasma cortisol before and after rolling in groups A and B is depicted in Table 1. In group A, there was a significant ($P<0.05$) increase in plasma cortisol level after rolling compared to that before rolling indicating an increase in the stress level. Higher degree of anxiety, muscular activity, pain and excitement could have resulted in hyper stimulation of adrenals. Similar observations have also been recorded earlier by Ghuman (1995) in cases of uterine torsion affected buffaloes. The variation observed in the cortisol levels in different buffaloes in the present study may be attributed to the variation in sensitivity of the individual to stress. The high level of plasma cortisol was maintained even after rolling of the uterine torsion affected buffaloes. This may be due to the fact that there is higher degree of inflammation, cell membrane and

tissue damage, hemorrhage and subsequent infection (toxin secreted by dead fetus) in uterine torsion affected buffaloes. While in group B, mean plasma cortisol level did not increase, but marginally decreased after rolling in comparison to that of before rolling. As plank was not used in group B, there was no external pressure on animal body and subsequently less stress resulting in decline in cortisol level. This may also be due to the fact that xylazine is an alpha-2-adrenergic drug and its muscle relaxant effect is based on inhibitions of the intraneural transmission of impulses in the central nervous system (Dart, 1999). In the past, it has been observed that buffaloes subjected to injudicious rolling (>3 rolls) had least survival rate as compared to those where rolling was well planned (Dhaliwal *et al.*, 1991) and also due to excessive adrenal stimulation because of 1 to 2 extra rolls which resulted in slower decline in plasma cortisol during post-detorsion period (Ghuman *et al.*, 1997).

Mean concentration of erythrocytic SOD before and after rolling in both the groups are depicted in Table 1. In group A, there was non-significant increase in SOD activity after rolling and similar findings were also reported by Sathya *et al.* (2007). This might be due to various kinds of stressors which might increase lipid peroxidation (LPO) and SOD activity (Gaal *et al.*, 1993; Sun *et al.*, 1999). Hence, higher LPO levels in uterine torsion affected buffaloes after rolling could be attributed to higher SOD activity. While in group B, SOD level did not increase but, marginally decreased after rolling as compared to that of before rolling which may be due to release of stress because of the xylazine's sedative action.

Comparative observations on rolling in both groups are shown in Table 2. It was observed that rolling by pre-administration of xylazine without plank (group B) proved to be less stressful and painful to the animal and there was less struggling during rolling the animals compared to that of Modified Schaffer's method. It was

Table 1
Plasma cortisol and erythrocytic SOD concentration in different groups of buffaloes (Mean±SE)

Groups	Cortisol (ng/ml of blood)		SOD (units/ml of hemolysate)	
	Before rolling	After rolling	Before rolling	After rolling
A	16.86±3.13 ^a	25.93±2.73 ^b	139.76±10.72 ^a	142.81±9.26 ^a
B	24.77±1.51 ^a	20.58±2.30 ^a	168.28±13.70 ^a	147.48±15.78 ^a

Values with different superscripts (a & b) for a parameter differ significantly ($p<0.05$) within rows

Table 2
Comparative observations on rolling using plank (with Modified Schaffer's method) and rolling after sedation with xylazine without plank

Parameters	Animals rolled with Modified Schaffer's method	Animals rolled with pre-administration of xylazine without plank
Total cases	8	8
High degree (>180°)	6	5
Light degree (<180°)	2	3
One rolling correction	2	4
Two rolling correction	4	2
Three rolling correction	1	1
Caesarean section	1	1

also observed that comparatively less manpower was required when rolling was performed in buffaloes with prior administration of xylazine. From the findings of the present study, it may be concluded that xylazine can be used during rolling in uncomplicated, light degree fresh cases of uterine torsion to avoid undue struggling of buffalo which occurs during Modified Schaffer's method rolling.

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