

## Plasma cortisol concentrations in calves delivered from uterine torsion affected buffaloes

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### ABSTRACT

A study on 65 buffaloes having uterine torsion was conducted to estimate the plasma cortisol concentration in 6 live calves delivered from them. Two calves delivered normally after induction of parturition were also included for comparison. Plasma cortisol concentration in calves delivered from dams after detorsion of uterus and manipulations were non-significantly higher than normally delivered calves. Number of rolls required for detorsion of uterus also increased plasma cortisol concentration in calves. It thus appeared that estimation of plasma cortisol concentration may be a good prognostic indicator for fetal survival following handling of dystocia.

**Key words:** Buffalo, Dystocia, Fetal cortisol, Uterine torsion.

Pregnancy and parturition are stressful events. Any complication at parturition jeopardizes the fetal survival and may cause death of the dam as well, due to shock. Delay in expert help in dystocias, stresses the fetal calf that leads to severe metabolic alterations thus reducing its survival (Sloss and Dufty, 1980).

Uterine torsion is a condition that develops during late pregnancy or at the start of the process of calving. Due to occlusion of the blood supply to the uterus, often the fetus dies, however, it may survive if the degree of rotation is less or the problem is handled quickly. Treatment involves detorsion of uterus by rolling followed by vaginal delivery or cesarean section. These obstetrical procedures are highly stressful that may also stress the fetus, if alive. Prabhakar *et. al.*, (1994) found only 13.98 per cent live calves delivered in buffaloes with uterine torsion. The purpose of the present study was to evaluate the plasma cortisol concentrations, the indicator of stress,

in fetuses delivered live from uterine torsion affected buffaloes after detorsion of uterus.

65 buffaloes with uterine torsion presented for treatment at erstwhile Veterinary Clinics, PAU, Ludhiana during the period from July 2004 to March 2005 were taken. Following complete anamnesis, and through vaginal and rectal examination, it was decided to detort the uterus by Sharma's method of detorsion (Singh and Nanda, 1996). Mutations were done to correct the malposture and deliver the fetus after detorsion of uterus immediately or after dilation of the cervix. Six live fetuses delivered during the procedure were blood sampled by jugular vein puncture to estimate the plasma cortisol concentration. Two other live fetuses delivered from buffaloes, induced to parturition by prostaglandin administration (Vetmate, 500 µg, im) were also sampled for comparison. Single person applied the force to effect fetal extraction in both the groups. The plasma cortisol concentrations were estimated by the method of Parkash and Madan (1984). Student's 't' test was applied to check the significant variations in plasma cortisol concentration (Singh *et. al.*, 1991).

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Plasma cortisol concentration estimation is the accepted method to evaluate the intensity of stress (Hoyer *et al.*, 1990). The average plasma cortisol concentration in calves delivered live after detorsion of uterus and mild vaginal manipulation in buffaloes with uterine torsion was  $30.07 \pm 5.75$  ng/ml. The levels were non-significantly higher than the levels observed in the calves delivered after induction of parturition ( $24.0 \pm 7.07$  ng/ml). The cortisol concentrations were highest in calves subjected to higher degree of traction (18.0 to 48 ng/ml) than to have delivered with mild manipulations (9.0 to 32.0 ng/ml). The calves delivered from the dams, who were rolled thrice for detorsion of uterus had  $34.33 \pm 8.76$  ng/ml plasma cortisol when compared to  $23.66 \pm 7.36$  ng/ml recorded in calves delivered after the detorsion of uterus in a single roll.

Parturition is a stressful event that involves many physical and behavioural changes in the dam and perceived as stressful (Nakao and Grunert, 1990). Development of dystocia and obstetrical procedures adopted to deliver the fetus further add to already existing stress (Prabhakar *et al.*, 2002). The fetus in utero may also get stressed owing to these obstetrical procedures. The cortisol levels might, therefore, be higher in calves delivered from buffaloes subjected to detorsion of uterus as compared to those delivered after induction of parturition, thus showing higher degree of stress in them. The data of present observation and earlier observations suggested that rolling of dam and pulling to deliver for longer duration stressed the calves and higher stress has been found to lower the survival rate and reduced adaptation to the environment. The data in terms of fetal cortisol concentration after different rolls needed for uterine detorsion indicated that the stress of rolling of the dam is also reflected on the fetus. Higher cortisol in such calves could be reflective of higher adrenal activity; reduced steroid metabolism or

transplacental transfer of maternal steroids (Hoyer *et al.*, 1990). All the eight live calves delivered in the present study, survived the initial stress and were discharged along with the dam.

Cortisol estimation in calves thus, may be a good prognostic indicator to gauge the future survivability and growth of the calves.

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