

## Effect of Vitamin C Administration on Serum $\beta$ -Carotene Concentration in Dystocia Affected Buffaloes Followed by Caesarean Section

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### ABSTRACT

*Dystocia has been considered as a stressful condition that requires immediate attention of a veterinary practitioner because it put the animals in life threatening situation. Role of vitamins as antioxidants has been well documented in the literature. Serum  $\beta$ -carotene estimation following administration of vitamin C in dystocia affected buffaloes revealed that vitamin C administration has no effect on its circulating concentration.*

**Key words:** Buffaloes, Dystocia, Caesarean section, Vitamin C and  $\beta$ -carotene.

### INTRODUCTION

Dystocia means difficult birth and has been considered an event which requires immediate attention of a veterinary practitioner because of its impact on survival rate of dam and calf, subsequent fertility of dam and economics of animal rearing. The overall incidence of dystocia in buffaloes has been reported to vary from 1-12.6% and the percentage of maternal and fetal dystocia out of 112 cases of dystocia has been reported to be 59.82% and 40.17% in buffaloes<sup>1</sup>. Dystocia has been considered as a more stressful event in comparison to eutocia as evident by higher cortisol concentration in

dystocia affected buffaloes on calving day<sup>2</sup> and thus it makes buffaloes susceptible to oxidative stress.

Vitamin C is the major water-soluble antioxidant and acts as the first defense against free radicals and  $\beta$ -carotene acts as a weak antioxidant in solution<sup>3</sup>. Civelek<sup>4</sup> reported no significant difference between plasma vitamin C and  $\beta$ -carotene levels in dystocia and control cow heifers whereas Yildiz<sup>5</sup> reported lower concentrations of plasma vitamin A and  $\beta$ -carotene in dystocia group of cows compared to normal parturition group.

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Vitamins can interact with each other's either synergistically or antagonistically to increase each other's activity and to decrease their effectiveness respectively in the body. Vitamin C synergistic action with Vitamin E is well documented in literature as vitamin C can regenerate vitamin E in cell membranes in combination with glutathione or compounds capable of donating reducing equivalent<sup>6</sup>. Vitamin C has an antagonistic relationship with vitamin B<sub>12</sub> as it enhances iron absorption which leads to deficiency of cobalt which is essential for vitamin B<sub>12</sub> synthesis<sup>7</sup>. Therefore, present study was designed to explicit the effects of vitamin C administration on serum  $\beta$ -Carotene concentration in dystocia affected buffaloes which underwent caesarean section as treatment of dystocia.

#### MATERIAL AND METHODS

Twenty buffaloes were divided into two groups (dystocia control and dystocia treatment group). Each group was comprised of ten dystocia affected buffaloes subjected to caesarean section. All the animals received routine supportive therapy consisting of parenteral antibiotics, dexamethasone, fluid therapy, haemostatic, vitamin B complex, antihistaminic, Mifex, NSAIDS and intrauterine antiseptics post-delivery of the fetus. The buffaloes of dystocia treatment group were additionally given vitamin C 30 ml (CMAC; containing ascorbic acid 250mg/ml, Macnor Life sciences Pvt. Ltd.) intravenously prior to caesarean and then at 24 hours interval post caesarean once. Jugular venous blood samples were collected in plain vials without anticoagulant prior to caesarean and 2, 24 and 48 hours after caesarean. An aliquot of sera stored at -20<sup>0</sup> C was used for  $\beta$ -carotene estimation.

Serum  $\beta$ -carotene was estimated by butylated hydroxytoluene (BHT) method as described by Suzuki and Katoh<sup>8</sup>. One ml of serum was pipette into a test tube around which an aluminum foil was wrapped. To the serum 1 ml of ethanol containing butylated hydroxytoluene (20 $\mu$ g/ml) was added. Then 3 ml of hexane was added to the tube. The

mixture was shaken mechanically for 10 minutes. Then the tubes were centrifuged at 800  $\times$  g for 10 minutes. After centrifugation, 2 ml hexane extract (upper layer) was pipetted out. The absorbance of this extract was measured at 453 nm against hexane as blank.

The calculations were carried out as follows:  
 $\beta$ - carotene ( $\mu$ g/dl) = Absorbance at 453 nm/0.00258

#### Statistical analysis

The concentration of  $\beta$ -carotene is presented as Mean  $\pm$  SE. The differences of  $\beta$ -carotene concentration between different time intervals were analyzed through Duncans Multiple Range test using SPSS software 16.0 for windows. The values differed <5% (P<0.05) was considered as statistical significant.

#### RESULTS AND DISCUSSION

Serum  $\beta$ -carotene exhibited individual variation among different animals but did not vary significantly between sampling intervals in any of the groups of dystocia affected buffaloes (Table 1). Highest concentration of beta carotene was recorded at 24 hours (19.8 $\pm$ 1.74  $\mu$ g/dl) in control and at 48 hours (19.4 $\pm$ 1.47  $\mu$ g/dl) in treatment group post caesarean. There was no significant difference in serum  $\beta$ -carotene concentration between vitamin C treated and untreated buffaloes. There is no parallel report in the available literature to confirm or repute our findings. However, serum  $\beta$ -carotene range obtained in the study is similar with finding of Civelek<sup>4</sup> in case of cows affected with dystocia. Bisla<sup>9</sup> observed that ascorbic acid when given @ 7.5 gm in one liter dextrose isotonic saline intravenously just after laprorumenotomy, prior to diaphragmatic herniorrhaphy; 2 hours and 48 hours post diaphragmatic herniorrhaphy reduces the oxidative stress factor by 24% at 48 hours post diaphragmatic herniorrhaphy. Similarly, Kumar<sup>10</sup> also reported that treatment with vitamin C reduces plasma cortisol concentration to 52.14% in comparison to untreated group to 38.63% in dystocia affected buffaloes which underwent caesarean section.

**Table 1: Serum  $\beta$ -carotene concentration ( $\mu\text{g}/\text{dl}$ ) following administration of exogenous vitamin C in dystocia affected buffaloes (Mean  $\pm$  SE)**

Groups	Concentration of serum $\beta$ -carotene at various intervals ( $\mu\text{g}/\text{dl}$ )			
	0 hour	2 hours	24 hours	48 hours
Control group(n=10)	17.5 $\pm$ 1.68	18.6 $\pm$ 1.07	19.8 $\pm$ 1.74	18.24 $\pm$ 1.42
Treatment group(n=10)	18 $\pm$ 1.73	19.2 $\pm$ 1.67	17.7 $\pm$ 1.70	19.4 $\pm$ 1.47

### CONCLUSION

Vitamin C administration in dystocia affected buffaloes had no influence on circulating serum  $\beta$ -carotene concentration.

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