Original Research

Effect of Vitamin E and Selenium on Haemato-Biochemical Constituents in Dystocia Affected Marathwadi Buffaloes

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Abstract

The present study aimed to evaluate the changes in the haemato-biochemical constituents in dystocia affected Marathwadi buffaloes. Total 30 buffaloes were presented to Teaching Veterinary Clinical Complex, Udgir. Buffaloes presented at TVCC were divided into 5 equal groups. The buffalo in group I (n= 6) normally parturated, in group II (n= 6) dystocia due to uterine torsion kept as control, in group III (n= 6) dystocia due to uterine torsion were given vitamin E and Se intramuscularly prior to detorsion kept as torsion treatment. Buffaloes in group IV (n= 6) dystocia due to incomplete cervical dilatation were not given Vitamin E and Se and served as control. And in group V dystocia due to incomplete cervical dilatation (n= 6) were given vitamin E and Se intramuscularly before initiation of treatment. Mean Hb concentration significantly increased 48 hrs after parturition as compared to before parturition in all the groups. Mean PCV concentration significantly increased (P<0.01) 48 hrs after parturition as compared to before parturition in all the five groups. Mean total protein concentration significantly decreased (P<0.05) 48 hrs after parturition as compared to before parturition in all the groups. The mean albumin concentration in Group I, III, IV and V on 48 hrs after parturition decreased significantly (P<0.01) as compared to before parturition.

Key words: Dystocia, Haemato-Biochemical Buffaloes, Vitamin E and Selenium

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Introduction

Dystocia is one of the most important obstetrical conditions which develops when the birth process is stuck by some physical hurdle or functional defect (Srinivas *et al.,* 2007). Amongst all domestic animals, cattle and buffalo are considered the species in which the incidence of dystocia appears to be highest. The incidence of dystocia is considered to be higher in river than in swamp buffalo and also in primipara than in pleuripara (Jainudeen, 1986). The incidence of fetal monstrosities is higher in the buffalo (Purohit *et al.,* 2011). Sex of calf has significant effect on difficulty scores. Male calves are born with the most difficulty (Freeman, 1984). Frazer *et al.* (1996) suggested that uterine torsion in cows is ultimately of fetal origin, as it tended to be associated with oversized male fetuses. Several authors have supported the idea that active movements by a large fetus during late gestation and early stage of labor might precipitate rotation of the unstable uterus (Noakes *et al.,* 2009). Blood cellular constituents of buffaloes affected with uterine torsion shows normocytic normochromic anaemia which is result of accumulation of metabolic waste product or deficiency of raw materials during pregnancy which are needed for cell production leading to inhibition of erythropoiesis (Abdel-Ghaffar and Abu-El-Roos, 2002). This type of anemia was manifested by significant decrease in the RBC count, Hb content PCV% which may attributed to the increased plasma volume during pregnancy (Barakat, 1982).

Materials and Methods

Present study was carried out on a 30 clinical cases in Marathwadi buffaloes presented to the Teaching Veterinary Clinical Complex Udgir, during the period of 2017-2018. Before attempting relive dystocia, a complete history of case with regard to stage of gestation, duration of problem and previous handling of case was determined on the basis of clinical examination. Torsion was confirmed through per-vaginal and per-rectal examination. All the affected animals were subjected to rolling by using Schaffer's method and in all the animals uterus was successfully detorted. After detorsion, the fetus was removed per vaginally by manual manipulations. Blood samples were collected before parturition and 48 hrs after parturition. Treatment protocol included six buffaloes of dystocia due to uterine torsion were administered vitamin E-selenium (10 ml; Inj. Repronol, Cadila; containing tocopherol acetate 50 mg and sodium selenite 1.5 mg/ml) @ 1mg/50kg body weight intramuscularly before obstetrical treatment and 6 buffaloes serve as a control. All the serum samples were analyzed for the total protein, albumin, and globulin using standard analytical kits by an Evolution 3000 semi-auto biochemical analyzer.

Sampling Schedule

Jugular venous blood samples were collected in heparinized vials. Sample was collected before parturition, and 48 hours after parturition for Haemato-biochemical estimation. All the samples were carried to the laboratory on ice and centrifuged. The supernatant plasma was frozen at −20 °C until analyzed.

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Assay Procedure

Haemoglobin

Haemoglobin was estimated by using Sahli's haemometer method (Sastry, 1983) and expressed in g/dl.

Packed Cell Volume

Packed cell volume was estimated by using Microhaematocrit method (Jain, 1986) and expressed in percentage.

Total Protein

Serum total protein was estimated by Biuret method (Doumas, 1975) using standard kits procured from ChemCHEK, Agappe diagnostic ltd., Kerala with the help of Semi Auto Biochemistry Analyzer (EVOLUTION 3000).

Albumin

Serum albumin was estimated by BCG method (Doumas and Watson, 1971) using standard kits procured from ChemCHEK, Agappe diagnostic ltd., Kerala with the help of Semi Auto Biochemistry Analyzer (EVOLUTION 3000).

Globulin

Serum globulin concentration was estimated by subtracting albumin concentration from total protein concentration (Doumas and Watson, 1971).

Statistical Analysis

Haemato-Biochemical parameters before and 48 hrs after parturition was analysed using student's paired t-test. Analyses were performed using the Statistical Package for Social Science software (SPSS -21.0). $P < 0.01$ and $P < 0.05$ were considered statistically significant.

Results and Discussion

Hemoglobin

Mean Hb concentration in Group I, II, III, IV and group V are presented in Table 1. Mean Hb concentration significantly increased 48 hrs after parturition as compared to before parturition in all the groups. The mean Hb concentration in group III and group V treated with Vit. E and Se was significantly higher ($P<0.01$) as compared to group II and Group IV.

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Table 1: Haemato biochemical parameters before and 48 hrs after parturition in dystocia affected buffaloes (Mean ± SEM)

S. No.	Group	Hb (g/dl)		PCV (%)		Total Protein (g/dl)		Albumin (g/dl)		Globulin (g/dl)	
		BP*	AP**	BP*	AP**	BP*	AP**	BP*	AP**	BP*	AP**
1	Group I (Eutocia)	11.47 ±0.26^{AR}	12.49 ±0.20^{AR}	34.72 ±1.17^{AQ}	38.14 ±0.66^{BR}	7.51 ±0.10^{BR}	7.28 ±0.10^{AQ}	4.45 ±0.09^{AQ}	4.26 ±0.09^{BR}	3.06 ±0.03^{AP}	3.02 ±0.04 ^{AR}
2	Group II (torsion control)	10.08 ±0.37^{AQ}	11.09 ±0.19^{AQ}	30.99 ±1.00^{AQ}	33.88 ±0.57^{BPQ}	7.03 ±0.10^{APQ}	6.83 ±0.09^{AP}	4.00 ±0.05^{AP}	3.81 ±0.11^{APQ}	3.03 ±0.06^{AP}	3.02 ±0.07^{AR}
3	Group III (torsion treatment)	9.99 ±0.44^{APQ}	11.69 ±0.33^{BQR}	31.45 ±1.24^{AQ}	33.63 ±1.59^{BPQ}	7.28 ±0.07^{AQR}	6.96 ±0.10^{APQ}	4.21 ±0.09^{APQ}	4.00 ±0.10^{BQR}	3.07 ±0.04^{AP}	2.96 ±0.05^{BR}
4	Group IV (ICD control)	8.90 ±0.36^{AP}	9.59 ±0.34^{BP}	27.39 ±1.23^{AP}	30.74 ±0.86^{AP}	6.78 ±0.08^{AP}	6.86 ±0.16^{AP}	4.00 ±0.06^{AP}	3.60 ±0.02^{BP}	2.78 ±0.06^{AP}	3.26 ±0.04^{BP}
5	Group V (ICD treatment)	10.41 ±0.50^{AQR}	11.78 ±0.43^{AQR}	32.26 ±1.32^{AQ}	35.89 ±0.18^{AQR}	7.18 ±0.12^{AQ}	7.30 ±0.11^{AQ}	4.35 ±0.08^{AQ}	4.15 ±0.08^{BR}	2.83 ±0.06^{AP}	3.15 ±0.03^{BQ}

BP – Before Parturition, AP** – 48 hrs after parturition; Different superscript within row (A B) and within column (PQR) for respective parameter differ significantly at (P<0.01) and (P<0.05).*

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These finding for increased Hb levels after detorsion are in agreement with Prabhakaran *et al.* (2006) Amer and Hashem, (2008) reported decreased Hb levels in dystocia affected animals which may be due to accumulation of metabolic waste products or relatively large loss of blood during abnormal parturition or deficiency of the raw materials during pregnancy which were needed for cell production leading to inhibition of erythropoiesis. Erythrocytes are relatively fragile in torsion affected animals and gets stabilize by 18 hours post detorsion due to alleviation of stress of torsion. The post parturition elevation in Hb could also be attributed to increase in plasma volume during pregnancy or due to the relatively large loss of blood during uterine torsion (Purohit and Gaur, 2014).

Packed Cell Volume (PCV)

Mean PCV concentration significantly increased ($P<0.01$) 48 hrs after parturition as compared to before parturition in all the groups. The mean PCV value in group II and III before and 48 hours after parturition was do not differ significantly. However, the mean PCV values in group V treated with Vit. E and Se was significantly higher ($P<0.05$) before and 48 hours after parturition as compared to group IV. These finding for increased PCV levels after detorsion are in agreement with Prabhakaran *et al.* (2006) and Dhindsa *et al.* (2008). Uterine torsion affected buffaloes suffer from normocytic normochromic anaemia. This change in the PCV is probably due to accumulation of metabolic waste products or relatively large loss of blood during abnormal parturition (Purohit and Gaur, 2014; Karthik *et al.*, 2015).

Total Protein

Mean total protein concentration was higher before parturition and decreased non-significantly 48 hrs after parturition in groups (II, III, IV and V). However, mean total protein value in group I decreased significantly ($P < 0.01$) 48 hours after parturition as compared to before parturition. The mean total protein concentration in group III and group V treated with Vit. E and Se were significantly higher as compared to group II and Group IV. The decrease in total protein as the animal approaches parturition may be due to result of fluid loss at birth (Kanekeo *et al.*1997). Prabhakar *et al.* (2000) and Arora *et al.* (2013) reported lower concentration of plasma protein in dystocia affected cows as compared to normally calving cows. Marginally lower levels of total protein in buffalo suffering from dystocia as compared to eutocia buffaloes, during immediate postpartum period were due to a diminished in protein synthesis as a consequence of a higher level of plasma cortisol (Furguson and Hoenig, 2001). Serum total protein concentration was significantly lower ($p<0.05$) in the buffaloes that suffered from uterine torsion as compared to normally parturated animals (Group I – Eutocia). Decline in total protein level has previously been reported in uterine torsion affected buffaloes (Amer and Hashem, 2008). However, findings for decrease in total protein

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concentration 48 hrs after parturition as compared to before parturition was earlier reported by Pattabiraman and Pandit (1980) in torsion affected buffaloes.

Albumin

The mean albumin concentration in Group I, III, IV and V on 48 hrs after parturition decreased significantly ($P<0.01$) as compared to before parturition Table1. These findings for decrease in albumin concentration before and 48 hrs after parturition is in agreement with earlier report of Nigel *et al*. (1992); Kaur and Singh, (1993); Amer *et al*. (2008). The decrease in albumin concentration as the animal approaches to the calving may be due to physiological oedema occurring at the time parturition or as a result of bloody fluid loss during calving. Postpartum decrease in albumin concentration may be due to transfer of protein into colostrum (Kanekeo *et al*., 1997). These findings for decrease in albumin concentration are not in agreement with Bademkiran *et al*. (2008) who reported no difference between normally calved and dystocia affected cows. Sathya *et al*. (2005) reported the protein level in dystocia affected buffaloes decreased non-significantly from day 0 to 1. Increased oxidative damages generated during parturition disturb the lipid-protein-interactions and block the protein dependent transport mechanisms, thereby resulting in depletion of protein content (Yokus *et al.*, 2007).

Globulin

Mean globulin concentration significantly differed on 48 hrs after parturition as compared to before parturition in Group III, IV and V while it non-significantly differed in group I and II (Table 1). Mean globulin concentration was significantly higher in Group IV and V while there is no significant difference between Group I, II and III. Mean globulin concentration before parturition does not differ significantly between groups. Similarly, mean globulin concentration 48 hrs after parturition do not differ significantly between Group I, II and III. However, there was significant difference between Group IV and V treated with Vit. E and Se. These findings are agreement with Amer and Hashem (2007) and Amer and Hashem, (2008) reported the globulin concentration were non-significantly differ on before detorsion, after detorsion, immediately after birth and 24 hrs after birth in torsion affected buffaloes. Plasma globulin concentration there was no significant changes in dystocia affected buffaloes before and after obstetrical treatment detected respectively (Singh, 2009).

Conclusion

In the present study author concludes that mean Hb and PCV concentration significantly increase 48 hrs after parturition as compared to before parturition. The Hb, PCV, total protein and albumin concentration in torsion treatment and ICD treatment group were significantly higher at 48 hrs after parturition as

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compared to control groups which is suggestive of beneficial role of Vit E and Se supplementation on the haemato- biochemical parameters in dystocia affected buffaloes.

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