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Haematological changes following maternal and fetal dystocia of graded Murrah buffaloes

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Abstract

The present study was undertaken to evaluate the changes in haematological status in relation to maternal and fetal dystocia of Graded Murrah buffaloes. A total of 43 buffaloes were divided into three groups, maternal dystocia (comprising uterine torsion) (n=25), fetal dystocia (n=10) and eutocia (normal parturition) (n=8) as healthy controls. Blood samples were collected at 0 hrs (before handling) and 24 hrs of treatment in both maternal and fetal dystocia affected buffaloes, whereas blood from normally calved buffaloes were collected within 1 hour of parturition (0 hrs) and 24 hours after calving. Results revealed that there were neutrophilia with lymphopenia was recorded in dystocia affected buffaloes when compared to eutocia group, while other parameters like haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leucocyte count (TLC) did not exhibit significant variations among the three groups of buffaloes. In conclusion, the levels of haematological parameters like TLC, neutrophil and lymphocyte count could be used as an indicator for severity of the condition and prognosis of both maternal and fetal dystocia affected buffaloes.

Keywords: buffalo; dystocia, haemogram, prognosis, uterine torsion

Introduction

Factors such as duration of straining, previous attempts in correction and severity of the condition either due to fetal or maternal causes influence the outcome of the condition [1, 2]. In few instances, the failure to relieve dystocia could be attributed to oversize of the fetus, difficult maldisposition and adhesion in uterine torsion. In uterine torsion the prognosis of the dam with conventional treatment depends upon many factors like site and degree of torsion followed by duration of the condition. When physical methods of examination fail to suggest the condition of the animal, haemogram may be used to determine the condition of the animal before and after the correction of dystocia. Haemogram status could predict the clinical condition of the dystocia affected animal and establish the survivability as prognosis to adopt a desirable therapeutic plan [1, 3, 2]. The present study recorded different clinically important haematological parameters in both maternal and fetal dystocia affected Graded Murrah buffaloes belonging to coastal Andhra Pradesh.

Materials and Methods

The present study was conducted in Graded Murrah buffaloes which were presented to the large animal obstetrical unit, Department of Veterinary Gynaecology and Obstetrics, NTR College of Veterinary Science, Gannavaram, Andhra Pradesh during the period from September 2017 to August 2018; A total of 43 buffaloes of different parity and were divided into three groups, maternal dystocia (comprising uterine torsion) (n=25), fetal dystocia (n=10) and eutocia (Normal parturition) (n=8) as healthy controls. Blood from normally calved buffaloes were collected (using EDTA vacutainers) within 1 hour of parturition (0 hrs) and 24 hours after calving. While, from maternal and fetal dystocia affected buffaloes samples were collected just before handling of dystocia (0 hrs) and 24 hours after manual delivery.

Whole blood samples were analysed 3 hrs after blood collection for estimation of Haemoglobin (Hb), Total erythrocyte count (TEC), Total leucocytes count (TLC), Neutrophils and Lymphocytes count as per the standard methods suggested by Jain (1986). The statistical analysis of the data was done as per the procedures described by Snedecor and Cochran (1994) [4].

Results and Discussion

Changes in levels of haematological parameters in blood are shown in Tables 1. Any changes in the haematological parameters seemed to indicate the dynamic changes in cellular metabolism occurring due to maternal and fetal dystocia.

The mean Hb concentration was within the normal range in both maternal and fetal dystocia affected and eutocia buffaloes as reported in the earlier study of Yıldız *et al.* (2011) [5]. The present study recorded higher level of Hb in maternal dystocia when compared to fetal dystocia, while no significance variation in Hb level with eutocia buffaloes. Significant ($P<0.05$) increase in Hb levels in all groups between 0 hrs and 24 hrs (Table 1). The results of the present investigation are similar to the study of Ali *et al.* (2011) and Abd Ellah *et al.* (2014) [6, 7] who also reported no significant differences in the Hb concentration between maternal dystocia and normal calving buffaloes. The present result is in contrary with the findings of Prabhakaran *et al.* (2006), Amer and Hashem (2008) and Khan (2012) [8, 9, 10] who reported significantly higher haemoglobin levels in fetal dystocia than maternal dystocia affected buffaloes. The variations in the levels of haemoglobin in the present study might be due to hydration status of the dam, loss of fluids from the degenerated blood vessels of uterus, reduced feed and water intake, which culminated to increased haemoconcentration [6]. The mean PCV concentration was significantly ($P<0.05$) decreased in fetal dystocia affected buffaloes than those of maternal dystocia and normally calved buffaloes at 0 hrs, while no significance variation was observed between groups at 24 hrs. Further, a significant ($P<0.01$) increase of PCV level was observed in fetal dystocia than maternal and eutocia buffaloes at between 0 hrs and 24 hrs (Table 1). These findings were an agreement with earlier reports of Karthick *et al.* (2016); Naik (2016) and Nagaraju (2018) [11, 12, 13]. In the present study, buffaloes that were presented to the obstetrical unit with a history of dystocia had moderate to severe degrees of dehydration, which might be reason for variations in PCV concentration as opined by Ghuman (2010) [14]. The variations in the levels of PCV in the present study might be due to hydration status of the dam, loss of fluids from the degenerated blood vessels of the uterus, reduced feed and water intake, which culminated to increased haemoconcentration [15].

The mean TEC counts showed no significant variation among both dystocia affected and eutocia buffaloes at both 0 hrs and 24 hrs, while significant ($P<0.01$) increase in TEC count in fetal and eutocia when compared to maternal dystocia buffaloes at between 0 hrs and 24 hrs (Table 1). The present investigation showed that mean TEC count was within the normal range in maternal, fetal dystocia and eutocia buffaloes as reported in the previous studies of Amer *et al.* (2008) and Yıldız *et al.* (2011) [1, 5]. These findings are also similar to the observations of previous findings of Ali *et al.* (2011), Yıldız *et al.* (2011) and Ali *et al.* (2016) [6, 5, 15]. On the contrary, Amer and Hashem (2008) [1] recorded significantly lower TEC counts in buffaloes with maternal dystocia as compared to fetal dystocia buffaloes. The present observations suggest that stress of either maternal or fetal dystocia have no significant influence on the mean TEC values in buffaloes as reported by Naik, (2016) and Nagaraju, (2018) [12, 13].

The mean TLC count was significantly ($P<0.05$) increased in fetal dystocia affected than maternal dystocia and eutocia buffaloes at both before and after 24 hrs of handling. The significant increase in the TLC counts in fetal dystocia

affected buffaloes was attributed to stress of excessive manipulations for relieving the dystocia with different obstetrical operations as reported by Phogat *et al.* (1991) [16]. Further, a significant decrease in the mean TLC counts in all groups at 24 hrs compared to 0 hrs (Table 1). In one study, Amer and Hashem (2008) [9] recorded mean total leukocyte count in buffaloes with uterine torsion and normal calving at before and after 24 hrs of treatment, they revealed leukocytosis with neutrophilia when compared to the eutocia animals. They suggested that leucocytic changes might be attributed to the stress exerted on the dystocia affected buffaloes which may be true in the present study also. On the divergent, studies of Ali *et al.* (2011) and Yıldız *et al.* (2011) [6, 5] recorded no/negligible variations in the mean TLC counts in buffaloes with uterine torsion and cows with fetal dystocia as compared to the eutocia animals. In the present study, variations in TLC counts might be due to unhygienic/unscientific approaches adopted during handling of dystocia might have increased the inflammatory process in the genital tract and further, delayed duration of dystocia also contributed for increased influx of inflammatory cells into the systemic circulation as opined by Jens and Ove (2006) [17].

The mean neutrophils count was significantly ($P<0.05$) higher in maternal dystocia as compared to fetal dystocia and eutocia buffaloes at both 0 hrs and 24 hrs (Table 1). The results of the present investigation are in conformity with the reports of Amer and Hashem (2008) [9] in Murrah buffaloes with uterine torsion and of Yıldız *et al.* (2011) [5] in cows with fetal dystocia where significant increase in the mean neutrophil count was observed as compared to the eutocia buffaloes and cows. It was opined that the increase in the mean neutrophil count might be due to increased plasma cortisol level because of excessive straining and stress of dystocia [1]. On the contrary, Ali *et al.* (2011) [6] found no significant difference in the mean neutrophil count between maternal dystocia and eutocia buffaloes. Variations in the neutrophil count in the present study might be due to increase in duration and severity of the condition which might have culminated to stress. Further, increase in stress also triggered the migration of inflammatory cells towards the site of inflammation as reported by Jens and Ove (2006) [17].

The mean lymphocyte count was significantly ($P<0.05$) lower in maternal dystocia and fetal dystocia when compared to eutocia buffaloes (Table 1). These observations were in accordance with findings of Amer *et al.* (2008); Ali *et al.* (2011); Naik (2016) and Nagaraju (2018) [1, 6, 12, 13]. It was concluded from the present study that dystocia affected buffaloes endured from normocytic normochromic anaemia associated with changes in the leucogram i.e., leucocytosis.

Conclusion

Further, it was concluded that the levels of haematological parameters like TLC, neutrophil and lymphocyte count could be used as an indicator for severity of the condition and prognosis of both maternal and fetal dystocia affected buffaloes. The present study could be undertaken in more number of dystocia affected buffaloes with various maternal and fetal causes so as to predict the prognosis more precisely. Thus the plan of treatment must be aimed to undertake rolling of the dam as early as possible in cases of uterine torsion, while decide upon the mode of obstetrical operation either mutation, forced traction or fetotomy in fetal dystocia or to salvage the animal in delayed cases that are presented > 36 hours to prevent financial losses to the farmer.

Table 1: Haematological parameters (mean±SE) in Graded Murrah Buffaloes at 0 hrs and 24 hrs: between 0 hrs & 24 hrs

S. No	Haematological parameters	Status of calving	Before handling (0 hrs)	After handling (24 hrs)
1	Haemoglobin (gm/dl)	Maternal dystocia (Group I)	10.92±0.26 ^{ab}	10.56±0.21 ^a
		Fetal dystocia (Group II)	9.33±0.21 ^{**a}	10.49±0.13 ^a
		Eutocia (Group III)	10.43±0.21 ^{**ab}	10.43±0.14 ^a
2	Packed Cell Volume (%)	Maternal dystocia (Group I)	38.12±0.71 ^{ab}	40.24±2.48 ^a
		Fetal dystocia (Group II)	35.30±0.96 ^{**a}	42.00±0.94 ^a
		Eutocia (Group III)	39.00±0.70 ^b	38.00±1.14 ^a
3	Total Erythrocyte Count (10 ⁶ /µl)	Maternal dystocia (Group I)	6.42 ± 0.08 ^a	6.45±0.07 ^a
		Fetal dystocia (Group II)	6.22±0.04 ^{**a}	6.50±0.39 ^a
		Eutocia (Group III)	6.19±0.04 ^{**a}	6.41±0.05 ^a
4	Total Leucocyte Count (10 ³ /µl)	Maternal dystocia (Group I)	7.61±0.16 ^{**a}	7.21±0.16 ^a
		Fetal dystocia (Group II)	10.09±0.04 ^{*c}	9.33±0.25 ^c
		Eutocia (Group III)	8.66±0.10 ^{**b}	8.26±0.07 ^b
5	Neutrophils (%)	Maternal dystocia (Group I)	51.16±0.72 ^{**c}	50.12±0.68 ^b
		Fetal dystocia (Group II)	46.30±0.47 ^{*b}	49.10±0.84 ^b
		Eutocia (Group III)	40.87±0.78 ^a	41.75±0.88 ^a
6	Lymphocytes (%)	Maternal dystocia (Group I)	46.64±0.72 ^a	47.08±0.66 ^a
		Fetal dystocia (Group II)	50.00±0.97 ^{ab}	49.90±0.86 ^a
		Eutocia (Group III)	52.12±1.31 ^b	50.25±1.37 ^a

Group with superscripts (*) in a row differed significantly ($P<0.05$)

Group with superscripts (**) in a row differed highly significantly ($P<0.01$)

Group with superscripts (abc) in a column differed significantly ($P<0.05$)

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