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Lakhan Ram Yadav
 College of Veterinary and
 Animal Science, Bikaner,
 Rajasthan, India

Sandeep Dholpuria
 Department of Veterinary
 Gynaecology and Obstetrics,
 College of Veterinary and
 Animal Science, Bikaner,
 Rajasthan, India

Pramod Kumar
 College of Veterinary and
 Animal Science, Bikaner,
 Rajasthan, India

Study of haematological parameters in goats with maternal dystocia and normal parturition during pre-partum and post-partum periods

Lakhan Ram Yadav, Sandeep Dholpuria and Pramod Kumar

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Abstract

Dystocia has a significant impact on future reproduction and production of animals. The experiment was conducted to determine haematological profiles in normal parturated and dystocia affected goats. The study was conducted on 10 goats. The goats were divided into two groups viz. normal parturated goats (NP) and maternal dystocia affected goats (MD). Blood samples were collected from maternal dystocia affected (n=5) and normal parturated goats (n=5) just before handling of dystocia or parturition and 24 hours after manual delivery or normal parturition for the estimation of various haematological parameters including Hb, RBC, WBC, PCV, MCV, MCH, Lymphocyte, Monocyte, Eosinophils, Basophils and Neutrophil count. Results revealed that Hematological parameters such as haemoglobin, WBC, monocytes, PCV decreased significantly ($p \leq 0.05$) in goats with maternal dystocia at post-partum period as compared to pre-partum and neutrophils decreased significantly ($p \leq 0.05$) in goats with maternal dystocia as well as normal parturated goats at post-partum period as compared to pre-partum period. Whereas lymphocyte increased significantly ($p \leq 0.05$) in goats with maternal dystocia as well as normal parturated goats at post-partum period as compared to pre-partum period.

Keywords: Goats, normal parturition, maternal dystocia, haematological parameters

Introduction

Dystocia, or difficult birth, is described as prolonged and difficult parturition that lasts more than one hour after rupture of the fetal membranes with frequent assistance required (Ahmed *et al.*, 2017). Dystocia is reported to be more prevalent in goats than in ewes (Sharma *et al.*, 1999; Mehta *et al.*, 2002)^[17, 11].

Dystocia can be classified into maternal causes and fetal causes (Noakes *et al.*, 2001)^[12]. The maternal causes of dystocia includes abdominal expulsive forces failure, birth canal obstruction, uterine rupture, uterine torsion and pelvic fracture. In goats, the incidence of dystocia due to maternal factors was reported to be 31.4 percent (Purohit *et al.*, 2006)^[14], 47.1 percent (Majeed and Taha, 1989)^[9] and 57.8 percent (Sharma *et al.*, 1999)^[17]. Maternal dystocia is most often caused by a failure of cervical dilatation, followed by uterine inertia (Purohit, 2006)^[15].

Parturition is a complex process which involves a sequence of endocrine events in the maternal, foetal and placental tissues that results in haemato-biochemical changes in the dam (Hussein and Abd Allah, 2008; Vannucchi *et al.*, 2015)^[7, 19]. Difficult births or dystocia is a complicated and stressful process, which makes the procedure more complicated and painful. The alteration in haemato-biochemical characteristics in dystocia and retained placenta have been extensively studied in goats (Patel *et al.*, 2020)^[13].

Variations in haematological parameters may exist between dystocia-affected and normal parturient animals. Therefore, the present research study was conducted to evaluate and compare the hematological parameters in normal kidding and assisted kidding due to maternal causes of dystocia in goats.

Corresponding Author:
Lakhan Ram Yadav
 College of Veterinary and
 Animal Science, Bikaner,
 Rajasthan, India

Materials and Methods

The present study was conducted on the goats presented to the department of Veterinary Gynaecology and Obstetrics, CVAS, Bikaner (RAJUVAS), and goats rearing at Bikaner and nearby goat farms in Bikaner city (for normal parturition). A total number of 10 goats of different parities were included in the study. The goats were divided into two groups *viz.* normal parturated goats (NP) and maternal dystocia affected goats (MD).

Blood samples were collected from maternal dystocia affected (n=5) and normal parturated goats (n=5) just before handling of dystocia or parturition and 24 hours after manual delivery or normal parturition for the estimation of various haematological parameters. Haematological analysis was performed shortly after blood collection. Whole blood samples from EDTA vials were used to measure complete blood count including Hb, RBC, WBC, PCV, MCV, MCH, Lymphocyte, Monocyte, Eosinophils, Basophils and Neutrophil count. These parameters were analysed as per the methods described by Jain (1986) [22].

The collected data were compiled, tabulated and analysed statistically by using analysis of Variance test (ANOVA) with the help of statistical software as per Snedecor and Cochran (1994) [18]. Means showing significant differences were compared by Duncan's new multiple range test (Duncan, 1955) [4].

Results and Discussion

The haematological observations are given in Table 1.

In the present study, when compared to the pre-partum period, haemoglobin was decreased non-significantly at 24 hours after kidding in normal parturated goats. The findings of present study are in agreement with previous research of Sangami (2017) [16] who found that haemoglobin concentration was decreased non-significantly at post-partum (24hr) period as compared to pre-partum period in normal parturated goats. In goats with maternal dystocia, haemoglobin value was found significantly ($p \leq 0.05$) decreased at 24 hours after assisted kidding as compared to pre-partum period in present study. This reduction in haemoglobin levels may be as a result of bleeding during assisted kidding in certain animals. The present findings are in agreement with previous research of Sangami (2017) [16] who found that Haemoglobin concentration was decreased significantly at post-partum (24hr) period as compared to pre-partum in dystocia affected goats.

Total erythrocyte count decreased non-significantly in normal parturated as well as goats suffering from maternal dystocia at 24 hours after kidding as compared to pre-partum period. The present findings are in accordance with the observations of Manat *et al.* (2016) [10] who found non-significant decrease in total RBC on the day of kidding in dystocia affected goats.

No significant difference was found in the values of Mean Corpuscular Volume and Mean Corpuscular haemoglobin in normal parturated goats and goats with maternal dystocia at pre-partum period and post-partum (24 hr) period. The results of present study are in agreement with the observations of Azab and Abdel-Maksoud (1999) [2] who observed no significant difference in MCV values at 0 day and 7 days after parturition in goats.

There were no significant differences in the values of WBC in normal parturated goats at pre-partum as compared to

post-partum (24 hr) period. The results of present study are in agreement with the observations of Azab and Abdel-Maksoud (1999) [2] who found no significant difference in WBC count at 0 day and 7 days after parturition in goats. However, WBC count decreased significantly ($p \leq 0.05$) at post-partum (24 hr) period in goats with maternal dystocia. The results of present findings are in agreement with Sangami (2017) [16] who also found that in dystocia affected goats, total leucocyte was significantly higher as compared to normal parturated goats at pre partum period (0hr) and decreased significantly in post-partum period.

The neutrophil count in goats with maternal dystocia and normal parturated goats was found significantly ($p \leq 0.05$) lower at post-partum (24hr) period as compared to pre-partum period. The results of present study are in agreement with observations of Azab and Abdel-Maksoud (1999) [2] who found that neutrophils count was significantly decreased in post-partum period in goats.

The values of lymphocyte were significantly higher in post-partum (24hr) period as compared to pre-partum period in maternal dystocia and normal parturated goats. These findings are in agreement with previous studies in cows, Yuksel *et al.* (2011) [21] who reported the haematological profile before and after parturition in cows suffering from dystocia and reported the mean lymphocytes count (%) was increased significantly following relieving dystocia in cows. The mean values of monocyte decreased significantly ($p \leq 0.05$) in goats suffering from maternal dystocia at post-partum (24 hrs) period compared to pre-partum period. Similarly, Yuksel *et al.* (2011) [21] also observed that mean lymphocytes count (%) decreased significantly after relieving dystocia in cows.

Non-significant difference was observed in the mean values of eosinophils in normal parturated goats and goats with maternal dystocia at pre-partum and post-partum period (24 hrs). The result of present study is similar with findings of Yildiz *et al.* (2011) [20] who reported no significant difference in eosinophils count in dystocia affected and normal parturated cattle.

Also, no significant difference was found in the values of basophils in normal parturated goats and goats with maternal dystocia at pre-partum and post-partum period (24 hrs). The result of present study are in agreement with Kaur *et al.* (1993) [8] also reported no significant differences in basophil count between buffaloes with uterine torsion, genital prolapse, dystocia and normal calving buffaloes.

The PCV values found significantly lower ($p \leq 0.05$) in goats with maternal dystocia at post-partum (24hr) period as compared to pre-partum period. The findings of the current study are in agreement with previous findings of Yuksel *et al.* (2011) [21] who found significant decline in packed cell volume during the post-partum period as compared to pre-partum period in goats and cows, respectively.

It was concluded that Hematological parameters such as haemoglobin, WBC, monocytes, PCV decreased significantly in goats with maternal dystocia at post-partum period as compared to pre-partum and neutrophils decreased significantly in goats with maternal dystocia as well as normal parturated goats at post-partum period as compared to pre-partum period. Whereas lymphocyte increased significantly in goats with maternal dystocia as well as normal parturated goats at post-partum period as compared to pre-partum period.

Table 1: Haematological parameters (mean \pm SE) in NP and MD goats

Parameters	Normal parturated goats (NP)		Maternal dystocia affected goats (MD)	
	Pre-partum (0 hr)	Post-partum (24 hrs)	Pre-partum (0 hr)	Post-partum (24 hrs)
HGB (gm/dl)	9.47 \pm 0.56	9.32 \pm 0.52	10.42 ^A \pm 0.46	8.84 ^B \pm 0.28
RBC (10 ⁶ / μ l)	17.45 \pm 0.89	16.39 \pm 0.61	16.47 \pm 0.75	15.55 \pm 0.60
MCV (fL)	18.15 \pm 0.62	17.35 \pm 0.56	20.16 \pm 0.73	19.06 \pm 1.12
MCH (pg)	5.49 \pm 0.15	5.89 \pm 0.11	5.88 \pm 0.35	6.06 \pm 0.08
WBC (10 ³ / μ l)	14.82 \pm 1.37	12.49 \pm 1.75	17.33 ^A \pm 0.56	13.12 ^B \pm 0.50
Neutrophil (%)	57.36 ^A \pm 0.67	55.34 ^B \pm 0.42	61.8 ^A \pm 0.66	58.4 ^B \pm 0.51
Lymphocyte (%)	28.34 ^A \pm 0.49	32.00 ^B \pm 0.82	31.4 ^A \pm 0.81	34.8 ^B \pm 0.58
Monocyte (%)	9.00 \pm 0.68	8.27 \pm 0.40	6.4 ^A \pm 0.4	5.3 ^B \pm 0.49
Eosinophil (%)	2.34 \pm 0.80	2.65 \pm 0.62	2.6 \pm 0.32	2.83 \pm 0.25
Basophil (%)	0.17 \pm 0.16	0.64 \pm 0.31	0.2 \pm 0.2	0.4 \pm 0.25
PCV (%)	31.82 \pm 1.87	30.36 \pm 1.52	36.3 ^A \pm 0.68	32.96 ^B \pm 1.08

Means having different superscripts (A, B) in row differs significantly ($p \leq 0.05$)

Conclusion

It was concluded that Hematological parameters such as haemoglobin, WBC, monocytes, PCV decreased significantly ($p \leq 0.05$) in goats with maternal dystocia at post-partum period as compared to pre-partum and neutrophils decreased significantly ($p \leq 0.05$) in goats with maternal dystocia as well as normal parturated goats at post-partum period as compared to pre-partum period. Whereas lymphocyte increased significantly ($p \leq 0.05$) in goats with maternal dystocia as well as normal parturated goats at the post-partum period as compared to the pre-partum period. So the findings on haemato-biochemical changes in dystocia affected goats may aid in managing obstetrical problems.

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