

Haematological Studies of Intestinal Obstruction in Buffalo Calves

R. R. Parsania, D. M. Tadkod and M. N. Mannari

Department of Surgery and Radiology, Gujarat College of Veterinary Science and Animal Husbandry, Anand 388 001.

ABSTRACT

Haematological studies were carried out before, during and after release of duodenal and ileal obstruction in two groups of buffalo-calves. In duodenal obstruction a significant increase in total erythrocyte count, haemoglobin content, percentage of packed cell volume (PCV) and leucocyte count was observed, whereas, the erythrocyte sedimentation rate (ESR) decreased. A progressive neutrophilia was noticed in all the animals. During ileal obstruction, the total erythrocyte count, haemoglobin content and percentage of PCV showed a marginal increase, which became highly significant by the 6th day of obstruction. The leucocyte count and neutrophil percentage showed an increase and remained highly significant throughout the period of obstruction. The ESR showed similar changes as in duodenal obstruction.

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INTRODUCTION

Intestinal obstruction is a subject that has fascinated man since the earliest studies of medicine. The malady manifests certain sets of clinical symptoms, only when it is well advanced. It is well known that continuous changes in both blood constituents and electrolyte balance occur during the obstruction.

Haematological studies during intestinal obstruction have been studied in horses (Vaughan, 1971 and Datt and Usenilk, 1975), in donkeys (Sing *et al.*, 1975) and in cattle (Britton, 1946, Esperson, 1964, Hammond *et al.*, 1964, Corker and Dzink, 1968 and Pearson, 1973). However, similar studies are lacking in buffaloes. In India, buffaloes are one of the important milk producing animals and cases of intestinal obstruction in these animals are often met.

Haematology is an useful diagnostic aid to know the status of the animal, for timely and suitable surgical intervention. In view of the above facts, it was thought worth-while to take up the work of haematological study during experimentally induced intestinal obstruction in buffalo calves.

MATERIALS AND METHODS

Twenty eight clinically healthy male buffalo-calves, in the age group of 8 to 12 months were selected for the study. In all the experimental animals, blood samples were collected, immediately prior to surgery for haematological studies. These values were used as base line values.

In the first group of 14 animals, high intestinal obstruction was created by ligating the duodenum with chromic cat-gut No. 1, about 8 cm. posterior to the pylorus.

In the second group of 14 animals, the ileum was ligated at about 20 cm. anterior to the ileo-caecal valve.

For studying haematological changes, 4 ml of citrated blood was collected daily from each of the animal, before feeding and watering. At the time of blood collection, blood smears were prepared for differential leucocyte count.

Depending on the condition of the animals and severity of the symptoms, the experimentally created obstructions were relieved 4 to 6 days after its creation. Six animals of 1st group and 4 animals of second group died before obstruction could be released. In the 4 animals of the 1st group and 6 animals of 2nd group, the obstruction was relieved simply by removing the ligature. In the remaining animals instead of releasing the ligature, resection of the part and intestinal anastomosis by everting technique was performed. Haematological studies in these animals, were continued for four days, after the release of obstruction.

TABLE 1

Table showing mean and S.E. values of different haematological parameters studied before, during and after release of duodenal obstruction in buffalo-calves.

Sr. No.	Haematological Parameters studied		Before	Range		Range after	
			obstruction	during	obstruction	release	of obstruction
1.	Total erythrocyte count (Mill/c.mm)	Mean	6.39	6.51	to 7.37*	6.34	to 6.76
		S.E.	0.15	0.15	0.36	0.24	0.22
2	Haemoglobin (g/100 ml)	Mean	9.88	9.90	to 11.05**	9.95	to 10.47*
		S.E.	0.22	0.22	0.51	0.31	0.36
3	Packed cell volume (%)	Mean	31.89	32.32	to 36.42**	32.43	to 34.12
		S.E.	0.97	1.07	1.97	1.32	1.17
4	Erythrocyte sedimentation rate (mm/hour)	Mean	51.14	37.00**	to 49.57*	45.37*	to 52.37
		S.E.	1.16	3.74	1.24	2.03	2.36
5	Total leucocyte count (Thousand/c.mm)	Mean	9.05	9.80**	to 10.95*	9.27	to 10.66**
		S.E.	0.25	0.28	0.31	0.12	0.26
6	Neutrophils (%)	Mean	27.93	36.21**	40.86**	30.00	to 40.25**
		S.E.	0.94	0.83	to 1.35	0.70	1.09

* = Significant at 0.05 level.

** = Significant at 0.01 level.

The total erythrocyte and leucocyte counts were carried out by Neubaur haemocytometer method, haemoglobin concentration by colorimetric method using Sahli's haemoglobinometer and the erythrocyte sedimentation rate (ESR) and packed cell volume (PCV) by Wintrobe's method, described by Schalm (1965). The differential leucocyte count (DLC) was done by the routine procedure using Leishman staining technique. All these studies were carried out on the same day of blood collection, except the DLC.

The mean and standard error for all the values of haematology were calculated by standard statistical procedure. The significance of mean difference with normal value were tested by "student paired 't' test" (Snedecor and Cochran 1967).

RESULTS AND DISCUSSION

The statistical values of different haematological studies are given in table 1 and 2.

TABLE 2

Table showing mean and S.E. values of different haematological parameters studied before, during and after release of ileal obstruction in buffalo-calves.

Sr. No.	Haematological Parameters studied		Before	Range		Range after	
			obstruction	during	obstruction	release of	obstruction
1	Total erythrocyte count (Mill/c.mm)	Mean	6.18	6.19	to 6.93**	6.21	to 6.44
		S.E.	0.10	0.09	0.19	0.12	0.14
2	Haemoglobin (g/100 ml)	Mean	9.45	9.55	to 10.06**	9.48	to 9.68
		S.E.	0.18	0.21	0.21	0.22	0.24
3	Packed cell volume (%)	Mean	31.10	31.60	to 32.42**	31.10	to 31.75
		S.E.	0.88	0.82	1.57	1.15	1.15
4	Erythrocyte sedimentation rate (mm/hour)	Mean	53.42	47.14**	to 52.14	49.20*	to 52.60
		S.E.	1.06	1.68	0.94	1.14	1.10
5	Total leucocyte count (Thousand/cmm)	Mean	9.20	9.64**	to 11.45**	9.48	to 10.40**
		S.E.	0.16	0.19	0.24	0.16	0.25
6	Neutrophils (%)	Mean	29.14	34.07**	to 44.14**	31.00	to 39.00**
		S.E.	0.36	0.61	1.73	0.36	1.46

* = Significant at 0.05 level.

** = Significant at 0.01 level.

In the present study, the total erythrocyte count increased significantly during duodenal obstruction but the increase was marginal when ileum was obstructed. This increase was noticed to be statistically highly significant on the 4th day of duodenal obstruction and 6th day of ileal obstruction. Datt and Usenik (1975) reported similar findings during their study in horses.

Significant rise in the haemoglobin concentration during high obstruction and a marginal increase during low obstruction were noticed in horses by Vaughan (1971) and Datt and Usenik (1975). Britton (1946) also reported an elevated haemoglobin concentration both in experimental and clinical cases of intestinal obstruction in cattle and sheep. Similar findings were recorded by Espersen (1964) and Robertson (1966) during abomasal displacement. The findings in the present study, corroborate with those of the above workers, as the increase in haemoglobin concentration

became highly significant on the 4th and 5th day of high obstruction and this increase was marginal in the initial stage of low obstruction.

During the study it was observed that the values of PCV increased and became highly significant in the later stages of duodenal obstruction, whereas such increase was only marginal in ileal obstruction. These findings are in agreement with the findings of Vaughan (1971), Singh *et al.* (1975) and Datt and Usenik (1975) in equines, and Britton (1946). Hammond *et al.* (1964) and Corker and Dzink (1968) in cattle.

The reasons for increase in total erythrocyte count, haemoglobin concentration and PCV have been attributed to dehydration following obstruction.

Fall in the ESR was observed to be highly significant during duodenal obstruction. But during ileal obstruction this fall was non-significant in the early stages and significant in the later stages.

Singh *et al.* (1975) reported similar findings while working in donkeys.

The highly significant leucocytosis observed during both, duodenal and ileal obstruction in the present study, seemed to be due to the trauma and peritonitis resulting from intestinal obstruction. Robertson (1966) during left sided abomasal displacement in cows and Singh *et al.* (1975) during obstruction in donkeys, observed similar increase in leucocyte count.

A progressive neutrophilia during duodenal and ileal obstruction in the present study are in agreement with the report of Singh *et al.* (1975), who studied the simple and strangulated obstruction in donkeys. The neutrophilia observed during the study may also be due to trauma and peritonitis.

All the haematological values regained normalcy in both, duodenal and ileal obstruction by the 4th day after the release of obstruction. Poulsen (1974) observed similar results while studying right-sided abomasal displacement in dairy cows.

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