

Haematology of the Red Sokoto Goats with Rumen Impaction

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Abstract: The haematological parameters were determined in clinically healthy red Sokoto goats and in goats with rumen impaction. The haematocrit, haemoglobin and red cell counts were significantly lower in red Sokoto goats with rumen impaction. The MCV were lower in goats with rumen impaction. Although age, sex and pregnancy appeared to have little or no influence on the haematocrit and erythrocyte count, pregnant goats had higher haemoglobin and MCV values. The low haematocrit and erythrocyte values were attributed to rumen impaction. The neutrophils were significantly higher in goats with rumen impaction. Young goats had higher lymphocytes in both groups of goats. The leucocytic values were not significantly affected by sex, pregnancy and rumen impaction in red Sokoto goats.

Key words: Haematology, rumen impaction, goats

Introduction

Rumen impaction is the overloading and atony of the rumen with ingesta. The rumen may be dilated and palpated and the paralumber fossa distended (Gyang, 1991; Elsa *et al.*, 1995). Signs of rumen impaction vary widely from mild indigestive upset to life threatening systemic signs. It may occur as a primary condition or may be secondary to other conditions such as impaction of other parts of the stomach, traumatic reticulo-peritonitis, metabolic disorders, viraemia, bacteraemia or blood parasitism. It has also been associated with confinement and the use of poor quality hay (Gyang, 1991).

In literature, there are abundant data on haematological parameters of different species of animals (Oduye, 1976; Oyewale, 1998). Following increased demand in protein available to the Nigerian populace, the Nigeria government through its animal research centers such as the National Animal Production Research Institute has embarked on intensified production of local livestock which demands that the animals be kept as healthy as possible. It may be difficult to assess the health status of an animal without recourse to an examination of its blood. Although there are some reports dealing with the haematological parameters of the normal healthy goats (Millson *et al.*, 1960; Holman and Dev, 1963), however, it is important to know the haematological status of goats with rumen impaction in this environment. The exact pathophysiology of rumen impaction is not completely understood, while the mechanical effect of dilated rumen on respiration and cardiac function is well known (Otesile, 1983), the haematological changes associated with rumen impaction is not well understood. This study was undertaken to determine the haematological values in goats with rumen impaction and the differences between the ages and sexes.

Materials and Methods

A total of hundred and five red Sokoto goats were used for this study. Eighty (80) goats belongs to Usmanu Danfodiyo University, Teaching and Research Farm, were used as controls while the other 25 red Sokoto goats were presented to Usmanu Danfodiyo University Veterinary Teaching Hospital Sokoto, with clinical case of rumen impaction between 1991 to 2001. They were separated and examined according to their sexes and ages ranging from 6 to 24 months. The animal management on the University Farm included grazing an improved grass/legume pastures supplemented with concentrate consisting of ground maize or guinea corn in the dry season. The goats were routinely dewormed with thiabendazole at a dose rate of 6mg/kg body weight at 2 monthly intervals throughout the year. About 2ml of blood were collected from the jugular vein of each goat examined on the University Farm and goats presented to

Veterinary Teaching Hospital with rumen impaction into bijou bottles containing EDTA. Red blood cells (RBC) and white blood cells (WBC) were counted with haemocytometers. Packed cell volume (PCV) was determined using the micro-haematocrit method. Haemoglobin (HB) concentration was assessed by the cyanmethaemoglobin method. From the above data, the mean corpuscular haemoglobin concentration (MCHC) were calculated according to method described by Schalm *et al.* (1975). Blood smears were stained with Giemsa stain for differential WBC counts. All data were analyzed statistically using student t test.

Results

There was a significant ($P < 0.05$) decrease in haematocrit, haemoglobin and red blood cell counts of red Sokoto goat with rumen impaction (Table 1) when compared with the clinically healthy red Sokoto goats. Although age, sex and pregnancy appeared to have little or no influence on the parameters, pregnant goats had lower haemoglobin and MCV in goats with rumen impaction. The leucocytic values were not significantly affected by physiological status (sex, pregnancy) and rumen impaction in red Sokoto goats. (Table 2). The neutrophils were significantly ($P < 0.05$) higher in goats with rumen impaction. Young goats had higher lymphocytes in both the healthy and rumen impacted of goats (Table 2).

Discussion

In this study the erythrocyte count was observed to be higher in healthy males than in pregnant female goats (Table 1). This is probably due to physiological condition (pregnancy) of the female goats. Similarly, the erythrocyte count was significantly higher in males than in female goat with rumen impaction (Table 1). The mean values of PCV, Hb and RBC in the healthy red Sokoto goats did not differ significantly from 24 months old female or male goats. This appear to be contrary to the observations of Holman and Dev (1966) where higher values were obtained in male goats than in females. The findings in this study agrees with those obtained in Pangolins (*Manis tricuspis*) (Oyewale *et al.*, 1997), sheep (Oduye, 1976) and African giant rats (Oyewale *et al.*, 1998), with no significant sex differences observed in haematological values. However, there was a significant decrease in haematocrit, haemoglobin and red blood cell counts in red Sokoto goats with rumen impaction. These changes could be explained by the fact that dilated rumen can severely compromise respiration by placing pressure on the diaphragm and reduce inspiratory phase of respiration which will lead to hypoxia and hypercapnia. The impacted rumen also reduces venous returns to the heart. This will cause the animal to become acidotic.

The mean value of MCV in goats with rumen impaction was lower

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Table 1: Haematological parameters of clinically healthy and rumen impacted red Sokoto goats

Animals	No. examined		PCV (%)		Hb (g/dl)		RBC X10 ¹² /l		MCV (g/dl)		MCHC (g/dl)	
	Healthy	Rumen impacted	Healthy	Rumen impacted	Healthy	Rumen impacted	Healthy	Rumen impacted	Healthy	Rumen impacted	Healthy	Rumen impacted
Age/sex												
6-12 months	35	4	28.1±3.7	11.5±1.0	9.07±2.0	3.2±1.3	11.8±1.1	3.8±1.4*	91.1±2.3	17.4±2.1	32.8±2.3	36.1±3.4
13-24 months	45	21	27.1±3.6	21.1±2.3*	8.60±1.4	4.2±1.0*	11.7±2.1	4.6±1.3*	21.4±3.1	18.5±1.4	31.5±3.1	35.0±2.7
Non pregnant females	50	14	24.3±4.2	11.0±2.1*	7.00±2.1	3.1±1.1*	11.8±2.3	5.4±1.2*	21.2±1.1	17.1±1.0	30.6±3.4	35.1±3.1
Pregnant females	8	7	26.7±4.0	12.0±2.3*	8.40±3.0	4.7±2.1*	10.5±2.6	4.2±1.3*	22.3±1.3	18.1±1.3	31.7±3.5	35.1±3.5
Males	22	4	26.7±4.0	14.7±3.0*	8.70±1.2	5.9±1.2*	13.0±3.2	7.0±1.1*	21.7±2.1	17.2±2.0	32.6±3.1	37.2±1.0

PCV= Packed cell volume, Hb= Haemoglobin conc., MCV= Mean corpuscular volume, RBC= Red blood cell, MCHC= Mean corpuscular haemoglobin conc., P<0.05 when compared with values in healthy goats using students t test.

Table 2: Mean white blood cell counts (WBC), neutrophils, lymphocytes and eosinophils of clinically healthy and rumen impacted red Sokoto goats

Animals	No. examined		WBC X10 ⁹ /l		Neutrophils (%)		Lymphocytes		Eosinophils(%)	
	Healthy	Rumen impaction	Healthy	Rumen impaction	Healthy	Rumen impaction	Healthy	Rumen impaction	Healthy	Rumen impaction
Age/sex										
6-12 months	35	4	17.4±3.8	16.4±2.4	45.8±6.2	56.8±2.3*	49.1±7.6*	45.6±5.3	4.4±4.0	18±0.2*
13-24 months	45	21	17.0±3.5	16.0±1.2	47.6±5.6	57.0±3.1*	48.3±7.5	41.2±4.1	5.8±4.7	2.0±0.3*
Non-pregnant females	50	14	17.2±3.6	16.2±2.0	46.7±5.6	56.7±2.5	48.3±5.6	42.0±4.4	5.7±4.5	2.0±0.1
Pregnant females	8	7	17.1±3.5	16.1±1.3	46.4±6.3	56.8±3.4*	45.2±8.9	41.3±4.2	4.9±4.2	2.1±0.3*
Males	22	4	17.1±3.5	16.1±1.3	46.4±6.3	56.8±3.4*	45.2±8.9	41.3±4.2	4.9±3.8	1.7±0.5*

*P<0.05 when compared with values in clinically healthy goats using students t test

than the data in healthy goats (Table 1). This could be due to the lower number of circulating erythrocytes in the goats. Oyewale, *et al.* (1997) indicated that low MCV values are due to decreased circulating numbers of erythrocytes in the blood.

In this study the leucocyte count in both the male and female goats were similar. In the previous studies in horses, the females had slightly higher mean leucocyte than the males (Schalm *et al.*, 1975), while the males of African giant rats had significantly higher mean leucocytes than the females (Oyewale *et al.*, 1998). The total leucocyte counts in this study were also not significantly affected by pregnancy and/or rumen impaction in red Sokoto goats. The neutrophils were significantly higher in goats with rumen impaction (Table 2). Also, eosinophils were significantly lower in red Sokoto goats with rumen impaction compared to the healthy goats. Young goats had higher lymphocytes in both groups. This probably could be due to the rumen acidosis, irritation from lactic acid, bacterial endotoxins and the low pH which causes ruminitis that facilitate penetration of bacteria into portal circulation and formation of abscesses in the liver.

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