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THE HAEMOGRAM OF ENTERITIS IN KIDS AT EL-GASSIM (With 4 tables)

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الصورة الدموية عن الإلتهاب المعوي في الجديان بالقصيم

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لقد أجريت هذه الدراسة على ٥٤ من الماعز الصغيرة (جديان) تراوحت أعمارها بين يوم واحد وشهرين. تنتمي حيوانات هذا البحث الى أحد المزارع الخاصة بإمارة القصيم وهى من النوع السعودى. إتضح من الفحص الإكلينيكى أن ٧٧,٧٨% من مجموع الحيوانات التى فحصت تعاني من الإسهال، الضعف العام وفقد الشهية، أما باقى الحيوانات فقد ثبت سلامتها إكلينيكيًا ومعمليًا واستخدمت كضابط فى هذا البحث. وتبعًا لنوع المسبب، وشدة المرض، فلقد قسمت الحيوانات المريضة الى ثلاثة مجموعات. ولقد تم مشاهدة وتسجيل الأعراض الإكلينيكية للحيوانات المريضة. وعن الأسباب المتعددة للنزلة المعوية فى الجديان، إتضح من الفحص المعملى أن طفيل الایمیریا يلعب دورًا هامًا فى هذا المرض. ولقد إتضح أن كل حيوان مريض مصاب على الأقل بثلاثة أنواع من هذا الطفيل. لوحظ أن ميكروب السالمونيلا بأنواعه الثلاثة طيفى ميوريم، إنتريتيدى، نيوبورت تلعب دورًا خطيرًا فى إحداث المرض. ولقد تميز الطور الحاد فى هذه الحيوانات المريضة بفقد سوائل الجسم عن طريق البراز وصحب ذلك زيادة معنوية ملحوظة فى قيم بعض مكونات الدم مثل الهيموجلوبين ونسبة الخلايا المضغوطة والعدد الكلى لخلايا الدم الحمراء. لوحظ أيضًا زيادة واضحة فى العدد الكلى لكريات الدم البيضاء. وعن الفحص التصنيفى لكريات الدم البيضاء، فلقد أظهرت الحيوانات المريضة زيادة فى النسبة المئوية للخلايا المتعادلة والحمضيه مع نقص ملحوظ فى نسبة الخلايا الليمفاويه.

THE HAEMOGRAM OF ENTERITIS IN KIDS AT EL-GASSIM

SUMMARY

The present study was performed on 54 kids, one day to two months old. Animals were of the native Saudi arabian breed, and belonged to one of the private breeding farms at El-Gassim Emarah. Diarrhoea, emaciation and weakness was excisted in 77.78% of the examined animals while the rest proved to be clinically and labortory healthy. The diseased animals were divided into three groups according to the severity and isolated causes of the disease. The clinical signs were observed and recorded. *Eimeria* spp. appeared to be the most important cause of enteritis among the studied animals. At least three species of *Eimeria* were recovered from each diseased case. *Salmonella typhimurium*, *Salmonella enteritidis* and *Salmonella newpoort* were reported to be associated with some outbreaks of the disease in the animals. In the diarrhoeic kids suffering from infection that usually run an acute course, excessive loss of body fluids was accompanied by haemoconcentration. Prominent elevation was recorded in the values of PCV, Hb and RBCs count. Leucocytosis was a prominent feature that accompanied by neutrophilia and eosinophilia. Decrease in lymphocytes percent was detected among animals of the diarrhoeic groups.

INTRODUCTION

It has been estimated by many owners of animal farms at El-Gassim Emarah, Saudi arabia that many losses occur every year among the newlyborn ruminants. Kids constitute an important part of the animals wealth in Saudi arabia.

Most of the losses among the kids may be due to infectious diseases on one hand and starvation, chilling or environmenal errors on the other hand. However, of the infectious conditions affecting the kids, diseases of the alimentary tract are the most important.

Enteric diseases are most commonly manifested by diarrhoea and can result in a significant mortality or economic losses from reduced conditions, faulty drugs given and labour.

Many flocks even those on extensive husbandary systems throughout the rest of the year are kept intensively at the parturition time. The produced ideal conditions for a bulling-

up of infectious neonatal disease, close confinement, gradual increase of contamination and a continual through-up of susceptible young animals all appear to amplify infectious agents. The fact that parturition takes place in winter or early spring means that adverse environmental factors such as cold, wet or windy weather are prevalent and these conditions are often associated with diarrhoea outbreaks.

Enteric diseases will undoubtedly continue to be a major component of the production disease facing goat's owners. It is hoped that sound knowledge of this disease, the different changes, accompanying it, its diagnosis and the rational basis for therapeutics will allow the veterinarian to play a significant role in limiting their effects on meat, milk and fiber production in goats industry.

Diarrhoea and enteritis as a disease entity was extensively studied among large ruminants in different parts of the world by many investigators. On the basis of the various environmental factors at El-Gassim Emarah and in relation with the various sources of importation of goats to this country, the scientific map of the various diseases affecting kids is uptill now not well established.

Blackwell (1983) stated that *Salmonella typhimurium* and *Salmonella dublin* were reported infrequently as causing enteritis in kids. Diarrhoea of young animals is a clinical entity with a variable aetiology involving an interaction between microorganisms, environment and the host (Tzipori, 1981). He added that diarrhoea can be attributed to infection with a single or multiple agents.

Coccidiosis in kids was reported by Prasad et al. (1981) and Soulsby, (1968).

Prasad et al. (1981) mentioned mixed *Eimeria* species infections in kids identified on oocyst morphology.

The present study aimed to illustrate some observations and data concerning the disease problem in kids. The work was planned to describe the clinical signs, some blood parameters as well as the aetiological agents concerned with the diseased cases.

MATERIALS AND METHODS

A total number of 54 kids, one day to two months old were included in this study. Thirty nine kids showed diarrhoea, while the rest were proved to be clinically and laboratory healthy. The animals were belonged to one of the private animal breeding farms at El-Gassim Emarah.

From each diarrhoeic animal two faecal samples were collected. The first faecal sample was taken on a sterile swab

THE HAEMOGRAM OF ENTERITIS IN KIDS AT EL-GASSIM

directly from the rectum. This sample was bacteriologically studied with special reference to the enterobacteriaceae organisms. The second faecal sample was collected using clean plastic bags (about 10 gm of faeces). This sample was used for parasitological studies (qualitative and quantitative) according to Coles, (1980).

Also, from each animal blood sample was collected from the jugular vein. The sample was collected in a bottle containing EDTA as anticoagulant for haematological studies. The erythrocytes count, haemoglobin content, packed cell volume, total leucocytes count and differential leucocytic count were studied (Coles, 1980).

RESULTS

The results of this investigation were illustrated as the followings:

A- Clinical symptoms and causes:

The observed clinical symptoms of the diseased animals vary greatly according to the nature and severity of the causative agent. Upon these basis, the diseased animals were divided into three groups.

The first group:

Animals of this group were 10 cases. Moderate clinical signs were observed. Animals behaved inappetance and were depressed. The average pulse and respiration rates were within the normal values (110/min. and 21/min. respectively). Also, the body temperature was normal in most cases (range between 38.6-40.7°C) except 3 cases with subnormal temperature. The faeces was fluid in nature and yellow in colour containing shreads of mucous and bright red blood droplets. The identified parasites in faeces were *Eimeria* oocysts. The average oocysts count was 2×10^4 /gm of faeces.

The second group:

Animals of this group were 12 cases. The pulse, respiration and body temperature were within the normal values. The animals showed profuse watery diarrhoea of greenish yellow colour containing mucous and blood. The animals showed inappetance, were depressed and emaciated. In most cases, the skin was wrinkled and lost its elasticity. Some cases were drawzy, while others recumbent. The faecal samples contain *Eimeria* oocysts. The average count reached 5×10^4 /gm of faeces.

The third group:

Animals of this group were 17 cases. The prominent sing was profuse watery diarrhoea. The faeces was pale brown or dark

A. A. MOTTELIB et al.

brown in colour. The odour of faeces was mostly offensive. Faeces contains blood and mucous. The animals expressed inappetence, were depressed and emaciated. Most of the cases showed dehydration. Some kids showed tremors and inability to stand. Only 6 case showed elevation in body temperature (range 41.2-42.0°C). These animals showed increased pulse and respiration rates (average 120/min. and 56/min. respectively). Laboratory examination of faeces showed the presence of salmonella organisms (Table, 1). and *Eimeria* oocysts. The average oocysts count was 5×10^5 /gm of faeces.

Various types of *Eimeria* oocysts have been identified. Six types of *Eimeria* species have been recognized. These were *E. arlioni* (71.8%), *E. parva* (64.1%), *E. granulosa* (51.3%) *E. faurei* (46.2%), *E. crandallii* (58.8%) and *E. intricata* (35.9%).
B- Haematological studies:

The values of the estimated blood parameters were illustrated in tables 2,3 and 4.

DISCUSSION

The causes of enteritis are variable and differ according to species, breed of the animal as well as the age, state of nutrition and environmental conditions (Blackwell, 1983) and Coles 1980). *Eimeria* spp. appeared to be the most important causes of enteritis in young kids up to two months old. Prasad et al (1981) and Reid (1976) emphasized the importance of a *Eimeria* as a major aetiological factor responsible for diarrhoea in feed lot lambs and kids.

Coccidiosis in kids was always due to mixed *Eimeria* infections. At least three species of *Eimeria* were recovered from each diarrhoeic case. These results were in harmony with those given by Prasad et al, (1981) and Reid (1976).

Demonstration of *Eimeria* oocysts in the faeces, with extremely high oocyst count associated with profuse watery diarrhoea was a constant feature of coccidia infected cases.

In this study identification of *Eimeria* spp. was based on the morphological features of the oocyst excreted in the faeces. These criteria were also formerly used by many authors for the same purposes (Soulsby, 1982 and Korkein et al 1979).

Salmonella typhimurium, *Salmonella enteritidis* and *Salmonella newport* were also reported to be associated with some outbreaks of diarrhoea in young kids. Blackwell (1983) reported that *Salmonella typhimurium* and *Salmonella dublin* were the causes of enteritis in lambs and kids.

Highly significant elevation ($P < 0.01$) in blood haemoglobin content was reported in all diarrhoeic kids except kids of group 1 in which the haemoglobin content was only

THE HAEMOGRAM OF ENTERITIS IN KIDS AT EL-GASSIM

significantly increased ($P < 0.05$).

In diarrhoeic kids highly significant increase ($P < 0.01$) in PCV was observed in all groups except animals of the first group in which it was increased but not significantly (table, 2). The non-significant increase in PCV in animals with mild or moderate coccidial infection might be due to loss of blood through the damaged mucosa of the intestine, since haemorrhagic diarrhoea was sometimes observed in coccidia infected kids.

In all diarrhoeic kids total RBCs counts were increased, but the elevation varies according to the aetiology of enteritis. Highly significant ($P < 0.01$) increase in RBCs count was reported in diarrhoeic kids suffering from heavy coccidia (group II), and in mixed coccidial and salmonella infections (table, 2).

From these data (Hb, PCV and RBCs), we can conclude that in diarrhoeic kids suffering from infections which usually run an acute course, excessive loss of body fluids was accompanied by haemoconcentration.

Leucocytosis was observed in all groups of diarrhoeic kids. The highest value was observed in animals of the third group (table, 2). The recorded leucocytosis in the diseased animals was due to the absolute neutrophilia and absolute eosinophilia ($P < 0.01$). *Jubb and Kennedy (1985) and Jones and Hunt (1983)* explained that the inflammatory leucocytosis was a response of the body to the destructive effects of salmonellae and coccidia and their toxins on liver and intestine. Lymphopenia was observed in all diarrhoeic groups which may be attributed to the increased activity of the adrenal glands when the tissues are invaded by these pathogenic microorganisms (*Coles, 1980*).

Numerous numbers of conclusions have been suggested. These conclusions were of great values for an accurate and sound diagnosis, prophylaxis and treatment of enteritis in kids. Moreover, it has a great clinical and academic importance, as it threw some light on the effect of enteritis on health and thriftiness of the animals. Our study was also of a great value in solving one of the most important problem facing the goat industry.

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Group	Mean (S.D.)	PCV	WBC	Platelets
Control	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
I	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
II	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
III	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
IV	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
V	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
VI	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
VII	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
VIII	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
IX	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1
X	10.0 ± 0.1	30.0 ± 0.1	10.0 ± 0.1	10.0 ± 0.1

THE HAEMOGRAM OF ENTERITIS IN KIDS AT EL-GASSIM

Table (1): Serotyping salmonella strains isolated from diarrhoeic kids

Serial No	Type	Serotype	No. of strains	%
1	S. Typhimurium	B	13	76.47
2	S. Enteritidis	D ₁	3	17.64
3	S. Newport	C ₁	1	5.88

Table (2): The mean values, standard errors and ranges of some blood parameters in kids

Animal groups	Hb (gm %)	PCV %	RBCs $\times 10^6/\text{c.mm}$	WBCs $\times 10^3/\text{c.mm}$
Control	8.89 \pm 0.14	23.4 \pm 0.21	9.6 \pm 0.21	6.71 \pm 0.21
	7.6 -10.5	20 - 26	8.4 -11.2	6.1 - 7.2
I	9.67 \pm 0.15 ⁺	23.8 \pm 0.11	10.6 \pm 0.15	8.85 \pm 0.12 ⁺⁺
	8.0 -11.0	21 - 28	9.0 -11.5	6.8 -10.5
II	11.51 \pm 0.11 ⁺⁺	30.0 \pm 0.021 ⁺⁺	12.1 \pm 0.11 ⁺⁺	11.20 \pm 0.31 ⁺⁺
	8.7-12.5	24-34	9.3 - 13.3	7.9 - 13.6
III	13.2 \pm 0.13 ⁺⁺	34.0 \pm 0.19 ⁺⁺	13.8 \pm 0.21 ⁺⁺	13.8 \pm 0.30 ⁺⁺
	10.5-15.4	30 - 39	9.5-15.5	8.5-15.2

⁺ $P < 0.05$ ⁺⁺ $P < 0.01$

Table (3): The mean values standard errors and ranges of the differential leucocytic count in kids

Animal groups	Band (%)	Neut. (%)	Lymph. (%)	Mon. (%)	Eos. (%)	Bas. (%)
Control	0.4±0.3 0.0-1.0	40.0±0.9 33-45	56.0±1.2 49-60	0±0.3 0.0-3.0	0.9±0.08 0.0-3.0	0.24±0.1 0.0-1.0
I	1.31±0.1 0.0-4.0	40.1±3.1++ 52-71	54.3±2.1++ 41-60	2.2±0.3 0.0-5.0	2.1±0.9 1.0-7.0	0.03±0.01 0.0-1.0
II	0.8±0.1 0.0-3.0	43.1±2.8++ 48-68	50.6±2.6++ 40-60	0.9±0.4 0.0-2.0	5.4±1.2++ 3.0-9.0	0.01±0.01 0.0-1.0
III	0.3±0.1 0.0-4.0	58.0±3.1++ 51-72	28.4±2.3++ 18-35	1.2±0.3 0.0-3.0	12.0±2.1++ 8.0-21	0.09±0.01 0.0-1.0

++ $P < 0.01$

Table (4): The absolute differential leucocytic count of the mean values

Animal groups	Band	Segm. Neut.	Lymph.	Mon.	Eos.	Bas.
Control	27	2684	3757	134	60	0
I	87	2690	3644	134	134	0
II	54	2895	2395	60	336	0
III	20	5703	1906	80	805	0