

Efficiency Of Narasin For Treatment Of Lamb Coccidiosis

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ABSTRACT

The present study was designed to evaluate the effect of narasin in treating coccidiosis in lambs. Fifteen lambs (5 healthy and 10 diarrheic from coccidiosis). The lambs were 4-6 week old and 4-5 kg body weight. These lambs belonged to a private farm in Sharkia Governorate. The lambs were divided into three equal groups. First group gp(1) was clinically healthy (control), gp 2 were suffering from diarrhoea due to coccidiosis left without treatment and, gp 3 treated with narasin (60 ppm /kg.ration) for 10 consecutive days. Blood samples were collected on the 7th and 15th days post treatment, for hematological and some biochemical parameter determination. Fecal samples were weekly examined for oocyst *Eimeria* spp. which decreased to 100% at 8 days post treatment.

The hematological study of gp 2 showed a significant increase in the total erythrocytic count, haemoglobin content and packed cell volume, meanwhile the total leukocytic count and lymphocyte were insignificantly decreased, the neutrophils, monocytes and basophils were insignificantly increased, the eosinophils show a significant increase (gp2). Total protein, albumin, glucose, sodium, potassium, calcium, inorganic phosphorus, magnesium, copper, zinc, iron and manganese levels were significantly decreased, the globulin and A/G ratio were insignificantly decreased. Meanwhile transaminases (AST-ALT), alkaline phosphatase, urea and creatinine were elevated in comparison with the clinically normal lambs (gp 1). Hematological and biochemical parameters returned to the normal levels 15 days post treatment (gp 3).

It could be concluded that the diarrhoea due to coccidiosis, induced a significant decrease in hemogram and some biochemical parameters which returned to the normal levels after 15 days post treatment by narasin.

INTRODUCTION

Coccidiosis is often a disease of feedlot lambs, and often occurs in the breeding flocks. Mixed infections build up to a peak that may last 1-4 weeks and then decline (1). *Coccidia* of the genus *Eimeria* may cause watery to bloody diarrhoea in many vertebrates (2). During the first few months of life, diseases usually affect the young animals. They cause great losses because the immune system of the young animals is not well developed and the maternal immunity can not withstand the variable infections (3).

The parasitic infestations are a major constraint for the small ruminant production, in the tropics and subtropics by causing morbidity, mortality and production losses (4). The protozoan parasites of the genus *Eimeria* multiply in the intestinal tract they cause tissue damage resulting in interruption of feeding and digestion processes besides nutrienting

absorption, dehydration, blood loss and increased susceptibility to other disease agents (5). Diarrhoea is a sign caused by various agents as bacterial, viral, protozoal, mixed infection and environmental factors (6). Coccidiosis is a worldwide contagious disease of sheep and goats, especially the young lambs and kids. The disease is caused by one or more of approximately 12 different species of *Eimeria* (7). The intensity of the parasitic infection in small ruminants is negatively correlated with that general health status (8).

The anticoccidial drugs have been widely used to minimize losses, caused by the disease (5). Narasin is a polyether ionophorous antibiotic, which is effective against coccidiosis (9). It is used as a growth promoter for poultry, cattle and lambs (10). Anticoccidial ionophore (narasin) has the affinity for monovalent and some divalent cations, causing translocation of these ions across the membranes (11, 12).

The objective of this study was to evaluate the efficacy of narasin for the treatment of coccidiosis in the newly born lambs. Moreover, the effect of coccidiosis on the hematological picture and some biochemical parameters was considered.

MATERIAL AND METHODS

Narasin is manufactured by Elanco Comp. for Pharmaceutical preparation

This study was carried out at a private farm in Sharkia Province. Fifteen lambs 4-6 week old and 4-5 kg Bwt., ten were diarrheic from coccidiosis and 5 were healthy. They were divided into three equal groups. The lambs of gp1 were clinically healthy control, gp 2 were suffering from diarrhoea due to coccidiosis left without treatment and gp 3 were suffering from diarrhoea due to coccidiosis and treated with narasin (60 ppm /kg. ration) for 10 consecutive days.

All animals were fed on barseem, dry ration and water ad libitum. The lambs which were suffering from coccidiosis showed inappetance, weakness and diarrhea, besides depression, straining and normal rectal temperature.

Fecal samples were prepared for parasitological examination using centrifugal floatation technique for the detection of oocysts (13).

Two blood samples were collected from all animals, before and after treatment 7 and 15 days post treatment. One sample was collected in heparinized tube for hematological study and the 2nd sample was collected in centrifuge tube to obtain clear serum for clinicobiochemical study.

The blood picture was performed according to the techniques previously described (14). Sera were used for the determination of the transaminases (AST-ALT) (15) alkaline

phosphatase (16), total protein (17) and albumin (18). Globulin was calculated as the difference between the total protein and albumin, glucose (19), urea (20), creatinine (21) calcium (22) inorganic phosphorus (23), magnesium (24) and sodium and potassium (25), copper (26), iron (27) and zinc (28) were assayed.

Our data were statistically analysed (29)

RESULTS

Treated gp 3 showed reduction in the number of eimeria oocysts/gm of feces to 100% at 12 days post treatment (table, 1).

Table 2 shows that the coccidiosis induced diarrhea led to significant increase in the total erythrocytic count, hemoglobin content and packed cell volume. The total leukocytic count and lymphocytes were insignificantly decreased and neutrophils, monocytes and basophils insignificant by increase, a significant increase in the eosinophils was recorded in the diseased lambs.

Table 3 shows a significant decrease in the total protein and albumin but the globulin and A/G ratio were insignificantly decreased in the diarrheic lambs.

Table 4 shows significant elevation in activities of the transaminases (AST-ALT), alkaline phosphatase, urea, creatinine and a significant decrease in glucose of the diarrheic lambs

Table 5 shows a significant decrease in the serum sodium, potassium, calcium, inorganic phosphorus, magnesium, copper, zinc, iron and manganese levels in diarrheic lambs compared with the clinically normal lambs (gp 1).

The hematological and biochemical parameters returned to the normal levels on the 15th day post treatment with naracin (gp 3).

Table 1. Efficacy of narasin (60ppm/ kg.bwt) in lambs naturally infested with coccidiosis.

No. of lambs	oocyst /Filed				
	Pre treatment	Days post treatment			
		2	4	8	12
1	10	6	3	0	0
2	8	4	2	0	0
3	9	5	0	0	0
4	12	7	5	2	0
5	8	6	3	0	0

Table 2. Haemogram and leukogram of the clinically healthy and diseased lambs (mean \pm S.E.).

Parameter	GROUPS				
	Gp(1)	Gp(2)	Gp(3)		
			Day post treatment		
			5 th day	10 th day	
RBCs (106/ μ l)	9.03 \pm 0.82	11.21 \pm 0.39*	11.09 \pm 0.28*	9.34 \pm 0.1.62	
Hb (gm/dl)	11.45 \pm 0.33	12.61 \pm 0.32*	12.07 \pm 0.16*	11.57 \pm 1.09	
PCV%	39.82 \pm 1.95	48.93 \pm 1.30**	45.85 \pm 1.16*	41.06 \pm 1.94	
Total WBCs (x103)	10.06 \pm 0.92	9.44 \pm 1.83	9.69 \pm 1.04	9.98 \pm 1.93	
Differential count	Lymphocyte (%)	59.62 \pm 2.42	55.73 \pm 1.89	57.82 \pm 2.04	59.35 \pm 2.07
	Monocytes (%)	3.06 \pm 0.39	3.93 \pm 0.90	3.75 \pm 0.28	3.87 \pm 0.73
	Neutrophils (%)	33.60 \pm 2.91	34.64 \pm 1.84	33.84 \pm 2.63	33.71 \pm 2.70
	Eosinophils (%)	2.20 \pm 0.15	2.95 \pm 0.22*	2.62 \pm 0.08*	2.41 \pm 0.62
	Basophils (%)	1.52 \pm 0.12	1.93 \pm 0.18	1.97 \pm 0.4	1.66 \pm 0.33

*Significant at <0.05

** Significant at <0.01

Table 3. Serum protein, albumin and globulins of the clinically healthy and diseased lambs (mean \pm S.E.).

Parameter	GROUPS			
	Gp(1)	Gp(2)	Gp(3)	
			Day post treatment	
			5 th day	10 th day
Total protein (g/dl)	8.41 \pm 0.54	5.82 \pm 0.61*	6.32 \pm 0.43*	7.97 \pm 0.79
Albumin (g/dl)	4.92 \pm 0.60	2.94 \pm 0.39*	3.30 \pm 0.21*	4.86 \pm 0.57
Globulin (g/dl)	3.49 \pm 0.68	2.88 \pm 0.42	3.02 \pm 0.32	3.11 \pm 0.53
A/G ratio	1.41 \pm 0.19	1.02 \pm 0.21	1.09 \pm 0.19	1.56 \pm 0.25

*Significant at < 0.05

Table 4. Liver and kidney function of the clinically healthy and diseased lambs (mean ± S.E.).

Parameter	GROUPS			
	Gp(1)	Gp(2)	Gp(3)	
			Day post treatment	
			5 th day	10 th day
AST (U/L)	40.42±2.04	47.37±1.92*	45.95±1.03*	42.09±2.32
ALT (U/L)	27.18±1.13	34.21±1.08*	31.23±0.96*	28.08±1.72
Alp. Ph.(I.U/ml)	23.09±2.20	31.12±2.15*	28.17±1.84*	24.29±2.28
Urea (mg/dL)	22.39±2.04	27.94±1.94*	25.06±1.81*	23.04±2.17
Creatinine (mg/dL)	1.84±0.07	2.72±0.12*	2.58±0.25*	1.90±0.31
Glucose (mg/dl)	84.06±2.96	72.12±2.05*	77.15±2.03*	82.74±2.15

*Significant at <0.05

Table5. Serum level of the Macro and micro elements of the clinically healthy and diseased lambs (mean±S.E.).

Parameter		GROUPS			
		Gp(1)	Gp(2)	Gp(3)	
				Day post treatment	
				5 th day	10 th day
Macro- elements	Sodium mg/dl	142.10±3.1	127.56±3.12*	127.56±3.12*	136.84±5.82
	Potassium (mg/dl)	4.06±0.05	2.81±0.49*	3.05±0.37*	3.84±0.68
	Calcium (mg/dl)	8.02±.59	6.17±0.21*	6.52±0.15*	7.97±1.59
	Phosphorus (mg/dl)	4.43±0.56	2.90±0.35*	3.07±0.21*	4.24±0.84
	Magnesium (mg/dl)	4.23±0.23	3.08±0.32*	3.42±0.19*	4.07±0.97
Micro- elements	Copper (ug/100 ml)	169.31±9.2	139.1±6.12*	145.23±5.03*	157.18±4.83
	Zinc (ug/100 ml)	91.05±3.71	74.21±4.2*	82.21±3.04*	89.43±3.93
	Iron (ug/100 ml)	79.89±3.28	51.1±5.9*	67.23±3.83*	74.71±3.92
	Manganese(ug/100ml)	13.15±0.93	8.8±1.02*	9.03±0.96*	11.73±1.61

*Significant at <0.05

DISCUSSION

Narasin is a polyether ionophore which alters the ion transport and disrupts the osmotic balance (30). The newly born animals are reliable to suffer severely from a various of enteric diseases caused by viral, bacterial and parasitic diseases beside nutritional and hygienic conditions such susceptibility up to sudden departure from the sterile intrauterine life condition to an extra uterine polluted environments these pollutants decrease the general body resistance thus neonates become susceptible to severe disease conditions (31)

Coccidiosis caused inappetance, weakness, diarrhea, depression and straining in the infested diarrhetic lambs similar signs were previously recorded (32,33) and showed that the clinical signs of coccidiosis in lambs were diarrhoea, dehydration, weight loss, tenesmus and anemia in 2-8 week old lambs. It has been also recorded that coccidiosis in lambs caused enteritis with greenish yellow watery or bloody diarrhea of offensive odor, besides general weakness and moderate dehydration (34),retarded growth and anemia (35). Similar clinical signs were recorded in goats (36).

The efficacy of narasin at a dose of 60 ppm/kg ration to overcome coccidiosis was evaluated in the present study in diarrheic lambs. Complete disappearance of the oocysts was observed on the 8th day post treatment. In lambs narasin, (a polyether ionophorous antibiotic) showed anticoccidial effect (10), the drug was used as growth promoter in cattle and lambs. The ionophores (monensin or lasalocid) at 20-30 ppm in feed for 7 days induced a complete reduction of the oocyst fecal count (32).

In the present experiment, diarrheic lambs due to coccidiosis revealed a significant increase in the total erythrocytic count, haemoglobin content, packed cell volume beside an insignificant decrease in the total leukocytic count and lymphocytes, there was an insignificant increase in the neutrophils, monocytes and basophils, but the eosinophils were significantly increased. Kids suffering from coccidiosis developed hemoconcentration (37). *Coccidia* infestation causes significant increase in the total erythrocytic count, haemoglobin content and packed cell volume. This change in the erythrogram may be attributed to the excessive loss in body fluids and hemoconcentration (38). Diarrhoea due to coccidiosis induced dehydration and hemoconcentration, (39). Significant elevation in the erythrocytic count and packed cell volume, and insignificant decrease in the total leukocytic count (39, 40).

The concentrations of the total proteins and albumin in the diarrheic lambs due to coccidiosis in our results were evident to show a significant decrease but the globulin and A/G ratio were insignificantly decreased when compared with the healthy lambs. The above mentioned results are in accordance with several previous investigations (8,32,33,41). The above mentioned results could be attributed to the inability of the gut in the parasitized lambs to absorb and assimilate the haemopoietic elements required for the blood serum total protein, albumin and globulin (34,42,43). Moreover, albumin may be lost

with the inflammatory exudate of the damaged tissue (44).

The diarrheic lamb in the present study, showed a significant increase in the mean values of the activities of the blood serum transaminases (AST-ALT) and alkaline phosphatase, beside the urea, creatinine level, meanwhile there was significant decrease in the glucose several reports cited similar results (33, 42, 45,46). The hypoglycemia in lambs suffering from diarrhoea due to coccidiosis could be attributed to anorexia, decreased intestinal glucose absorption, and the low glucose reserve in the young age (43,47).

The statistical analysis of the obtained results revealed a significant reduction in the serum sodium, potassium, calcium, inorganic phosphorus and magnesium levels in the diarrheic lambs suffering from coccidiosis in comparison with the clinically normal lambs. Our results confirm several previously cited studies (33, 48). The increased in the weight of feces up to 40% in diarrheic lambs may be attributed to the increased excretion of water which was accompanied by a considerable loss of sodium, potassium, calcium, inorganic phosphorus and magnesium (47). The hypophosphatemia and hypomagnesemia were mainly due to the decrease in feed intake and malabsorption (49).

The analytical findings of the serum constituents revealed a significant decrease in copper, zinc, iron and manganese. Significant decrease of the serum copper and zinc in goats infested with coccidiosis (50,51) and could be attributed to the malabsorption of the trace elements and impairment of food assimilation in addition to interference with the transportation of micronutrient through the damaged intestinal walls by the parasites and its toxins (8). The genus *Eimeria* multiplies in the intestinal tract and cause tissue damage resulting in interruption of feeding and digestion leading to malabsorption, dehydration and blood loss (5). Such change might be responsible for the reduction of the trace elements in the blood of the infested lambs

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الملخص العربي

تقييم النارسين في علاج الكوكسيديا في الحملان بمحافظة الشرقية

طارق علام يحيى على حافظ ، سهام محمد حسن ملهظ

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الإصابة بالكوكسيديا في الحملان تعتبر من أهم المشاكل التي تواجه مربي الحملان لما تسببه من خسائر اقتصادية كبيرة حيث أنها تؤدي إلى الإصابة بالهزال والضعف العام في الحالات المزمنة بالإضافة إلى تكلفة العلاج في هذه الدراسة يتم دراسة كفاءة احد الأدوية الحديثة (الনারسين) في علاج الإصابة بالكوكسيديا في الحملان.

استهدفت هذه الدراسة معرفة كفاءة النارسين في علاج الإصابة الطبيعية بالكوكسيديا واستبيان بعض التغيرات في صورة الدم وبعض الوظائف البيوكيميائية المصاحبة للإصابة بالكوكسيديا في الحملان. أجريت هذه الدراسة على عدد 105 حمل بمحافظة الشرقية تتراوح أعمارها من 4-6 اسبوع (5 حمل بصحة جيدة خالية من الطفيليات الداخلية والخارجية واستخدمت كمجموعة ضابطة بالإضافة إلى عدد 10 حمل مصابة طبيعياً بالكوكسيديا). تم تقسيم الحملان المصابة بالكوكسيديا إلى مجموعتين الأولى مصابة بالكوكسيديا ولم يتم علاجها، والثانية مصابة بالكوكسيديا وتم علاجها باستخدام النارسين (60 جزء في المليون لكل كيلو عليقة لمدة 10 يوم). تم اخذ عينات براز من الحملان السليمة والمصابة قبل العلاج وبعد نهاية العلاج بـ 7 و 15 يوم وذلك للفحص الباراسيتولوجي لتحديد شدة الإصابة بالكوكسيديا في الحملان وكذلك تم أخذ عينتين دم من كل حيوان قبل العلاج وبعد بـ 7 و 15 يوم الأولى على هيارين وذلك لدراسة تأثير الكوكسيديا على صورة الدم والأخرى لفصل المصل وذلك لقياس بعض الوظائف البيوكيميائية.

أوضح فحص عينات البراز كفاءة النارسين في علاج الكوكسيديا بنسبة 100% عند اليوم الثامن من العلاج.

يتبين لنا من تلك الدراسة أن الإصابة الطبيعية بالكوكسيديا في الحملان أدت إلى حدوث بعض التغيرات في صورة الدم تتمثل في حدوث زيادة معنوية في عدد كرات الدم الحمراء، تركيز الهيموجلوبين، حجم الخلايا المضغوطة ونقص غير معنوي في كرات الدم البيضاء، الخلايا الليمفاوية وزيادة غير معنوية في الخلايا المتعادلة، الخلايا الملتهمة الكبيرة والخلايا القاعدية بينما حدث زيادة معنوية في الخلايا الحامضية

وتشير النتائج أن الإصابة بالكوكسيديا أدت إلى حدوث زيادة معنوية في الترانس أمينيزسس (AST-ALT)، الفوسفاتيز القاعدي اليوريا والكرياتينين، كما أن الكوكسيديا أدت إلى نقص معنوي في البروتين الكلي، الزلال ونقص غير معنوي في الجلوبيولين الكلي والنسبة بين الزلال والجلوبيولين، الصوديوم، البوتاسيوم، الكالسيوم، الفسفور، الماغنسيوم، النحاس، الحديد، المنجنيز البروتين الكلي ونقص غير معنوي في الجلوبيولين الكلي والنسبة بين الزلال والجلوبيولين.

نستخلص من هذه الدراسة أن الكوكسيديا أحدثت بعض الآثار العكسية على صورة الدم وبعض القياسات البيوكيميائية في الحملان ولكن استخدام النارسين في علاج الكوكسيديا أدى إلى تحسن الحالة الصحية للحملان وعادت تلك الوظائف إلى وضعها الطبيعي بعد العلاج بـ 15 يوم .