Evaluation Of Abamectin For Treatment Of Ovine Acariasis In Sharkia Governorate

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ABSTRACT

The present study was designed to investigate the cause of mange among lambs. Moreover, the hematological, biochemical and histopathological studies were done.

Evaluation the effecacy of Abamectin on treatment of mange was evaluated.Ten lambs (1-1.5 years old weghing 30-45kg) which belonged to a private farm in Sharkia Governorate were used in this investigation. The lambs were divided into two equal groups Gp. (1) was (clinically healthy and free from internal and external parasite) was the control. Gp. (2) was suffering from skin lesions, including dermatitis of various degrees besides alopecia, itching, thickening of the skin and loss of condition. This group was treated by the therapeutic dose of Abamectin (0.2 mg kg B.wt). Skin scraping was collected from the diseased group before and after treatment at 5 ,10 and 20 day intervals. Skin biopsy was collected from the diseased lambs for histopathological examination. Two blood samples were collected from the two groups 10, 20 and 40 days post-treatment for hematological and biochemical analysis. The microscopic examination of the skin scraping revealed the presence of Sarcoptic scabiei ovis as the main cause of acariasis in lambs. Treatment of the infected lambs with Abamectin led to the disappearance of mange within 10 days post treatment .

Mange induced a significant decrease in the erythrocytic count, hemoglobin%, packed cell volume, and a significant increase in the total leukocytic count in the infected sheep. The total protein, albumin, bilirubin, total lipids, glucose, calcium, inorganic phosphorus and sodium chloride were significantly decreased and an insignificant decrease in the globulin, potassium and magnesium.

Microscopically, the affected skin showed hyperkeratosis and acanthosis. The dermis was inflamed.

All the hematological and biochemical Parameters were returned to the normal levels ten days after treatment by Abamectin .

It could be concluded that the ovine acariasis induce hematological, biochemical and histopathological changes which returned to the normal values after treament by Abamectin .Abamectin reduced the living mites to 0% 10 days post- treatment .

INTRODUCTION

Mange is the most common and widespread, highly contagious skin disease of sheep. The disease is widely distributed allover the world including Egypt *(1)*. Mange represents a big problem in the local breeds of the Egyptian animals, especially buffaloes and sheep. It causes losses in their production (bodyweight, wool and offspring) *(2)*. The prevalence of mite infestation depends on the nutritional, environmental and immunological state of the host.It increases during the bad nourishment, unsanitary environment ,major stress liver diseases and hypothyroidism *(3)*.

Chemicals still constitute an important part of efforts introduced to control the different parasitic diseases .Abamectin is macrocyclic lactones derived from soil dwelling actinomycetes. It is very effective against nematode, insect and arthropode infestations*(4)*.

The present study focused on the evaluation of the efficacy of Abamectin against the natural ovine acariasis.

The hematological and biochemical parameters in serum as well as the histopathological examination of the infected and treated sheep were tested.

MATERIAL AND METHODS

(1) Animals : -

Ten lambs of native breed (1-1.5 years old and 30 – 45 kg body weight which belonged to a private farm in Hehia, Sharkia Governorate, Egypt) were used in this

investigation. The lambs were divided into two equal groups. Gp. (1) was the control free from internal and external parasite. Gp. (2) was naturally infected with mange and free from internal parasites. The infected lambs were treated with one dose (0.2 mg kg B.wt.) Abamectin subcutaneously .

(2) Sampling:-

A- skin scraping samples.

The skin scrapings were taken from the developed lesions and treated with 10 % sodium hydroxide solution .This skin scraping samples were taken before treatment and 5,10, and 20 days post treatment and examined microscopically according to ***(5&6).***

B) Blood samples.

Blood samples were collected from Gps. (1 & 2) before treatment and 10, 20 and 40 day post-treatment.

1- First blood samples were taken in heparinized tubes for the determination of the erythrocytic and leukocytic counts, hemoglobin percent and packed cell volume according to **(7).**

2-Second blood samples were taken in centrifuge tubes to obtain clear serum for the determination of the total proteins ***(8)*** and albumin ***(9)*** the globulin was calculated by subtracting the albumin from the total protein the cholesterol **(10)** bilirubin ***(11)*** total lipids ***(12)*** and glucose ***(13)*** besides calcium ***(14)***, inorganic phosphorus ***(15)***, sodium and potassium levels by ***(16)*** and magnesium ***(17).*** The chloride levels were determined using the chloride analyser model 925.

C)Histopathological examination:

Skin biopsy from the infected lambs was taken in 10% formalin. Five micron-thick paraffin sections, were prepared and stained with hematoxylin and eosin, and examined microscopically according to***(18).***

D) Statistical analysis:

The obtained results were statistically analyzed using the students T. test according to ***(19).***

RESULTS

A)clinical signs:-

The infected lambs were showed various degrees of alopecia, itching and thickening of the skin at various areas. The affected lambs were emaciated.

B)Efficacy:-

Improvement of the clinical signs was observed following treatment by Abamectin (0.2 mg kg B.wt.). The living mites were (0%), 10 days post treatment (Table 1).

C)Hematological results:

Mange induced a significant decrease in the erythrocytic count, haemoglobin%, packed cell volume, and a significant increase in the total leukocytic count (Table 2)

D)Biochemical: -

The analysis of the blood parameters revealed that the infected sheep showed lower levels of serum total proteins, albumin, cholesterol, total lipids and glucose (Table 3). The calcium, inorganic phosphorus, sodium and chloride were significantly decreased. There was insignificant decrease of potassium and magnesium (Table 4). All the deviations in the hematological and biochemical parameters, caused by mange returned to their normal levels after treatment by Abamectin.

E)Histopathological results:-

Microscopically, the skin of Gp. (2) showed hyperkeratosis and acanthosis (Fig. 1) The mange was seen among the debris of the stratum corneum after the destruction of the tunnels (Fig. 2). Dermatitis was seen (Fig. 3).

Table (1): Efficacy of Abamectin (1 ml / 50 Kg B. wt) on natural acariasis in lambs.

Serial No of lambs	Mites/Field				
	Pre treatment	Days post- treatment			
		5	7	10	20
1	6	4	2	0	0
2	8	3	1	0	0
3	4	2	0	0	0
4	7	5	2	0	0
5	8	6	3	0	0

Table (2): Hemogram of the normal and mange-infected lambs before and after treatment (n = 5)

GROUPS	RBcS (106/c.mm)	H B (g m %)	P C V .(%)	MCV(fl)	MCH(pg)	MCHC(%)	WBCS (103/cmm)
Healthy lamb(control)	8.75±0.48	14.75±0.95	41.25±239	47.81±4.52	16.92±1.08	36.43±4.12	9.5±0.29
Affected lambs	6.25±0.63*	11±0.71*	35±0.82*	57.60±5.54	17.81±0.86	31.52±2.30	11.25±0.48*
10 day post-treatment	7.00±0.76	12±0.82	37.75±3.04	54.68±4.28	17.34±0.95	32.06±1.89	10.5±0.29*
20 day post-treatment	7.25±0.78	12.75±0.48	40±1.98	56.26±5.84	17.83±1.39	31.96±1.09	9±0.41
40 days post-treatment	7.75±0.63	14±0.41	42±1.78	54.06±6.48	18.09±2.31	33.42±0.85	9.25±0.48

* significant at $P < 0.05$ ** significant at $P < 0.01$

RBCS : red blood corpuscles H.B : hemoglobin P.C.V : Packed cell volume MCV : Mean corpuscular volume
MCH : Mean corpuscular hemoglobin MCHC : Mean corpuscular haemoglobin concentration
WBCS : White Blood corpuscles

Table (3): Mean values of some biochemical parameters of the normal and mange-infected lambs before and after treatment. (n=5)

GROUPS	Total protien (gm/100ml)	Albumin (gm/100ml)	Globulin (gm/dl)	AG ratio	Cholesterol (mg%)	Bilirubin (mg/100ml)	Total lipid (mg/100ml)	Glucose (mg/dl)
Healthy lambs (control)	8.63±0.34	4.85±0.26	3.78±0.36	1.3±0.10	129.20±13.20	0.364±0.09	210.46±19.10	63.17±4.36
Mange-affected lamb	6.65±0.66*	3.38±0.49*	3.28±0.46	1.12±0.29	89.63±10.32*	0.396±0.07	160.21±11.16*	44.26±3.42**
10 day post treatment	7.06±0.49*	4.01±0.09*	3.05±0.34	1.28±0.07	96.12±6.10*	0.383±0.09	184.63±10.11	50.13±2.16*
20 day post-treatment	7.12±0.61	3.92±0.41	3. 20±0.43	1.13±0.16	112.90±9.40	0.370±0.06	206.12±19.36	59.22±3.12
45 day post-treatment	8.33±0.65	4.57±0.27	3.86±0.27	1.10±0.04	125.36±9.96	0.365±0.08	212.36±11.12	65.36±4.30

* significant at $P < 0.05$ ** significant at $P < 0.01$

Table (4): Mean values of some minerals in lambs infected with mange, before and after treatment (n = 5)

GROUPS	Calcium (mg%)	Phosphorus (mg%)	CA/PH ratio	Sodium (mmol/l)	Magnesium (mmol/l)	Chloride (mmol/l)	Potassium (mmol/l)
Healthy lambs (control)	10.38±0.43	6.03±0.45	1.89±0.41	131.53±5.13	2.17±0.11	115.21±3.36	4.96±0.74
Mange-affected lambs	7.85±0.84*	4.7±0.29*	1.09±0.22	109.4±1.24**	2.08±0.13	96.36±2.75**	4.15±0.64
10 day post-treatment	9.18±0.11*	5.23±0.36	2.78±0.21	111.55±1.41**	2.03±0.09	101.72±4.67*	4.20±0.39
20 day post-treatment	9.43±0.65	5.68±0.32	1.67±0.14	120.08±3.56	2.15±0.13	109.36±2.70	4.35±0.35
40 day post-treatment	9.78±0.89	6±0.27	1.64±0.16	124.28±2.11	2.2o±0.12	113.41±3.15	4.48±0.31

* significant at P < 0.05 ** significant at P < 0.01

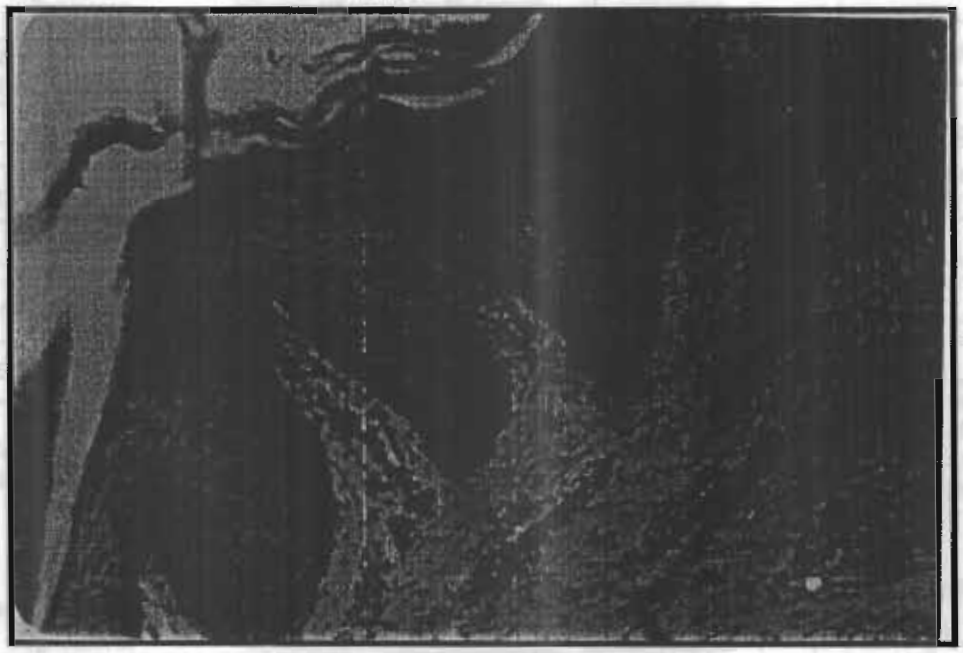

Fig. (1): Gp. (2): Skin showing hyperkeratosis and acanthosis (H&E X 150).

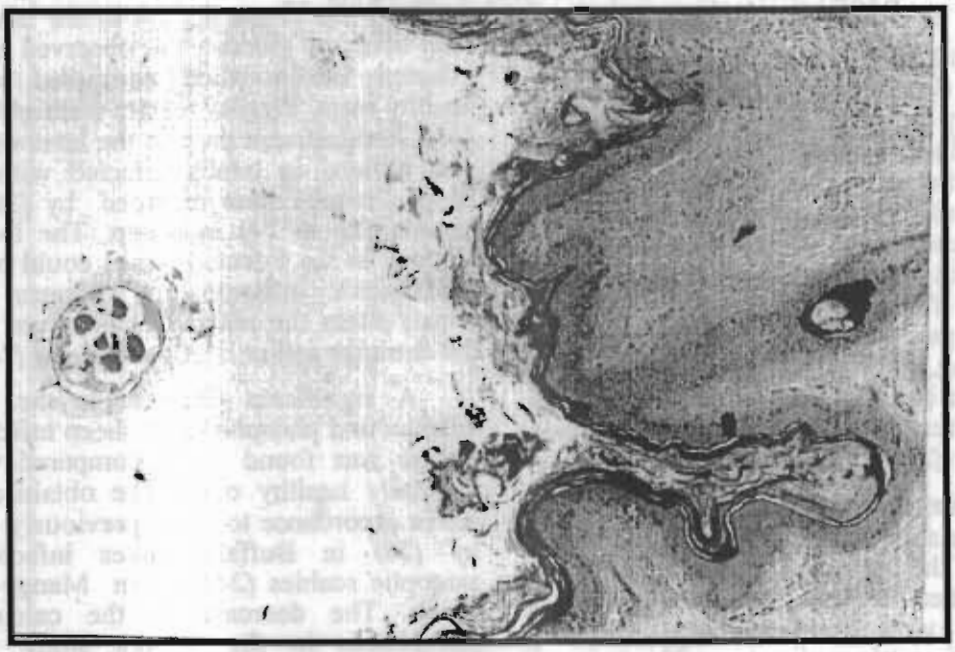

Fig. (2): Gp.(2): The mange is seen among debris of stratum corneum (H&EX150)

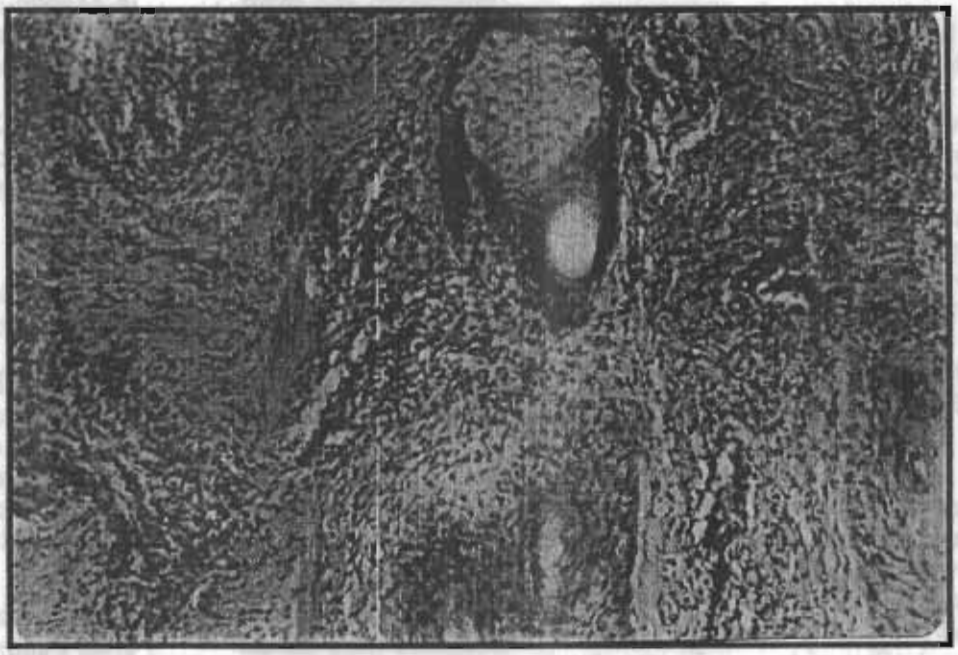

Fig. (2): Gp.(2): Dermatitis is evident. (H&EX150)

DISCUSSION

Trials to evaluate of the efficacy of Abamectin (0.2 mg kg body weight) against the naturally infected lambs with mange was carried out in this study. The clinical signs of mange in the examined lambs, varied from alopecia, itching, thickening of the skin at various areas, besides emaciation. These results are in accordance with previous work obtainad by *(20 & 21)* in camel and *(22)* in sheep. The parasitological examination of the skin scraping, under the microscope, revealed the presence of all stages of sarcoptic scabiei ovis. These results are in agreement with those recorded by *(23 & 24)* in sheep.

Treatment of the naturally infected lambs by mange with Abamectin induced reduction of the living mites to zero percent 10 day post treatment. These results are in concurrence with *(25)* who found that the injection of cattle infected with sarcoptic scabiei ovis with Abamectin (200 micrograms/ kg body weight) induced an efficacy of more than 99% 7 days post-treatment. Similar results were recorded by *(26 & 27)* in rams and bucks.

The hematological results in many lambs revealed a significant decrease in the erythrocytic count, hemoglobin percentage, packed cell volume and increased leukocytic count. Approximately similar results were recorded by *(28)* in buffaloes *(22)* in sheep and *(29)* in goats. The fall in the erythrocytic count, hemoglobin content and packed cell volume indicated anemia. The normal MCV and MCH values indicated the presence of normocytic, normochromic anemia which may be due to malnutrition and debility caused by the mite infection

The analysis of the blood serum constituents, in the diseased lambs revealed hypoproteinemia associated with hypoalbuminemia. The obtained data are in accordance with previous investigation in mange-affected camels *(30 & 31)*, cattle *(32)*, sheep *(22)* and goats *(29)*. Moreover the serum globulin was not affected by the disease status. The change in protein picture can be attributed to anorexia and mange- induced skin damage which led to protein breakdown with a consequent change in the serum protein level *(33, 34 and 27)*

A significant decline in the cholesterol, total lipid and glucose was observed in mange-infected lambs when compared with the healthy ones. Similar results were obtained by *(24)*. A significant drop in the level of glucose was noticed in lambs infected with mange. Similar results were recorded by *(30&31)* in camels *(22 & 24)* in sheep. The low blood glucose in the infected lambs could be due to the chronic inflammatory changes of skin, which alters the normal equilibrium between the entrance and utilization of sugar *(18)* .

A significant decrease in the level of calcium and phosphorus in sheep infected with mange was found when compared with the clinically healthy ones. The obtained results are in accordance to those previously obtained by *(28)* in Buffaloe-calves infected with sarcoptic scabies *(24&22)* in Mange-infected sheep. The decrease in the calcium and phosphorus in the present study may be attributed to the non diffusible albumin - bound fraction. The protein – bound ca + 2 was associated with low protein *(18 & 35)*. There was a highly significant decease in the serum sodium and non significant effect on the potassium and magnesium in Mange-infected lambs when compared with the healthy ones. The obtained results coincide with those previously obtained in camel *(31,22 & 27)*, besides sheep and goats *(22 & 27)* .A significant decrease in the level of chloride in the diseased lambs was observed in this study. The obtained results agree with those previously obtained by *(31)*.

The present investigation revealed that the infected sheep showed itching and alopecia. The migration of mites in the epidermis resulted in irritation of the skin and degeneration of the hair follicles leading to alopecia *(36)*. Microscopically, hyperkeratosis and acanthosis were the result of repeated attaches of the mites to the infected sheep skin, besides degeneration of the epithelial lining of the skin *(37)*.

All the above biochemical parameters regained their normal levels after treatment by Abamectin due to the cure of the diseased sheep .

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تقييم الأبامكتين فى علاج الجرب فى الاغنام بمحافظة الشرقية

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تم أجراء هذه الدراسة على عدد ١٠من الأغنام عمر١٨-٢٤شهر بإحدى مزارع الأغنام بمحافظة الشرقية وذلك لدراسة كفاءة الأبامكتين على الإصابة الطبيعية بالجرب. تم تقسيم هذه الحيوانات إلى مجموعتين كل مجموعة منهما تحتوى على عدد ٥أغنام المجموعة الأولى منها بصحة جيدة خالية من الطفيليات الداخلية والخارجية مجموعة ضابطة والمجموعة الثانية أغنام مصابة إصابة طبيعية بالجرب وتم علاجها بالجر عه العلاجية من الأبامكتين (١ سم/٥٠كجم من وزن الجسم) .تم اخذ قشور من ألاماكن المصابة بالجرب على محلول هيدروكسيد الصوديوم بتركيز ١٠% قبل العلاج وبعد نهاية العلاج بـ ٥ ، ٧، ١٠ يوم وذلك للفحص الطفيلى لتحديد مسبب الجرب وكذلك تم أخذ عينتين دم من كل حيوان قبل العلاج وبعدة ب ١٠،٢٠،٤٠ يوم الأولى على هيبارين وذلك لدراسة تأثير العقار على صورة الدم والأخرى لفصل المصل وذلك لقياس البروتين الكلى ، الزلال ، الجلوبيولين ، الكليسترول،البيلوربين،الدهوت الكلية الجليكوز، الكالسيوم،الفسفور ،الصوديوم ،البوتاسيوم ،الماغنسيوم والكلور ،البوتاسيوم .وتم اخذ عينات من الجلد من الاغنام المصابة بالجرب وذلك للفحص الباثولوجى.

بدراسة كفاءة الابامكتين في علاج الجرب وجد أنة له تأثير قوى وادى الى موت واختفاء طفيل الجرب بكل مراحلة بنسب ١٠٠ % عند١٠ أيام من إعطاء العقار .

تشير النتائج أن الاصابة بالجرب أدت الى حدوث نقص معنوى فى عدد كرات الدم الحمراء، تركيز الهيموجلوبين و حجم خلايا الدم المضغوطة بينما أزدادت عدد كرات الدم البيضاء.

وبدراسة التغيرات البيوكيميائية التى حدثت نتيجة الإصابة بالجرب وجد نقص معنوى في البروتين الكلي ، الالبيومين ،الكولسترول، البيلوربين،الدهون الكلية و الجليكوز في المصل ، .وكذلك ادى الى نقص معنوى فى الكالسيوم،الفسفور ،الصوديوم والكلور بينما ادى الى نقص غير معنوى فى الجلوبيولين ،البوتاسيوم والماغنسيوم . وبدراسة التأثير الباثولوجى للجرب وجد أن طفيل الجرب أحدث تغيرات مرضية بالجلد نتيجة لوجود الطفيل واطوارة الأخرى داخل طبقات الجلد.

و تلاحظ أن استخدام الأبامكتين ادي إلي عودة هذه الدلالات إلي المستوى الطبيعي في مصل الاغنام المصابة والمعالجة .

نستخلص من هذه الدراسة أنالإصابة بالجرب أدت الى بعض التغيرات فى صورة الدم وتغيرات بيوكيميائية ومرضية وان هذة الوظائف عادت الى وضعها الطبيعى بعد العلاج باستخدام الأبامكتين حيث أن هذاء العقار قضى على الطفيل المسبب للجرب بعد العلاج بفترة ١٠ أيام.