

ANTIHELMINTIC TRIALS IN SHEEP INFECTED WITH VARIOUS HELMINTHS IN AL-RASHDIA, BAGHDAD - IRAQ⁺

A.M. Abd AL- Amary*

Abstract:

Anthelmintics were assessed against various gastrointestinal and lung worms infecting a flock of sheep kept in the AL-Rashdia Province, the efficacy of the drugs was assessed by following the faecal egg counts post-treatment in the infected sheep compared to that of control non treated group.

Gastrointestinal helminthes infecting sheep flock were *Ostertagia* spp, *Chabertia ovina*, *Strongyloides* spp, *Nematodirus* spp, *Marshallagia marshalli* and *Moniezia expansa*, Lungworms were *Dictyocaulus filaria*, *Muellerius capillaris* and *Protostrongylus* spp. The efficacies were 90%, 88.63%, 97.62% and 100% for levamisole, Ivomic, tetramisole, and albendazole against different gastrointestinal nematodes respectively. Albendazole was 100% effective against *M. expansa* and *D. filaria* so did, Tetramisole for the second parasite, while Levamisole was not effective against *D. filaria* or *M. capillaris*.

المستخلص:

استخدمت انواع من مضادات الديدان ضد انواع مختلفة من ديدان المعدة و الامعاء و ديدان الرئة في قطع من الاغنام الخمجة في منطقة الراشدية. اذ تم الكشف عن كفاءتها العلاجية من خلال عدد البيوض المطروحة مع البراز بعد علاج الاغنام الخمجة مقارنة بمجموعة السيطرة غير المعالجة. شملت ديدان المعدة والامعاء في الاغنام الخمجة الانواع التالية:-

Ostertagia spp, *Chabertia ovina*, *Strongyloides* spp, *Nematodirus* spp, *Marshallagia marshalli* and *Moniezia expansa*, و ديدان الرئة ضمت الانواع التالية:-

Dictyocaulus filaria, *Muellerius capillaris*, and *Protostrongylus* spp.

وكانت كفاءة العلاجات هي 90% و 88.63% و 97.6% و 100% لدواء الليفاميزول، ايفومك، تتراميزول و البندازول على التوالي ضد انواع مختلفة من الديدان الاسطوانية للمعدة والامعاء. وكانت الكفاءة العلاجية للبندازول 100% ضد الطفيليات *Moniezia expansa* و *Dictyocaulus filaria* وكذلك تتراميزول ضد الطفيلي الثاني بينما الليفاميزول لم يكن فعالاً ضد الانواع

Dictyocaulus filari أو *Muellerius capillaris*

⁺Received on ٢٠٠٥/٩/٥, Accepted on ٢٠٠٧/٨/١٦

^{*}Asst. lect. \Department of Parasitology. College of vet med, University of Baghdad.

Introduction :

Iraq possesses a large population of sheep , estimated to be about 9 million heads. The majority of them, however, are distributed in the middle part, these sheep flocks are exposed to various gastrointestinal parasitic infections . Nematode infection of the gastrointestinal tract and the lung worms comprising the major parasitic problems to these flocks [1,2,3,4].

These parasitic infections are the cause of heavy economic losses due to ill health, lowering productivity besides the costly labour, medications and other control measures[5] Various antihelmintic trials were run in different countries by many workers [6,7,8,9] with variable results against nematodes in sheep and goats .The aim of the present study is to investigate the efficacy of some antihelmintics available in the local market against gastrointestinal nematodes and lung worms infection in sheep .

Materials and Methods :

The study was performed on sheep flock consisting of 46 heads , of local undescriptive Iraqi breeds ,of both sexes, aging between 3- 6 years ,kept at farm in AL-Rashdia province in Baghdad. All animals were examined for various gastrointestinal and lungworm infections .Faecal samples were obtained from all the sheep directly from the rectum, placed in plastic containers and examined by flotation and Baerman's technique [10] in the parasites laboratory. Further, quantitative estimations of the egg output per gram of faeces [e.p.g] were performed for all the samples by the modified – McMaster technique and faecal egg culture were done to ascertain the various nematodes infecting sheep[11] .Egg dimensions and the length of the third larval stages of nematodes were measured by ocular micrometer. Sheep were then divided into five groups and each sheep was identified by an ear tag carrying number. Group I. consisted of 8 animals , received levamisole [Vapco , Jordan] at a dose of 1 g/15 kg B.Wt dissolved in water (10 ml) and drenched orally according to the manufacturers recommendation. Group II. consisted of 9 animals, treated with Ivomic,[Merck and Co.Inc.,N.J.,U.S.A] at a dose rate of 0.5 ml / 50 kg body weight by subcutaneous injection underneath the axilla .Group III, consisted of 11 animals received Tetramisole[Tetramisole Hcl .Bp ,Icl Ltd ,Macclesfield cheshire , Engiand] at a dose of 15mg/kg B. W. .Group IV, consisted of 9 animals, treated with Albendazole[Vapco ,Jordan] at a dose of 5 mg / kg B.W. administered orally. The rest were 9 animals kept as control infected non treated groups. All the groups were administered the different antihelmintics on the same day [Day 1] of the experiment .Following the antihelmintics treatment ,their efficacy was followed by performing the egg counts e.p.g and culture at second , third and fifth day after dosage .

Results :

Table 1 shows the different types of gastrointestinal and lung worms infection in animals among the different groups in this study . The mean faecal egg counts of the different groups before treatment were 500,977.77,763.63 ,355.55, and 650 e.p.g .for the first , second , third , fourth , and fifth ,(control groups) respectively[Table 2].

The results of the laboratory identification of the eggs and faecal egg culture are presented in Table[1].It appears that all animals in the different groups were infected with different helminths.overall infection rate was 95 .65 % .Highest infection 58 .69% was with *Chabertia ovina*, followed by 45.65% with *Strongyloides spp*.The lowest infection was 2.17% with *Nematodirus spp* .

Faecal egg culture revealed the presence of five species of gastrointestinal nematodes and three different species of lung worms, in addition oocyst of some *Eimeria spp* .were seen as well(Table 1).Eggs of *Moniezia expansa*(cestodes)were also seen in 9 animals.Thus constituting an infection of about 19. 56% [Table 3] .

Three different species of lung worms were seen in the studied flock namely, *Dictyocylus filaria*, *Protostrongylus spp* and *Muellerius capillaris* [Table 4]. The results of the trial with the four different anthelmintics used in this study against gastrointestinal nematodes were presented in [Table 2].

Group 1 of the animals which received levamisole treatment had an average of 500 e.p.g before dosing which was reduced by 70% ,85% and 90% on the second ,third, and fifth day post treatment respectively . This means that levamisole had 90% efficacy against these parasites . Group II were treated with Ivomic by s/c injection. the faecal egg counts was 977 . 77 e.p.g befor treatment but this were reduced by 75% , 84.05% and 88.63% on the second , third and fifth day respectively. Thus Ivomic showed to be 88.63 % effective against various helminths infecting these animals [Table 2] .

Group III were drenched with tetramisole. Their egg counts were 763.63 e.p.g before treatment but reduced by 80.95%,90.47% and 97.62% at the second ,third and fifth day respectively.This drug had 97. 62% efficacy against different helminths [Table 2] .

Group IV had Albendazole treatment with faecal counts of 355.55 e.p.g before dosing which were reduced by 95.62 % , 100% and 100% at the second,third and fifth day post - treatment respectively [Table 2] .

The faecal counts of the control group [Group v] is presented in [Table 2].It is more or less at the same level through the experiment. The efficacies of the different antihelmintics used in the present trial against lung worm were presented in [Table 4]. A total of 12 sheep were infected with *D. filaria* which upon treatment disappeared almost completely except in two animals .Levamisole was non effective at all against *D. filaria* and *M. capillaris* [Table 4] .

Adminstration of Ivomic cured the single cases which were infected with *D. filaria* and *Protostrongylus spp* . However ; It was non effective against *M. capillaris* and the animals remained shedding larvae in their faeces [Table 4] .

Albendazole and tetramisole were effective in curing the *D. filaria* infected sheep .but tetramisole was non effective in the removal of the *protostrongylus spp* . infection [Table4] . Albendazole adminstration to the nine *M. expansa* infected sheepresulted in a rapid cure with 100% efficacy from the third day after dosing [Table 3] .

Discussion

During the present investigation trials on four different antihelmintics and their efficacies were assessed under field condition against various gastrointestinal nematodes and lungworm infection in sheep .Thus all the four antihelmintics were found effective in different degrees against gastrointestinal nematodes infection .In the present study it was found that Albendazole is 100% effective against the different gastrointestinal nematodes , lungworm and cestode infection . These

findings agree with the results of the other workers [12,6,8,9,13]. The authors, however, used the Albendazole at a dose of 3.5 mg / kg orally. [14] reported effective reduction of *Trichostrongylus* and *protostrongylus* spp. from sheep after dosing with albendazole. [15] reported 71.1 % reduction in some gastrointestinal helminths in goats following Albendazole treatment. [13] reported 100% efficacy of Albendazole against *D. filaria*, *M. capillaris* and *M. expansa* and similar results were reported here. [16] found 99% efficacy of Albendazole against *M. capillaris* infection in goats.

In the present study dosing sheep with tetramisole at a dose of 15 mg / kg B.wt. showed 97.62 % efficacy against various gastrointestinal helminths. [9] reported 72.2% efficacy of this drug against various gastrointestinal nematodes in goat. The difference in the above results could be related to the managerial conditions together with presence of resistant worms in that area.

Tetramisole when given to *D. filaria* infected sheep in this study resulted in a complete recovery, this indicates its high efficacy against this parasite. However, it was non effective against *protostrongylus* spp. [10] mentioned high efficacy of this drug against *D. filaria* and there is some doubt in regard to its efficacy against immature rather than, adult parasites. The results obtained here with tetramisole contradict to those of [9] who reported inferior efficacy to other anthelmintics and against gastrointestinal nematodes in this study. Efficacy of Ivermectin in this study was 88.63 % against gastrointestinal nematodes. [17] found 96% efficacy against certain helminths infecting the gastrointestinal tract together with *D. filaria* in sheep. [18] reported very high activity against various gastrointestinal and lungworm infections in sheep. [19] reported 97.7% to 100% efficacy against gastrointestinal nematodes of sheep and 66.5% against *M. capillaris* and *Cyst. ocreatus*. [20] reported 100% efficacy of Ivermectin through the reduction in the egg of nematodes in the faeces. [21,22] found 100% efficacy of ivermectin against all strongyle worms in sheep. [23] obtained similar results except in one sheep in which the count remained 10 – 15 e. p.g. Differences in the results are difficult to explain in the view of the present findings and this aspect needs further investigation. Levamisole in this study gave 90% efficacy against gastrointestinal helminths. However, it cured one animal with *D. filaria* but did not eliminate *M. capillaris* from both sheep. This result disagrees with that of [24] in that *Ostertagia*, *Chabertia ovina* and other *Strongyles* were resistant to the levamisole. [25] obtained complete eventual recovery in the lambs infected with *Ostertagia* spp. following levamisole treatment. Significant reduction in the faecal egg counts in the trichostrongyles infected sheep were reported [26,27,9] in goat. [28] reported efficacy of 55% for levamisole against trichostrongylus worm in sheep. [21] reported high efficacy of levamisole against gastrointestinal helminths except *Ostertagia* and trichostrongylus where it was less effective.

Levamisole in this study did not affect *M. capillaris* and *D. filaria*. [16] reported 40 % - 64% efficacy against the same parasite in goat, [15] reported 57.4% reduction in some trichostrongyle worms in goats following treatment with levamisole. These variations could be attributed to the differences in the strains of the parasite and its susceptibility to the drugs. The cases of lung worm infection in the present study were few in number and more accurate information on the efficacy of anthelmintics could be obtained by further investigations on large number of infected sheep.

Table [1]: Distribution of different helminth species in experimental sheep.

Species	No. of the infected animals	Percentage of infection
<i>Ostertagia spp</i>	16	34.782
<i>Chabertia ovina</i>	27	58.695
<i>Strongyloides spp</i>	21	45.652
<i>Nematodirus spp</i>	1	2.17
<i>Moniezia expansa</i>	9	19.56
<i>Marshallagia marshall</i>	20	43.478
<i>Eimeria spp</i>	1	2.17
<i>Dictyocaulus filaria</i>	12	26.086
<i>Muellerius capillaris</i>	3	6.521
<i>Protostrongylus spp</i>	2	4.347

Table [2] :Efficacy of the four different antihelmintics used in this study .

Group	No. of animals	Anthelmintics and dosage	Mean of e.p.g.				Percentage efficacy
			e.p.g. pre-treatment	Post –treatment(day)			
				2 nd	3 rd	5 th	
I	8	Levamisole lg.../15kg B.wt orally	500	150	75	50	90
II	9	Ivomic 0.5 ml /50kg.B.wt s/c	977.77	244.44	155.55	133.33	88.63
III	11	TetramisoIe 15 mg /kg B.wt orally	763.63	145.45	36.36	18.18	97.62
IV	9	Albendazole 5mg / kg B.wt orally	355.55	155.5	0	0	100
V	9	ControlI	650	710	590	620	----

Table 3 :Efficacy of albendazole in sheep infected with *Moniezia expansa* .

Total number of Sheep	infected animals No. (%)	Efficacy % 2 nd 3 rd 5 th (days)
46	9 (19.56)	60 100 100

Table 4 : Effect of the four antihelmintics against the three different lungworm species in sheep .

Drugs	Species of the lungworm		
	<i>D. filaria</i>	<i>Protostrongylus</i>	<i>M. capillaris</i>
Levamisole	2**	-	2*
Ivomic	1	1	1*
Albendazole	3	-	-
Tetramisole	6	1*	-
Total number	12	2	3

*positive after – treatment .

** one of them remained positive after treatment

References

1. Muslih ,N.J . ;Zangana, I .K. and Arsalan ,S.H ."Incidence of various clinical Diseases in sheep and goats in North Iraq" . *int . J.. Anim.. Sci .* , Vol.3,PP.157-163,1988.
2. Al- Obaidi , N .M . *A study of the epidemiology of lungworm of sheep in Ninevah Province , Iraq* . M. Sc . thesis . College of Vet Medicine University of Mosul ,1989.
3. AL – Saeed , A .T .M. and Al- Khalidi , N.W "A Study the epidemiology of the abomasal Nematodes of sheep in Mosul -(Iraq)" *J . Vet . Parasitol .* , Vol.4,No.1,PP. 17- 20,1990.
4. Alani , A .J . and Yahya , H.Q. "A study of the epidemiology of intestinal helminthes infecting sheep slaughtered at Mosul abattoir" , *J. Vet .Parasitol .* , vol .5, No.2,PP. 34 –38,1992.
5. Altaif , K.I."Effect of antihelmintic treatment on the performance of Awassi sheep in Iraq" .*Trop. Anim . Hith . prod .* ,Vol. 111,PP. 241 – 245 ,1979.
6. Girardi .C.and Gallo,M.G."Antihelmintic activity of thiophanate in sheep" . *Rivistadi zootechnica Veterinaria* ,Vol 9,PP.169'(Veterinary Bulletin 1982,Vol.52, No.1,Abst.231,1981.
7. Kettle ,P.R.;Viasoff,A.Reid T.C.;and Horton,C.T. " A survey of nematode control measures used by milking goat farmers and of antihelmintic resistance on their farm" .*N.Z.Vet . J .* ,Vol. 31,PP. 139 – 143,1983 .
8. Guha,C.;Roy,S.and Banerjee ,A .K." Efficacy of Albendazole (Albendazole) In the treatment of gastrointestinal nematodes in goats in West Bengal". *Ind. Vet . J .* , Vol.63, PP.1042- 1044,1986 .
9. Guha,C.and Banerjee ,A.K." Efficacy of four antihelmintics in the treatment of Gastrointestinal nematodes of goat –A comparative assessment" . *Ind . Vet . J .* , Vol. 64, PP. 335 - 337 , 1987.
10. Soulsby, E. J .L . *Helminths , Arthropods and protozoa of Domesticated Animals* .7 th edition, Baillier Tindall . London . pp. 269- 284,1982 .
11. Anon ,A.J . . *Manual of Veterinary Parasitological Laboratory Techniques* . Technical Bulletin No : 18 . Ministry of Agri . , Fisheries and Food . ADAS . Her Majesty Stationary . Office London . pp . 11- 37, 1986.
12. Shanata , C.S. ; Wan , S .P. and Cheath , T .S." Antihelmintic trials against gastrointestinal helminths of goat. I . The efficacy of Albendazole" .*Malaysia Vet . J .* , Vol.7,No.1,PP.1 - 10 . Vet . Bull . 52(11) . Abst . 7073,1980 .

13. Corba, J., Krupicer, I.; Legeny, J. and Stoffa, P. "Albendazole, a new broad Spectrum antihelmintic for ruminants". *Veterinarstri* Vol.38No.3, PP. 121 – 122. *Vet. Bull.* Vol.58No.11, Abst. 7065, 1988.
14. Cordero - Del – Campillo, M.; F.A. and Banos, P., "Efficacy of Albendazole against protostrongylid infestation in sheep". *Vet. Rec.*, Vol.106, No.22, PP.458, 1980.
15. Charles, T.P.; Pompeu, J. and Miranda, D.B., "Efficacy of three broad spectrum antihelmintics against gastrointestinal nematode infection of goats". *Vet. Parasitol.*, Vol.34, PP.71– 75, 1989.
16. Heimonas, H.A.; Horla, S.T. and Liakos, V.D. "Treatment of Muellerius capillaris infection in goat". *Bulletin of Hellenic Vet. Med. Soc.*, Vol.31No.4, PP. 233 – 234, 1980.
17. Wescott, R.B. and Leamaster, B.R. "Efficacy of Ivermectin against naturally acquired and experimentally induced nematode infection in sheep". *Amer. J. vet. Res.*, Vol.43, No3, PP. 531-533, 1982.
18. Chabala, J.C.; Morzik, H., Tolman, R.; Campbell, W.C. and Ostlind, D.A. "Ivermectin a new broad - spectrum antiparasitic agent". *J. Medicinal Chemistry*, Vol.23 No.10, PP.1134–1136, 1980.
19. Dorchie, P. and Lahitte, J. "Antiparasite treatment of sheep with Injectable Ivermectin". *Revue de Medecine veterinaire*, Vol. 137, No.7, PP. 485-490. *Vet. Bull.* Vol. 57. Abst. 313, 1987.
20. Niangu, J.C.; Wescott, R.B. and Ruvuna, F. "Comparision of Ivermectin and thiabendazole for treatment of naturally occurring nematode infections of goat in Kenya". *Vet. Parasitol.*, Vol. 23, No.3–4, PP.205–209, 1987.
21. McKenna, P.B. and Watson, T.G. "The comparative efficacy of four broad spectrum antihelmintics against some experimentally induced trichostrongyloid infection, in sheep and goat". *N.Z. Vet. J.*, Vol. 35, No.11, PP.192 - 195, 1987.
22. Bouche, C.; Belot, J. and Parent, R. "Observation on ivermectin treatment of Village sheep at the end of dryseason in the Sahel". *Bulletin Mesuel de la societe Veterinaria pratique de France*, Vol.73, No.1, PP. 25–39. *Vet Bull.* (1989), Vol.59, No.10, Abst. 5975, 1988.
23. Helle, O. "Deworming of sheep with Ivermectin after housing in autumn". *Norsk Veterinaerti disskrift.*, Vol.98, No.12, PP.931-932. *Vet. Bull.* Vol.58, No.6. Abst. 3541, 1986.
24. Kotrla, B. and Kozolan, O. "Repeated antihelmintic treatment and its effect on the Course of natural helminth infection of sheep". *Veterinari Medicina*, Vol.26, No.8, PP. 497–504, *Vet. Bull.*, Vol.52, No.6, Abst. 3220, 1981.
25. Connan, R.M. "Ostertagiasis in young lambs in spring". *Vet. Rec.*, Vol.119, No.14, PP.359 – 360, 1986.
26. Briajaya, and Stevenson, P. "The effect of Antihelmintic treatment on the weight gain of Village sheep in West Java". *Penjakit Hewan*, Vol. 17, No.30, PP.5 – 7. *Vet. Bull.* 1986, Vol.57, No.11, Abst. 137, 1985.
27. Reddy, M.R. and Hafez, M. "Efficacy of Levamisole on the gastrointestinal Nematodes of sheep". *Livestock Advisor.*, Vol.12, No.1, PP.51 – 53, 1987.
28. Elliott, D.T. "Removal of *Haemonchus contortus* *Ostertagia circumcincta* and *Trichostrongylus* spp: from goats by Morantel citrate, Levamisole hcl, Fenbendasole And Oxfendazole". *New Zealand Vet. J.*, Vol.35, No.12, PP.208 – 210, 1987.