

Efficacy Of Albendazole And Ivermectin Suspensions In Treatment Of Gastrointestinal Nematodes In Sheep , A Comparative Study

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ABSTRACT

A study was undertaken to investigate the effect of albendazole and Ivermectin suspension (oramectin)[®] in the treatment of sheep naturally infested with gastrointestinal nematodes in Sharkia province. Twenty four sheep aged from 10-12 months and weighing 30-40 kgm were used. They were selected according to the presence of eggs of gastrointestinal (GI) nematodes in their faeces. The animals were classified into four equal groups each of 6 animals and treated as follows: 1st group (G1) was non-infested non-treated and served as negative control, 2nd group (G2) was naturally infested with gastrointestinal (GI) nematodes, non treated and served as positive control, 3rd group (G3) was naturally infested with GI nematodes and treated with albendazole suspension 2.5 % (2 ml/10 kgm bwt.), 4th group (G4) was naturally infested with GI nematodes and treated with oramectin suspension (2.5 ml/10 kgm bwt.). Blood samples were collected for biochemical and haematological findings at zero day, and after 7th, 14th, 21st and 28th day post treatment (PT), faecal samples were also collected from each animal to detect the drug efficacy which was assessed as a percentage of egg reduction (Faecal egg count reduction percent, FECR%) , then at 7th, 14th, 21st and 28th day post treatment (PT). Biochemical and haematological findings were recorded and compared with infected non-treated control. Ivermectin suspension treated group revealed more efficient effect (98.81%) than that of albendazole suspension (91.54%). The effect of tested drugs on liver function and blood picture of tested animals revealed an improvement with no differences between them.

INTRODUCTION

Sheep are among the first domestic animals kept by man for the production of meat, milk, skin and wool. Gastrointestinal (GI) parasites are often observed among our country's livestock and it causes widespread infection leading to important economic losses (1,2). Gastrointestinal nematodes sensitize animals to shortage of trace elements and vitamins (3-6).

Dede et al.(7) recorded significant changes in the biochemical metabolism of hosts attacked by parasites. The changes in clinically important parameters and the activities of enzymes are important findings to indicate pathological situations (8,9).

The " ideal anthelmintic" should be safe, highly effective against adult and immature stages of the important worms, rapidly and completely metabolized, available in a variety of convenient formulations, economical to be use and be compatible with other commonly used compounds (10).

Albendazole is one of benzimidazoles which represent a large family of broad spectrum anthelmintics. It is widely used for many years in a wide range of animal species (11). The mode of action of benzimidazoles is by inhibition of nematode tubulin formation (12).

Ivermectin is an avermectin used for elimination of internal and external parasites in cattle, sheep, goats and camels. It is a fermentation product of *Streptomyces avermitilis*. It acts as a GABA agonist, causing paralysis of susceptible arthropods and nematodes; it also inhibits the enzymes implicated in the glycolytic pathway, the primary source of energy in worm (13).

This study was conducted to compare the efficacy (Faecal egg count reduction percent, FECR %) of Albendazole suspension 2.5% and Ivermectin suspension (Oramectin)[®] in treatment of GI nematodes in sheep with special references to their biochemical and haematological changes in treated animals.

MATERIAL AND METHODS

Material

Animals

The present study was conducted on 24 sheep aged from 10-12 months and weighing 30-40 kgm. They were freely housed in sheds and fed on concentrated ration and tiben, they were belonged to private farm in Kafr Saker, Sharkia province.

Drugs

1-Albendazole suspension 2.5%, it is an oral suspension for the treatment of gastrointestinal nematodes in animals. It is manufactured by Pharma Swede Co. Egypt, each ml contain 25 mg of albendazole. Its dose level in sheep is 2 ml /10 kgm bwt.to be given once as drench according to the instructions of the manufacturing company.

2-Ivermectin suspension (Oramectin)®.it is an oral solution for the treatment of gastrointestinal nematodes in animals .It is manufactured by Pharma Swede Co. Egypt, each 1 ml contain 0.8 mg of ivermectin.Its dose level is 2.5 ml / 10 kgm bwt (200 µg Ivermectin / kg) to be administered once as a drench or via stomach tube according to the instructions of the manufacturing company.

Experimental design

Animals in this study were grouped into four equal groups (6 animal/each) , 1stgroup (G1) was non-infested non-treated and served as negative control, 2nd group (G2) was naturally infested with gastrointestinal nematodes non treated and kept as positive control, 3rd group (G3) was naturally infested with GI nematodes and treated with albendazole suspension 2.5 % (2 ml/10 kgm Bwt.) and 4th group (G4) was naturally infested with GI nematodes and treated with ivermectin suspension (2.5 ml/10 kgm Bwt.).

Samples

Faecal samples were collected from each animal directly from the rectum in poly-ethylene sacs and examined for detection of the eggs of gastrointestinal nematodes (GI) and counting the eggs to determine the severity of infestation. Faecal samples were examined by direct smear concentration method and egg count by McMaster technique (15).

Blood samples were collected for biochemical and haematological findings (heparenized for haematological studies and serum collection for biochemical tests) at zero day, then at 7th,14th ,21st and 28th day post treatment (PT).Faecal samples were collected from each animal to detect the drug efficacy which was assessed as a percentage of egg reduction (Faecal egg count reduction percent , FECR%)then at 7th,14th ,21st and 28th day PT. Biochemical and haematological findings were recorded and compared with infested non-treated control.

Methods

1) Faecal examination includes

Direct smear method (14) and Mc Master Technique (15).

2) Haematological studies include

Red and white cell counts (16), blood haemoglobin concentration (17), packed cell volume (PCV) (18), differential leucocytic count (19), Red blood indices (20), Mean corpuscular volume (MCV), Mean corpuscular haemoglobin (MCH) and Mean corpuscular haemoglobin concentration (MCHC).

3) Biochemical studies include

Serum transaminases (AST& ALT) (21), and serum alkaline phosphatase (ALP) (22).Total serum proteins (gm %) (23) and albumin (24), while serum globulins were determined by subtracting serum albumin from total serum proteins.

Sodium and Potassium (25), Calcium (26) phosphorus (mg/dl) (27) and Magnesium (28) were also determined.

Statistical analysis

Data were statistically analyzed according to SPSS program (29)

RESULTS AND DISCUSSION

The efficacy of tested drugs on sheep naturally infested with GI nematodes

A strong correlation can occur between egg counts and worm burden with the presence of clinical signs of parasitic gastroenteritis (30,31). They added also that counts less than 500-1000 egg/gram faeces mixed species in sheep are

considered to be mild ,while over 9000-10000 are considered as heavy infestation.

The clinical signs of infested sheep were chronic body loss, dark green almost soft faeces, anorexia, odema of intermandibular space (bottle jaw), mucosa and conjunctiva are pale, and easily detachable wool. Similar clinical signs were previously recorded (32).

Our results were illustrated in Table.1 which revealed that the mean pre-treatment egg count per gram faeces (epg) of gastrointestinal nematodes (GI) in G3, and G4 at zero time were 2700-8940 (5180) and 2800-9110 (5250) respectively.

The results showed that FECR% (Faecal egg count reduction %) in group(3) was 65.21 %, 79.80 %, 87.24 % and 91.54%,while in group(4) it was 88.23 %, 91.85%, 95.35%and 98.81% at 7th ,14th ,21stand 28thday PT

respectively. These results revealed that ivermectin suspension was more effective than albendazole suspension in treatment of GI nematodes in sheep, which may be due to presence of benzimidazole resistance.

In Alpin goat (33) and in Kasmer vally sheep (34) nearly similar count was recorded.

Ivermectin was 96% effective against gastrointestinal nematodes of Pashmina goats (35). On the other hand albendazole efficacy in commonly grazed sheep in a semi-arid area near Mafikeng, South Africa, from January to March 2006 was more than 80% in most farms and 60-68% in some farms (36). The clinical anthelmintic efficacy of albendazole and ivermectin given to lambs naturally infested with gastrointestinal nematodes was 79.0% and 91.9% respectively (37).

Table 1. The efficacy of oral administration of albendazole suspension 2.5 % (2 ml/10 kgm bwt.), and ivermectin suspension (2.5 ml/10 kgm bwt.) given once on fecal egg count reduction percent (FERC %) and egg count per gram feces (epg) in sheep naturally infested with Gastrointestinal nematodes (Mean ± SE) n=6

| Group | Time | Before treatment (Zero time) | | Days post treatment | | | | | | | |
|---------------------------|------|------------------------------|--------|---------------------|--------|------------------|--------|------------------|--------|------------------|--------|
| | | epg | FERC % | 7 th | | 14 th | | 21 st | | 28 th | |
| | | | | epg | FERC % | epg | FERC % | epg | FERC % | epg | FERC % |
| Albendazole treated group | | 2700-8940 (5180) | 0 | 1802 | 65.21 | 1046 | 79.80 | 660 | 87.24 | 438 | 91.54 |
| Ivermectin treated group | | 2800-9110 (5250) | 0 | 617 | 88.23 | 427 | 91.85 | 244 | 95.35 | 62 | 98.81 |

Haematological results

Gastrointestinal nematodes can lead to anemia as a result of decrease in the amount of hemoglobin and number of erythrocytes (7). So, eliminating anemia is important for the treatment.

Effects of naturally infested sheep with gastrointestinal nematodes on various haematological parameters have been shown in Table 2. The values of total erythrocytic count ,haemoglobin content ,PCV%, and other haematological indices (MCV,MCH,MCHC)

were significantly decreased, while total leucocytic count was significantly increased with eosinophilia in infested groups compared with control non-infested non-treated group, similar results were previously obtained (38).

It was observed that, haemoglobin level returned to its normal level after ivermectin usage (39).

The decrease in RBCs, PCV%, Hb% and blood indices might be due to blood loss from parasitism especially *Haemoncus spp.* as well as reduction of amino acid and impairment in

absorption, utilization and assimilation of some elements essential for erythropoiesis (40). While increase in WBCs and eosinophilia can be attributed to the reaction and sensitivity of the

host against the secretory products of parasites (41).

Post treatment with the two drugs showed that there was improvement in haematological parameters with no differences between them.

Table 2. The effect of oral administration of albendazole suspension 2.5 % (2 ml/10 kgm bwt.), and ivermectin suspension (2.5 ml/10 kgm bwt.) given once on blood picture in sheep naturally infested with Gastrointestinal nematodes (Mean \pm SE) n=6

| Parameter | Group Control Non infested (zero time) | Infested Group (zero time) | Albendazole treated group | | | | Ivermectin treated group | | | |
|----------------------------------|---|----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | | | 7 th day | 14 th day | 21 st day | 28 th day | 7 th day | 14 th day | 21 st day | 28 th day |
| RBCs (10 ⁶ x cumm) | 11.2 \pm a 0.18 | 6.92 \pm d 0.35 | 7.25 \pm c 0.25 | 8.76 \pm c 0.40 | 10.04 \pm bc 0.32 | 10.69 \pm b 0.18 | 7.95 \pm c 0.34 | 9.26 \pm cb 0.45 | 10.24 \pm b 0.56 | 10.96 \pm ab 0.61 |
| Haemoglobin (gm %) | 11.6 \pm a 0.54 | 5.69 \pm d 0.43 | 7.45 \pm c 0.25 | 8.38 \pm cb 0.25 | 9.44 \pm b 0.55 | 10.12 \pm ba 0.54 | 7.51 \pm c 0.25 | 8.55 \pm cb 0.43 | 9.84 \pm b 0.25 | 10.75 \pm a 0.41 |
| PCV % | 32.0 \pm a 0.85 | 20.12 \pm d 0.36 | 24.40 \pm c 0.24 | 26.60 \pm c 0.25 | 29.2 \pm ab 0.81 | 30.8 \pm a 0.85 | 25.41 \pm c 0.25 | 27.68 \pm cb 0.43 | 29.82 \pm ab 0.75 | 31.18 \pm a 0.85 |
| MCV(cu u) | 30.81 \pm a 0.68 | 26.81 \pm c 0.55 | 27.9 \pm c 0.45 | 29.32 \pm cb 0.23 | 29.92 \pm b 0.69 | 30.08 \pm a 0.68 | 28.19 \pm cb 0.61 | 29.62 \pm b 0.43 | 30.02 \pm ab 0.75 | 30.62 \pm a 0.85 |
| MCH(u ug) | 9.60 \pm a 0.41 | 8.14 \pm b 0.05 | 8.91 \pm b 0.12 | 9.08 \pm ab 0.22 | 9.18 \pm ab 0.25 | 9.48 \pm a 0.41 | 8.77 \pm b 0.64 | 9.00 \pm b 0.56 | 9.04 \pm ab 0.58 | 9.58 \pm ab 0.64 |
| MCHC % | 31.08 \pm a 0.46 | 27.99 \pm c 0.36 | 28.42 \pm c 0.44 | 29.14 \pm b 0.65 | 29.88 \pm b 0.62 | 30.5 \pm ab 0.55 | 28.57 \pm c 0.25 | 29.09 \pm cb 0.26 | 29.75 \pm b 0.32 | 31.00 \pm a 0.33 |
| WBCs(10 ³ x mm) | 8.85 \pm c 0.31 | 10.92 \pm a 0.25 | 10.05 \pm ab 0.45 | 9.65 \pm b 0.55 | 9.15 \pm b 0.54 | 9.56 \pm b 0.48 | 10.15 \pm ab 0.28 | 9.82 \pm b 0.34 | 9.35 \pm b 0.24 | 9.12 \pm b 0.36 |
| Neutrophils % | 40.5 \pm a 0.82 | 39.2 \pm ab 0.95 | 39.9 \pm a 0.34 | 40.3 \pm a 0.45 | 40.5 \pm a 0.44 | 41.5 \pm a 0.54 | 39.7 \pm ab 1.03 | 40.13 \pm a 0.42 | 40.35 \pm a 0.95 | 41.05 \pm a 0.85 |
| Eosinophils % | 4.5 \pm c 0.28 | 9.0 \pm a 0.24 | 8.2 \pm a 0.25 | 7.5 \pm b 0.30 | 6.5 \pm b 0.42 | 6.5 \pm b 0.52 | 7.86 \pm ab 0.24 | 6.95 \pm b 0.25 | 6.05 \pm b 0.22 | 5.86 \pm cb 0.32 |
| Basophiles % | 0.3 \pm cb 0.1 | 0.4 \pm c 0.2 | 0.3 \pm c 0.1 | 0.3 \pm c 0.2 | 0.3 \pm c 0.1 | 0.3 \pm c 0.2 | 0.3 \pm c 0.1 | 0.33 \pm cb 0.1 | 0.3 \pm c 0.1 | 0.31 \pm c 0.1 |
| Lymphocytes% | 50.5 \pm b 0.91 | 47.5 \pm c 1.18 | 47.6 \pm c 1.17 | 48.0 \pm c 0.94 | 48.8 \pm cb 0.95 | 49.0 \pm cb 0.88 | 47.96 \pm c 1.21 | 48.25 \pm c 0.95 | 49.08 \pm cb 0.88 | 49.55 \pm cb 0.94 |
| Monocytes% | 3.4 \pm b 0.18 | 3.5 \pm cb 0.26 | 3.5 \pm cb 0.25 | 3.5 \pm cb 0.22 | 3.4 \pm b 0.24 | 3.5 \pm b 0.25 | 3.5 \pm cb 0.24 | 3.5 \pm b 0.35 | 3.4 \pm b 0.24 | 3.4 \pm b 0.44 |

Means within the same column carrying different letters are significant at P < 0.05

Biochemical results

The results are illustrated in Table.3,our results revealed that animals naturally infested with GI nematodes showed a non significant effect on serum transaminases (AST&ALT),and alkaline phosphatase (ALP), these results were reinforced with those previously obtained (42).A significant decrease was noticed in total proteins, albumin and globulins in animals naturally infested with GI nematodes ,the decrease in total proteins may be attributed to the presence of parasites which interfere with absorption of protein intake (43,44).Also may be due to edema that resulted from infestation with GIT nematodes (45,46) .

Pathological changes in the intestinal tract, leading to changes in biochemical parameters in animals infested with gastrointestinal nematodes (4, 5, 6, 47).

Kaneko et al.(8), and *Karagul et al.*, (9) recorded that the activities of ALP, ALT and AST enzymes in serum were significantly changed because of degeneration of cellular membrane, loss and collapse of diffuse tissue inflammation. The AST and ALT enzyme activities in sheep infested with gastrointestinal nematodes did not change (6). *Ceylan et al.* (48) found that there were no significant change in the activities of these enzymes in goats infested naturally with GIT.

Ceylan et al.(48) and *Molento et al.*, (49) found that the total protein levels in some animals such as cattle and goats infested with different GI parasites did not significantly changed; on the other hand there were reports indicating their increases in sheep infested with endoparasites (6) and goat experimentally infested with GI nematodes (50).

Mean values of serum sodium, potassium, calcium, phosphorus and magnesium in sheep naturally infested with GIT nematodes revealed a significant decrease in their levels compared with control non-infested non-treated group

(Table4).Macro element shortage observed in parasitic diseases leads to clinical defectiveness, loss of efficiency and death (7,8).The decrease of such elements may be attributed to the inability of the gut in parasitized animal to absorb and assimilate these elements due to change in pH (43).

Moreover,Trichostrongylosis infestation of lambs reduces the absorption of phosphorus and increases the loss of endogenous phosphorus thus leading to phosphorus deficiency (32).

Mbuh and Mbwaye (50) found that the levels of Na and Ca decreased in goat because of parasitism but K level wasn't affected from disease. *Ayaz et al.* (6) reported that Na, K, Ca levels didn't change in sheep infested with endoparasites while Mg and P were increased. In several studies it was reported that macro element concentrations such as Ca, Na, Mg , K, P changed after ivermectin application in ewes naturally infested with gastrointestinal nematodes (51,52).

Ceylan et al.(48), observed that there were non significant changes in levels of Ca, Na, Mg, K in goats naturally infested with gastrointestinal nematodes and treated with ivermectin.

Post treatment with the two drugs showed an improvement in these biochemical parameters with no differences between them.

CONCLUSION

Finally we can conclude that oral administration of ivermectin suspension in sheep naturally infested with GI nematodes is efficacious than that of albendazole suspension. The effect of tested drugs on liver function and blood picture of tested animals revealed that the two drugs showed that there was improvement with no differences between them.

Table 3. The effect of oral administration of albendazole suspension 2.5 % (2 ml/10 kgm bwt.), and ivermectin suspension (2.5 ml/10 kgm bwt.) given once on liver function parameters in sheep naturally infested with Gastrointestinal nematodes

(Mean \pm SE) n=6

| Parameter | Group Control Non infested (zero time) | Infested Group (zero time) | Albendazole treated group | | | | Ivermectin treated group | | | |
|------------------------------|--|-------------------------------------|---------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | | | 7 th day | 14 th day | 21 st day | 28 th day | 7 th day | 14 th day | 21 st day | 28 th day |
| AST (IU/L) | 98.00 \pm d | 97.20 \pm d | 96.7 \pm d | 95.3 \pm d | 97.08 \pm d | 97.55 \pm d | 95.97 \pm d | 98.1 \pm d | 96.11 \pm d | 96.96 \pm d |
| | 27.79 | 22.35 | 27.87 | 25.25 | 27.79 | 23.25 | 25.11 | 20.9 | 29.6 | 26.41 |
| ALT (IU/L) | 16.70 \pm b | 15.87 \pm b | 16.00 \pm b | 16.7 \pm b | 16.3 \pm b | 16.7 \pm b | 16.55 \pm b | 15.99 \pm b | 16.21 \pm b | 16.9 \pm b |
| | 7.18 | 7.68 | 7.8 | 8.33 | 7.18 | 8.12 | 8.11 | 7.65 | 7.41 | 8.0 |
| ALP (IU/L) | 235.5 \pm d | 225.47 \pm d | 235.8 \pm d | 239.5 \pm d | 235.50 \pm d | 240.5 \pm d | 240.7 \pm d | 234.55 \pm d | 240.47 \pm d | 236.28 \pm d |
| | 178.62 | 169.26 | 177.94 | 180.68 | 178.62 | 178.88 | 178.2 | 179.4 | 177.88 | 178.36 |
| Total serum protein(gm%) | 6.91 \pm a | 5.75 \pm c | 5.96 \pm c | 6.30 \pm cb | 6.52 \pm b | 6.72 \pm a | 6.28 \pm cb | 6.48 \pm ab | 6.58 \pm ab | 6.75 \pm a |
| | 0.28 | 0.38 | 0.23 | 0.28 | 0.22 | 0.02 | 0.53 | 0.23 | 0.43 | 0.24 |
| Albumin (gm %) | 3.71 \pm a | 2.84 \pm c | 2.99 \pm c | 3.19 \pm cb | 3.30 \pm b | 3.47 \pm ab | 3.19 \pm bc | 3.31 \pm ab | 3.35 \pm ab | 3.5 \pm ab |
| | 0.45 | 0.35 | 0.43 | 0.37 | 0.54 | 0.44 | 0.58 | 0.42 | 0.40 | 0.30 |
| Globulin (gm %) | 3.28 \pm a | 2.81 \pm c | 2.97 \pm c | 3.11 \pm b | 3.22 \pm b | 3.25 \pm a | 3.09 \pm b | 3.17 \pm b | 3.23 \pm ab | 3.25 \pm a |
| | 0.51 | 0.55 | 0.32 | 0.42 | 0.53 | 0.52 | 0.45 | 0.22 | 0.18 | 0.22 |

Means within the same column carrying different letters are significant at $P < 0.05$

Table 4. The effect of oral administration of albendazole suspension 2.5 % (2 ml/10 kgm bwt.),and ivermectin suspension (2.5 ml / 10 kgm bwt.) given once on sodium , potassium, calcium, phosphorus and magnesium levels in sheep naturally infested with Gastrointestinal nematodes (Mean \pm SE) n=6

| Parameter | Group Control non infested (zero time) | Infested non treated group (zero time) | Albendazole treated group | | | | Ivermectin treated group | | | |
|-----------------------|--|---|---------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | | | 7 th day | 14 th day | 21 st day | 28 th day | 7 th day | 14 th day | 21 st day | 28 th day |
| Sodium (mmol/L) | 147.6 \pm a | 142.85 \pm b | 143.24 \pm b | 143.95 \pm b | 144.85 \pm ab | 145.96 \pm a | 143.65 \pm b | 144.81 \pm ab | 145.25 \pm ab | 146.15 \pm a |
| | 4.8 | 5.95 | 5.66 | 5.41 | 4.9 | 4.93 | 5.81 | 5.24 | 4.95 | 4.65 |
| Potassium (mmol/L) | 5.26 \pm a | 5.11 \pm b | 5.14 \pm b | 5.18 \pm ab | 5.20 \pm a | 5.24 \pm a | 5.11 \pm b | 5.17 \pm ab | 5.21 \pm a | 5.25 \pm a |
| | 0.36 | 0.63 | 0.51 | 0.49 | 0.58 | 0.54 | 0.44 | 0.49 | 0.46 | 0.55 |
| Calcium (mg/dl) | 11.88 \pm a | 5.18 \pm d | 7.90 \pm c | 8.13 \pm c | 10.12 \pm b | 10.88 \pm b | 7.88 \pm c | 10.76 \pm b | 10.88 \pm b | 10.95 \pm ab |
| | 0.40 | 0.15 | 0.52 | 0.13 | 0.42 | 0.25 | 0.38 | 0.45 | 0.52 | 0.21 |
| Phosphorus (mg/dl) | 6.91 \pm a | 4.81 \pm c | 5.44 \pm cb | 5.98 \pm b | 6.55 \pm ab | 6.59 \pm a | 5.98 \pm b | 6.14 \pm b | 6.35 \pm b | 6.58 \pm ab |
| | 0.49 | 0.58 | 0.62 | 0.23 | 0.32 | 0.54 | 0.32 | 0.25 | 0.45 | 0.18 |
| Magnesium (mg/dl) | 2.67 \pm a | 1.8 \pm c | 2.04 \pm c | 2.12 \pm b | 2.15 \pm b | 2.29 \pm ba | 2.17 \pm b | 2.28 \pm b | 2.35 \pm b | 2.40 \pm ab |
| | 0.11 | 0.32 | 0.12 | 0.54 | 0.21 | 0.24 | 0.52 | 0.12 | 0.18 | 0.10 |

Means within the same column carrying different letters are significant at $P < 0.05$

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الملخص العربي

كفاءة الالبندازول والايفرمكتين في علاج الاصابة بالديدان المعوية في الاغنام (دراسة مقارنة)

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أجريت هذه الدراسة على قطيع من الأغنام المصاب طبيعياً بالديدان المعوية في مزرعة تابعة لمحافظة الشرقية لعمل مقارنة بين تأثير كلا من الالبندازول والايفرمكتين بالفم في علاج الديدان المعوية في الأغنام وقد استخدم في هذه الدراسة عدد ٢٤ رأس من الأغنام يتراوح اعمارهم من ١٠-١٢ شهر ويتراوح أوزانهم من ٣٠-٤٠ كجم/حيوان ، في اليوم الأول تم اخذ عينات دم وروث من الحيوانات وتم تحليل الروث لتحديد درجة الإصابة وأيضاً تم تحليل الدم وأظهرت نتائج التحاليل الدموية للحيوانات المصابة انخفاضاً معنوياً في عدد كرات الدم الحمراء وتركيز الهيموجلوبين وحجم الخلايا المضغوطة وكذلك كان هناك

زيادة معنوية في عدد كرات الدم البيضاء. أوضحت التحاليل البيوكيميائية لمصل الدم لنفس الحيوانات عدم وجود اختلافات معنوية في وظائف الكبد (AST,ALP,ALT) بينما أظهرت النتائج نقصا معنويا في تركيز البروتين الكلى والألبومين وأيضا نقصا ملحوظا في نسبة الصوديوم والبوتاسيوم والكالسيوم والفسفور والماغنسيوم وأوضحت الدراسة ان التغيرات الدموية والكيميائية في الحيوانات المصابة ماهى إلا انعكاسا لدرجة الاصابه . وقد تم تقسيم الحيوانات إلى اربع مجموعات كل مجموعة تتكون من ٦ حيوانات على النحو التالي : المجموعة الأولى غير مصابة وغير معالجة(الضابطة) ، المجموعة الثانية مصابة وغير معالجة ، المجموعة الثالثة مصابة ومعالجة بالألبندازول (٢ مل/١٠ كجم من وزن الحيوان) بالفم ،المجموعة الرابعة مصابة ومعالجة بالايفرمكتين (أورا مكتين) (٢,٥ مل /كجم من وزن الحيوان) بالفم . تم جمع عينات روث من الحيوانات المعالجة بعد العلاج ب ١،٢،٣،٤ أسابيع وكذلك عينات دم لمتابعة تطور الحالة بعد العلاج. بعد انتهاء التجربة تم تقييم فعالية الأدوية كنسبة مئوية من الحد من عدد البويضات (الديدان المعوية) في روث الحيوانات المصابة والمعالجة (FECR %). وأظهرت النتائج أن FECR % في المجموعة (٣) كانت (٦٥،٢١ ، ٧٩،٨ ، ٨٧،٢٤ ، ٩١،٥٤) ، في المجموعة (٤) كانت (٨٨،٢٣ ، ٩١،٨٥ ، ٩٥،٥٣ ، ٩٨،٨١) مما سبق يمكننا القول بأن مستحلب الأيفرمكتين الذى يعطى بالفم اظهر كفاءة أعلى من مستحلب الالبندازول فى علاج الديدان المعوية فى الاغنام. فيما يتعلق بتأثير كلا الدوائين على التغيرات البيوكيميائية لمصل الدم فقد أوضحت الدراسة انهما اظهرا تحسنا ملحوظا فى هذه النسب بدون اختلافات ملحوظة بينهما .