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EFFICACY OF IVERMACTIN AGANIST SOME NATURALLY ACQUIRED GASTRO-INTESTINAL PARASITIC INFECTION IN MULES

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SUMMARY

The activity of a single subcutaneous injection of ivermectin at dose of 200 mcg/kg of body weight was evaluated against naturally acquired gastro-intestinal parasites in mules. Faecal samples were examined at the time of treatment and weekly thereafter up to 4 weeks. Results indicated that invrmectin was highly effective (100%) against Oxyuries equi, Strongyloides westeri, Tristostronglus axei, Trichhonema spp., and Strongylus spp. as judged one week after ivermectin administration.

Complete elimination of Parascaris equorum eggs occurred two weeks after treatment. In contrast, ivermectin was not effective against the tape worms, Anoplocephala spp.. Infected animals had low levels of haemoglobin and red blood cells counts and an elevated packed cell volume, white blood cells and erythrocyte sedimentation rate.

These values returned to normal values 21 days post treatment. No adverse reaction was recorded in the treated animals.

INTRODUCTION

Various types of gastro-intestinal parasites were found infecting mules in northern Iraq (1). The control of gastro-intestinal parasites is one of the major problems in equines (2). Many drugs were in use in the field against these parasites in horses, donkeys and mules. The recently developed antipyretic

drug ivermectin (22,23 – dihydroavermectin B1, produced by Streptomyces avermitilis) has been reported to be highly effective against most gastro-intestinal parasites in equids (3-5). However, there is a paucity of data on the efficacy of inverrmectin against naturally intestinal parasitic infection in mules (6). Most reports emphasis the effectiveness of ivermectin in controlling the intestinal round worm, however, data on the effectiveness against tapeworm are lacking (6).

The primary aim of this study was to evaluate the efficacy of injectable inermectin against mixed natural infection of gastro-intestinal parasites in mules.

MATERIALS AND METHODS

A total of 20 mules, 4 to 7 years old of both sexes, weighing 250 to 280 kg were used in this experiment. These animals were kept stabled in an army unit at Al-Khazer (northern Iraq). Faecal sample were obtained directly from the rectum and kept in plastic containers. Blood were taken from jugular vein in a plastic tube containing EDTA and smears for differential leukocytic count were prepared by the convential technique. Samples were then transferred to the Clinical Pathology Laboratory in the College of Veterinary Medicine (Mosul) for further examination which include the identification of eggs parasites and for haematological examination.

Animals are divided in to two groups, group 1 : consist of 14 mules. (Table 1). Group 2 : comprised 6 mules infected with the same parasites in group 1 and served as a control group. Faecal egg count (epg) was done for both groups on day 0, 7, 14, and 21 per and post treatment using the modified

McMaster method (7). The identification of eggs were done according to Thienpont, et al. and Soulsby (8,9).

Blood samples were collected at the same intervals for protein haematological index including red blood cells (RBC) hemoglobin (Hb) packed cell volume (PCV) white blood cells (WBC) erythrocyte sedimentation rate (mm/1hr) and differential leukocyte count (%) by the methods of Schalm (10).

The ivermectin was given s/c at shoulder region (1.0 % w/w solution and at a dose of 200 mcg/kg B.W.) (11). Injections were given at a rate of 1 ml/50 kg B.W.

Clinical observations were made daily during the test periods for any untoward effects after treatment.

RESULTS

Seven species of gastro-intestinal parasites were recognized in both groups including Oxyuries equi, Strongyloides westeri, Trichostrongylus axei, Trichonema spp., Parascaris equorum, Strongylus spp. and Anoplocephala spp., mixed infection was occured and some of them showed 6 species of parasites (Table 1 and 2). Mean epg values for both groups before and following invermection treatment were presented in Table 1 and 2.

Two weeks following treatment, the faecal egg counts (epg) values were uniformly reduced 100% for most species of parasites (Table 1).

Anoplocephala spp. was recorded in 5 mules only. Treatment was 10 % - 40 % effective. Faecal egg counts of Strongyllus spp., O. equi, Trichonema spp., Trichostrongylus axei, Strongyloides westeri were presented in faeces of all mules in both groups prior ivermectin treatment. Mean epg

ranged from 400 to 1250, these eggs were absent one week post treatment expect those which showed P. equorum eggs which gave 100 % clearance two weeks post treatment (Table 1).

Control non-treated group did not showed reduction in faecal egg count, and their total epg ranged from 900 to 2450 throughout the experiment (Table 2).

All infected animals including controls revealed a decrease in Hb and RBCs and an elevation in PCV, WBC and ESR. These values reach approximately to the normal values 21 days following ivermectin treatment. However, infected nontreated group showed no changes in their haemogram throughout the experiment.

No untoward reaction was recorded in the treated animals.

DISCUSSION

In reviewing literatures no published work on the efficacy of injectable ivermectin on the parasitic infection in Mules could be found (6).

From the present study it was found that ivermectin had 100% efficacy against most gastro-intestinal parasites tract of mules.

Lyons (3,12) have reported 91%-100% efficacy of this drug in horses. The elimination of most nematodes eggs from faeces one week following administration suggests the high efficacy against all stages of life cycle of these worm (5).
Partial activity of the drug was observed against P. equorum one week following treatment but 100% efficacy was noticed two weeks later, this may be attributed possibly to the noneffectiveness of this dose level or more than one

administration is required. Lyons, et al. (14) their emphasized in this study the efficacy of paste formulation of ivermectin on the removal of P. equorum rather than the injectable form of the drug.

A lack of activity against the tapeworm (Anoplocephala spp.) was found here and similar results have been reported by others (3,4,15). This may be attributed to the mode of action by which the drug affect and eliminate the parasite from the gastro-intestinal tract. Two animals (No. 6 and 11) died on day 3 and 8 respectively following ivermectin treatment. The cause of the death was attributed to the development of colic. Post mortom finding indicated numerous mesenteric aneurysms and this might be due to previous parasitic infection (Table 1).

Decrease in the values of Hb and RBCs in the infected mules reflects blood loss due to the activity of parasites resulting in the development of anaemia. It may also results from the protein loss due to inflammation and ulceration of the gastro-intestinal tract which could lead to impaired absorption or excretion of protein large molecules through the injured mucosal calls (11).

Leukocytosis occured as a result of secondary bacterial infection at the site of intestinal damage by the parasite (7). Changes in the haemograms return to its normal values reported in a previous work (Unpublished data) 7 - 21 days following treatment, indicating the ability of ivermectin to eliminate most of the parasites from the gastro-intestinal tract (6,11).

Non of the treated animals showed sign of toxicosis or local reaction at the site of injection either immediate or delayed which agree with the finding of Asquith and Kulwich, Bello and Lyons (16-18).

One the basis of clinical, faecal and haematological findings, it can be concluded that invemectin at a dose of 200 ug/kg B.W is highly effective and safe drug for the control of gastro-intestinal nematodes in mules.

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Table 1 : Pre- and posttreatment gastrointestinal parasites (faecal eggs count, epg) for mules throughout the experiment.

No.	Sex	Age (years)	Time	Faecal Eggs Count (EPG)							Efficacy (%)
				A	B	C	D	E	F	G	
1	F	4	0	0	400	0	350	0	350	150	0
			7	0	0	0	0	0	0	125	90
			14	0	0	0	0	0	0	100	92
			21	0	0	0	0	0	0	100	92
2	F	5	0	0	0	0	0	0	400	0	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
3	F	5.5	0	250	350	100	200	50	450	0	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
4	F	6	0	150	150	0	0	150	450	50	0
			7	0	0	0	0	50	0	40	90.5
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
5	F	5.5	0	0	0	350	150	0	200	0	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
6	F	7	0	150	200	200	0	100	400	100	0
				animal die on day 3							

7	F	7	0	0	0	0	0	0	50	350	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
8	F	5.5	0	1000	150	0	150	50	400	0	0
			7	0	0	0	0	0	0	0	98.8
			14	0	0	0	0	0	0	0	100
			21		0	0	0	0	0	0	100
9	F	6	0	50	300	100	300	0	250	100	0
			7	0	0	0	0	0	0	80	92.5
			14	0	0	0	0	0	0	80	92.5
			21	0	0	0	0	0	0	75	93.5
10	M	4	0	200	200	200	100	200	200	0	0
			7	0	0	0	0	140	0	0	87.3
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
11	M	9	0	0	250	150	150	150	400	50	0
			7	0	0	0	0	50	0	50	91.3
				animal die on day 8							
12	M	7	0	100	100	0	0	0	400	0	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100
13	M	6	0	150	150	300	0	100	250	50	0
			7	0	0	0	0	0	0	50	95
			14	0	0	0	0	0	0	40	96
			21	0	0	0	0	0	0	40	96
14	M	5	0	200	200	200	150	0	150	0	0
			7	0	0	0	0	0	0	0	100
			14	0	0	0	0	0	0	0	100
			21	0	0	0	0	0	0	0	100

(A) Oxyuris equi (B) Strongyloides westeri (C) Trichostrongylus axei (D) Trichonema spp. (E) Parascaris equorum (F) Strongylus spp. (G) Anoplocephala spp.

time 0 = before treatment, 7 = 7 days post treatment, 14 = 14 days post treatment, 21 = 21 days post treatment, F = Female, M = Male.

Table 2 : Faecal eggs count (epg) of gastrointestinal parasites in mules in control group.

No.	Sex	Age (years)	Time	Faecal Eggs Count (EPG)						
				A	B	C	D	E	F	G
1	F	7	0	100	0	0	200	200	400	0
			7	100	0	0	200	200	400	0
			14	150	0	0	200	350	500	0
			21	150	0	100	200	350	500	0
2	F	6.5		0	0	0	0	0	400	0
			7	0	0	0	0	0	400	0
			14	0	0	0	0	0	600	0
			21	0	0	0	0	100	650	0
3	F	5	0	250	600	0	0	0	0	1200
			7	0	400	0	0	0	0	1400
			14	0	400	0	0	0	0	1200
			21	0	400	0	0	0	0	1200
4	F	5	0	200	400	0	0	200	600	0
			7	100	350	0	0	200	650	0
			14	100	400	0	0	200	650	0
			21	100	450	0	0	200	950	0
5	M	7	0	0	300	1400	0	100	600	0
			7	0	200	1200	0	100	600	0
			14	0	200	1400	0	50	800	0
			21	0	250	1400	0	100	800	0
6	M	6.5	0	0	0	200	200	0	1200	200
			7	0	0	200	200	0	1200	200
			14	0	0	250	200	0	1400	600
			21	0	0	300	500	0	1400	600

(A to G and time) see Table 1.

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اختبار فعالية عقار الايفوميك ضد بعض طفيليات المعدة والامعاء المخمجة طبيعيا في البغال

عامر نعمت سليم

فرع الطب الباطني والوقائي / كلية الطب البيطري / جامعة الموصل / موصل ، العراق.

الخلاصة

تم تقييم كفاءة الايفوميك (الايفرمكتين) ضد الاصابة الطبيعية بديدان المعدة والامعاء في البغال باعطائها جرعة واحدة قدرها (٢٠٠) مايكروغرام / كغم من وزن الجسم تحت الجلد. اجرى فحص البراز قبل العلاج وبعده دوريا لمدة شهر واحد وكانت نسبة تأثير عقار الايفوميك بواقع ١٠٠% ضد طفيليات Strongyloides westeri ; Oxyuries equi ; Trichonema spp and Strongylus spp. ; Tristrostrongylus axi في الاسبوع الاول بعد العلاج. بينما كان تأثير العقار ضد الطفيلي Parascaris equorum بعد اسبوعين من العلاج كما لوحظ عدم كفاءة العقار المذكور ضد الديدان الشريطية Anoplocephala spp..

أظهرت الحيوانات المصابة انخفاض في مستوى هيموكلوبين الدم وعدد كريات الدم الحمراء وزيادة في مقياس الدم وكريات الدم البيضاء ونسب ترسيب كريات الدم الحمراء وقد لوحظ رجوع هذه النسب الى معدلاتها الطبيعية خلال ٢١ يوم من بدء العلاج.

لم يظهر العقار أي تأثيرات جانبية على الحيوانات المعالجة خلال فترة التجربة.