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EFFECT OF SYNANTHIC AND IVOMEC ON TRICHINELLA SPIRALIS WITH REFERENCE TO THEIR SEROLOGICAL EVALUATION

BY

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SUMMARY

Three groups, each of 10 rats were experimentally infected with *Trichinella spiralis* larvae (250/rat). On the 5th week postinfection animals of two groups were treated with a single dose of Synanthic (Oxfendazole) and Ivomec MK-933 at a dose of 5 mg and 0.2 mg/kg B. W. respectively. Efficacy rate of the former was 84.2% and for the later was 73.5% depending on the number of living larvae in the diaphragm. *Anti-Trichinella spiralis* haemagglutinating antibodies were monitored before and after treatment. They were markedly declined two weeks after treatment. This makes passive haemagglutination test a feasible test to evaluate the drug efficacies either in laboratory or field studies.

INTRODUCTION

Trichinella spiralis is a zoonotic parasite distributed allover the world. For many years much attention has been paid to the effect of drugs against both muscular and intestinal phases of trichinosis (Campbell and Denham, 1983). In Egypt, Selim et al. (1982) studied the trichinicidal effect of Fenbendazol, Neguvon and Methyridine on the adult and larval forms of *T. spiralis* in mice.

Due to contradictory and conflicting results of some drugs against encysted larvae in the muscles, the present study aimed at evaluating comparatively the effect of synanthic (oxfendazole) and Ivomec MK933 (avermectin) on the encysted larvae in rats. Also serological monitoring of haemagglutinating antibodies was adopted to confirm the parasitological evaluation.

MATERIAL AND METHODS

1- Animals experimented:

Thirty laboratory bred male rats, weighing 150 gm each, were allocated into three equal groups. Each animal orally received 250 *Trichinella spiralis* larvae derived from pig muscles.

2- Drugs and administration:

Six weeks post infection (PI) animals of the:

a) Group I; were orally treated with a single dose of synanthic (oxfendazole, Mycofarm, Ireland Ltd.) at a rate of 5 mg/kg B.W.

b) Group II; were subcutaneously injected with Ivomec MK-933 (MSD) at rate of 0.2 mg/kg B.W.

c) Group III; were kept as infected non-treated control until the end of the 11th week PI.

3- Parasitological examination:

Two rats from each group were sacrificed weekly on the 7th to 11th week PI. Their diaphragms were artificially digested according to Reinecke (1982) and Maki and Yanagisawa (1983). Efficacy of each drug was primarily calculated in term of total larval count per digested diaphragm using the formula of Moskey and Harwood (1941). Statistical analysis was done with the aid of Minitab Soft Ware Program (1986).

Table (1): Effect of Synanthic and Ivomec MK on the 6 weeks old *T. spiralis* encysted vae in rat diaphragm

Rat No.	Group I	Group II	Group III
1	211	166	821
2	135	341	890
3	0	217	915
4	155	193	818
5	101	260	901
6	193	245	994
7	148	281	945
8	209	131	888
9	0	285	975
10	270	269	877
Mean±SE*	142±13.0	238.8±19.8	902.4±18.4

* Values vary significantly at $p < 0.05$
NB: Efficacy of Synanthic is 84.2% and of Ivom 73.5%.

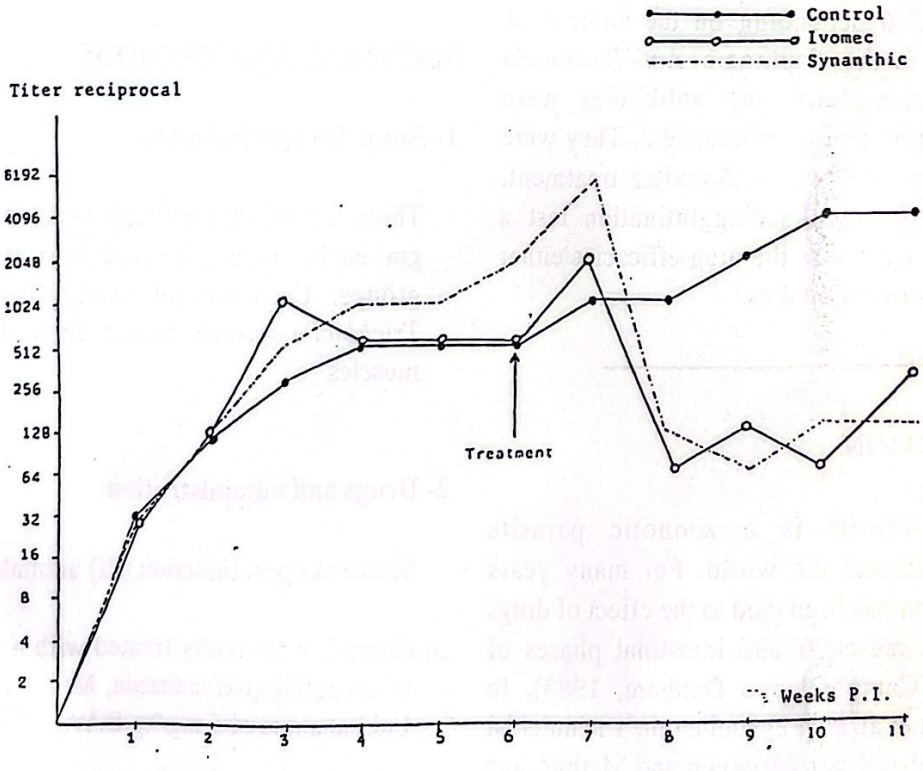

Fig. (1): Pattern of haemagglutinating antibodies before and after treatment.

4- Monitoring of haemagglutinating antibodies:

The passive haemagglutination test was employed to measure the specific antibodies weekly before and after treatment (Pina et al, 1989) till the end of the experiment. The PHA test was carried out after Kagan and Norman (1969), but formalinized sheep erythrocytes were used instead of tanned cells (Barrett, 1983).

To prepare *T. spiralis* antigen larvae were procured from heavily infested pig muscles after digestion and purified by centrifugation in percoll (Candolfi, et al., 1988). Larvae hemogenized, sonicated and the soluble antigen was then separated by cool centrifugation at 10,000 for 2 hours.

RESULTS

Examination of diaphragms of treated and non-treated rats revealed the anti-trichinella effect of Synanthic and Ivomec MK-933. The mean larval count was 142±13.0 per diaphragm of Synanthic-treated rats and 238.8 ± 19.8 of non-treated ones.

Efficacy of Synanthic and Ivomec was 84.2% and 73.5% respectively (Table, 1).

Diaphragms of rats No. 3 and No. 9 (Group. I) were found to harbour no larvae by digestion technique, while all rats (Group II & III) were harbouring infection allover the period of experiment.

By using passive haemagglutination test, some rats showed positive reaction at 1/2 and 1/8 titres. This was completely eliminated by dilution of sera at 1/16.

The weekly seroversion of anti-trichinella haemagglutinating antibodies in rats of the three groups seems to be in a parallel pattern before treatment (Fig. 1).

Sera of rats No. 3 and No. 9 gave positive reactions at titres of 1/256 and 1/512. Sera of treated animals showed an overall decline in the antibodies level during 8th, 9th and 10th post infection.

Sudden increase in the titres occurred on the 7th week (a week after treatment). Lowered levels of antibodies were fluctuating during the weeks after treatment.

DISCUSSION

It is obvious from the present study that Synanthic at therapeutic single dose was enough to kill 84.2% of *T. spiralis* larvae in the diaphragm of rats. However, Fernandez (1979) obtained 88% killing rate in mice but by repeated dosing of oxfendazole. Approximately the same efficacy (82.7%) was reported by Selim et al. (1982) after S/C injection of Methyridine in mice.

Ivomec proved to be less effective than Synanthic as it eliminated 73.5% of the encysted larvae. This may be due to stimulation of oxfendazole to excessive inflammatory infiltrate in the cysts similar to that produced by mebendazole (Fernandez, 1979 and Maki and Yanagisawa 1988).

Repeated injection of Ivermectin at increasing dose rate of 3 mg per Kg B. W. was enough to kill 99% of larvae in rats (Rapic et al. 1982). The efficacy of treatment at a dose of 0.3 mg/kg B. W.

was 84% against migrating larvae and 83% against encysted forms.

Positive reaction of some sera before infection is attributed to occurrence of multispecific IgM (Immunoglobulin M) which is also strong agglutinator although it is present at low concentration if compared to other antibodies (Tizard, 1987).

The parasitologically larval free rats (Synanthic treated, No. 3 & 9) were positively reacting at variable titres. This indicates the occurrence of some larvae which overlooked the examination and are capable of releasing strong and specific antigens enough to keep haemagglutinating antibodies circulating in the blood as long as they live (Ottesen et al. 1975, Warren, 1978 and Silberstein and Despommier, 1984).

The sudden increase of antibodies on the 7th week is due to release of strong immunogenic products from the destroyed larvae.

Although there were a marked drop in the antibodies level, their pattern still fluctuating on the 8th-11th week. This could be immunodepressive and immunopotentative effect of the larval products, as in many other metazoan parasites (Stites et al., 1987). Immunopotentiation occurs by polyclonal T-cell activation while immunodepression is due to lymphocytotoxic effect of the larva excretions (Terry and Hudson, 1982).

The validity of using larval reduction in the diaphragm is only based on its correlation with that in the other muscles (Maki and Yanagisawa, 1983). Also to use the antigen derived from porcine *T. spiralis* larvae due to its efficiency to test antibodies of murine origin and Vice Versa (Omar and Mousa, 1993).

Since the low titres of antibodies after treatment is measurable, the passive haemagglutination test seems to be feasible tool to estimate the success of treatment.

For conclusion, field application of such simple, not sophisticated rapid test to evaluate anti-trichinella drugs needs to find out the standardized correlation between titres of haemagglutinating antibodies and repeated dosage of either Synanthic or Ivomec.

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