

## THE ANTI-PROTOZOAL EFFECTS OF PRAZIQUANTEL ON GIARDIASIS IN MICE

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### ABSTRACT

The chemotherapeutic effects of anti-cestodes drug praziquantel on giardiasis in laboratory mice. Forty mice were divided into 4 groups of 10 mice each. Group 1 was infected; group 2 was infected and treated orally by giving praziquantel at a dose of 10 mg/kg body weight as a single dose; group 3 was infected and treated orally by giving metronidazole at a rate of 15-20 mg/kg body weight daily for 7 days; group 4 was uninfected. Cyst excretion rate was recorded for the infected groups of mice.

The infected and praziquantel treated mice have recovered much more faster than infected mice and treated by metronidazole. There were no side effects reported.

Praziquantel proved for the first time to be an ideal drug for the treatment of giardiasis in mice.

### INTRODUCTION

Giardiasis is very common amongst children in Iraq<sup>1-3</sup>. *Giardia* is unique in its ability to establish itself in the host by direct ingestion of cysts. Metronidazole is now in use for the treatment of giardiasis but its presence is limited nowadays due to the previous economic sanction which was imposed on Iraq and its wide uses as well. Therefore, alternative drugs should be looked for.

Praziquantel, a new anti-schistosomal prazinoquinoline compound is a drug of choice for the treatment of cestod infections and schistosomiasis as well<sup>4</sup>. Its amount in the store of the Ministry of Health is quite good in addition to the limited usage of it due to very low numbers of schistosomiasis cases in the region<sup>3</sup>.

Mice is an ideal laboratory model for giardiasis<sup>5</sup>. Thus, this study is the first to investigate the chemotherapeutic effects of the anti-cestode drug praziquantel on giardiasis in laboratory mice.

### MATERIALS AND METHODS

**Mice:** BALB/c mice were obtained from the University of Basrah farm. They were 4-5 weeks old. Mice were maintained in an animal house kept at 25 °C and were allowed to feed *ad libitum* on standard diet and water. Fecal examination was carried out to ensure that all mice were free of intestinal parasites.

**Parasite:** Cysts of *Giardia muris* were obtained initially from a naturally infected mice. Their stool samples were emulsified and washed 3 times in distilled water. The deposited was adjusted so as to contain 150000+20000 cysts/0.5 ml given by stomach tube.

**Experimental design:** Forty mice were divided into 4 groups of 10 mice each. Group 1 was infected; group 2 was infected and treated orally by giving praziquantel as a single dose of 10 mg/kg body weight; group 3 was infected and treated orally by giving

metronidazole at a rate of 15-20 mg/kg body weight daily for 7 days: group 4 was uninfected.

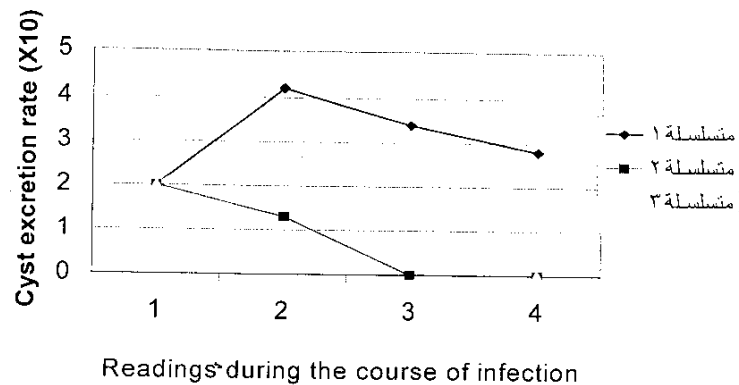
**Cyst excretion rate:** It was studied every 5 days during the course of infection using a 2-hour stool collection method<sup>5</sup>. Mice were kept for 2 hours in separate cages without bedding. Stool passed during that time were collected, suspended in water and the suspension centrifuged, cysts were counted by haemocytometer.

### RESULTS

Stool cyst excretion was recovered in all inoculated mice, while no *Giardia* infection occurred in the uninoculated mice of group 4. The inoculated mice of group 1 became infected and showed a mean peak of  $4.2 (X10) + 0.74$  on day 10 (Fig 1). Then cyst excretion declined and parasites could be detected at  $2.8 (X10) + 0.6$  on day 20.

The infected and praziquantel treated mice of group 2, the parasites disappeared and no longer could be detected in the stool by day 15 (Fig. 1). There were no side effects reported. The infected and metronidazole treated mice of group 3, cysts could not be found in the stool by day 20.

Fig. 1. Cyst excretion rate during the course of infection



### DISCUSSION

Results of these experiments demonstrated that praziquantel is effective against giardiasis following oral administration. There was no adverse effects upon the treated mice in this experiments. In terms of cost, the 5-day treatment with metronidazole is more expensive than the one-day treatment with praziquantel.

Metronidazole causes relatively minor side effects, mostly nausea, headache and metallic after taste<sup>4</sup>. Also this drug is carcinogenic in rats and mice and mutagenic in bacteria. Although these adverse effects have never been demonstrated in human beings, it should not be given to pregnant women<sup>4</sup>.

The mode of action for praziquantel is unknown and so this topic needs to be investigated.

In conclusion, these results reported here represents the initial trials of praziquantel against giardiasis, which is never been tried before.

### تأثير عقار البرازوكوانتيل على داء الجيارديا في الفئران المختبرية

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#### الخلاصة

أجريت الدراسة لأول مرة لمعرفة تأثير دواء الديدان الشريطية البرازيكونتيل على داء الجيارديا في الفئران المختبرية قسمت ٤٠ فأرة إلى ٤ مجاميع بحيث تتألف كل مجموعة من ١٠ فئران أصيبت المجموعة الأولى ، المجموعة الثانية أصيبت وعولجت فمويا" بإعطائهم البرازيكونتيل في جرعة ١٠ ملغم / كيلو غرام من وزن الجسم كجرعة واحدة فقط ، أما المجموعة الثالثة فقد أصيبت وعولجت فمويا" بإعطائهم الميترانيدازول بنسبة ١٥ - ٢٠ ملغم/ كغم من وزن الجسم يومياً لمدة ٧ يوم وأما المجموعة الرابعة فقد تركت بدون إصابة . سجلت نسب طرح اكباس الجيارديا للمجاميع المصابة من الفئران . لوحظ شفاء الفئران المصابة والمعالجة بالبرازيكونتيل أسرع بكثير من الفئران المصابة والمعالجة بدواء الميتدانيدازول . لم تسجل مضاعفات بين الفئران . لذا نبرهن للمرة الأولى بان دواء البرازيكونتيل هو دواء مثالي لمعالجة داء الجيارديا في الفئران .

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