# COMPARATIVE STUDY OF DIFFERENT DOSES OF MEBENDAZOLE IN HOOKWORM INFECTION

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## INTRODUCTION

Soil-transmitted helminthiasis is still a public health problem in Thailand. The prevalence of hookworm infection was 43.65%, *Trichuris trichiura* 9.13%, *Ascaris lumbricoides* 4.85% and *Enterobius vermicularis* 0.27% (Papasarathorn *et al.*, 1984). Recently Vajarasthira (1986) found that in some areas of Nakhon Srithammarat province, southern Thailand, the hookworm infection rate was 80 to 90%. Identification of hookworm species in Thailand have shown that *Necator americanus* was predominant 98.0%, *Ancylostoma duodenale* 1.1% and *Ancylostoma ceylanicum* 0.3% (Harinasuta and Areekul, 1983).

Mebendazole (methyl-5-benzoylbenzamidizole-2-carbonate) is a synthetic drug in Benzimidazole group. The drug is very effective against hookworm infection, ascariasis, trichuriasis, enterobiasis and taeniasis (Harinasuta, 1976). The general acceptable dosage for hookworm infection is 1 tablet of 100 mg twice daily for 3 days which yields the cure rate 70.3-93.0% (Chongsuphajaisiddhi *et al.*, 1976).

This study was carried out to compare the efficacy of mebendazole 600 mg conventional dose and mebendazole 300 mg single dose in the treatment of hookworm infection in Thai children.

## MATERIALS AND METHODS

This study was carried out at the Hospital for Tropical diseases, Bangkok and Amphur Sisawat, Kanchanaburi province 180 km from Bangkok in West Thailand. A total of 66 children with mild to moderate hookworm infection was recruited for this study. There were 40 males and 26 females aged from 4 to 14 years old (Table 1). Consent was sought from the parents prior to drug treatment. The children were divided into 2 groups: Group I comprise of 31 children from Sanamchaiked, Chachoengsao province, Northern Thailand were treated with mebendazole 300 mg single dose at the Bangkok Hospital for Tropical Diseases. Group II consist of 35 children from a rural area at Amphur Sisawat, Kanchanaburi were treated with mebendazole 600 mg conventional regimen (100 mg twice daily for three days). The stools were collected in plastic bags and sent by car to the Faculty of Tropical Medicine, Bangkok on the same day.

Each patient was thoroughly examined, and stools by direct smear were examined for 3 consecutive days. Routine laboratory tests are done prior to treatment and in follow-up evaluation period.

Quantitative stool examinations were done by Kato-Katz technique (Katz *et al.*, 1972). All these children were found positive for hookworm. The follow up stool collections and examination were done on day 14 to 16

and day 21 to 23 after treatment. Cure was considered if six stool examinations were negative for hookworm eggs. The adult worms were identified by stool sedimentation method. The intensity of hookworm infection was classified into light (< 2000 eggs/gm of stool), moderate (2000-7000 eggs/gm) and heavy infection (>7000 eggs/gm).

## RESULTS

Almost all 65 children had light and moderate hookworm infection, with the exception of one who had heavy hookworm infection (Table 1).

Table 1

Number of children divided by group and by severity of hookworm infection.

| Egg per gram | Group I | Group II |
|---|---|---|
| Light infection < 2000 | 19 | 31 |
| Moderate infection 2000-7000 | 11 | 4 |
| Severe infection > 7000 | 1 | - |
| Total | 31 | 35 |

The result of the treatment of hookworm infection is shown in Table 2. In group I : 31 children, 18 males and 13 females, treated with mebendazole 300 mg single dose gave an egg reduction rate (ERR) of 90.0% and a cure rate of 16.1%. In group II : 35 children, 22 males and 13 females, treated with mebendazole 600 mg conventional dose gave an ERR of 99.5% and a cure rate of 91.4%.

No side effects were observed in both groups.

A total of 406 adult worm were identified; 99% were *Necator Americanus*, 0.5% *Ancylostoma duodenale* and 0.5% *Ancylostoma ceylanicum*.

## DISCUSSION

Mebendazole is an effective drug for the treatment of soil-transmitted helminthiasis because of its broad spectrum and low toxicity. In the control and/or eradication of soil-transmitted helminthiasis there seem to be a trend in the use of a single dose regimen following a periodic treatment pattern of 3-4 times a year. Cabrera (1980) reported a cure rate of 88.2% with mebendazole 600 mg single dose in the treatment of hookworm infection, while in this study the cure rate with mebendazole 300 mg single does was 16.1%. From the difference in cure rates it indicate that a higher dose of mebendazole even given in a single does is more effective. Chavarria (1973) with a single dose of

Table 2

Result of treatment by mebendazole 300 mg single dose (group I) compared to mebendazole 600 mg conventional regimen (group II).

| Gr. | No. of cases | Mean EPG before Rx | Mean EPG after Rx | No. of cure | cure rate % | Egg reduction rate % |
|---|---|---|---|---|---|---|
| I | 31 | 929.6 (46-6532) | 84 (23-2560) | 5 | 16.1 | 90.9 |
| II | 35 | 245.7 (46-7300) | 1.38 (23-69) | 32 | 91.4 | 99.5 |

EPG = egg per gram of feces.

mebendazole 300 mg reported a higher cure rate (44.4%) than in this study. Mebendazole 600 mg conventional regimen is also effective in hookworm infection, with a cure rate of 91.4% but it is time consuming in management of drug administration and follow-up.

There were no difference on the distribution of hookworm species, as reported from Thailand and Indonesia respectively, *Necator americanus* 99%, 88.9%, *Ancylostoma duodenale* 0.5%, 11.1%, *Ancylostoma ceylanicum* 0.5% in Thailand.

Mebendazole is also effective for the mass treatment of other soil-transmitted helminthiasis because of its broad spectrum, low toxicity (APCO Parasitologists Meeting in Tokyo, 1979; Chavarria, 1973). The finding of a minimum and effective single dose will reduce the time, cost and difficulty of management and treatment in the rural communities where there is a high prevalence of soil-transmitted helminthiasis.

## SUMMARY

Sixty six children (40 males, 26 females) aged from 4 to 14 years with hookworm infection were treated with mebendazole. Thirty one and 35 children were treated with mebendazole 300 mg single dose and 600 mg conventional regimen respectively. Stool examination by Kato-Katz technique were done for 3 consecutive days before treatment and on day 14-16, 21-23 after treatment. The cure rate with 300 mg mebendazole was 16.1% with 90.9% egg reduction while 600 mg mebendazole gave 91.4% cure rate with 99.5% egg reduction. No side effects were observed in all children. Four hundred and six adult worms were identified, 99% were *Necator Americanus*, 0.5% *Ancylostoma duodenale* and 0.5% *Ancylostoma ceylanicum*.

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