

A SINGLE DOSE OF PHENYLENE-DI-ISO-THIOCYANATE (1, 4), JONIT* IN THE TREATMENT OF ADULT PATIENTS WITH HOOKWORM INFECTION IN SAWAN-PRACHARAK HOSPITAL, THAILAND

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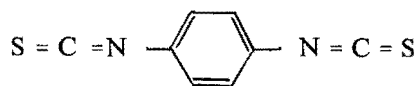
INTRODUCTION

Hookworm disease is widespread in almost all subtropical and tropical agricultural countries. It is one of the most prevalent helminthic diseases of man. Two species of hookworm *Necator americanus* and *Ancylostoma duodenale* have been the cause of human ancylostomiasis in Thailand and Malaysia. *N. americanus* is found to be predominant, 83.9-94.5 per cent in South Thailand (Juttijudata *et al.*, 1961) and 82% in Malaysia (Darling *et al.*, 1920). *A. duodenale* is more prevalent in semi-arid areas whereas *N. americanus* is found where the rainfall is continuous and the atmosphere more humid. A survey was undertaken in areas of Nakorn Sawan Province in Central Thailand for 2 consecutive years and stool examinations carried out at Sawan-Pracharak Hospital. The results in 1969 revealed that out of a total of 5125 stool specimens, 643 (12.55%) were positive for hookworm, and in 1970 from 5681 stool examinations, 972 (17.11%) contained hookworm ova.

Hookworm disease accounts for most cases of iron deficiency anaemia. Despite a large number of drugs commercially available, the treatment of hookworm infection remains unsatisfactory because none of the drugs are consistently effective against both the common species of hookworm. Recently bitoscanate, Phenylene-di-iso-thiocyanate (1, 4),

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Jonit, has been found to be effective in helminthiasis in laboratory animals and in man. The drug derived from mustard oil is almost colourless, tasteless and odourless powder with a molecular weight of 192 and a melting point of 130°C, having the following chemical structure.



MATERIALS AND METHODS

The drug trials were carried out at the Sawan-Pracharak Hospital in Nakorn Sawan Province, of Central Thailand.

Fifty-one patients were admitted to the hospital for treatment, there were 29 males and 22 females with ages ranging from 14 to 64 years. Their body weights ranged from 31kg to 60kg. Prior to treatment the haemoglobin levels varied from 1.4 to 15.6gm per cent.

Egg counts were carried out by Stoll's method and all were performed by the same laboratory technician. Patients with less than 1,500 e.p.g. faeces were not included in this study. Egg counts as well as haemoglobin and haematocrit were carried out before treatment and also 2 weeks and 4 weeks after treatment. A single dose of 150 mg Phenylene-di-iso-thiocyanate (1, 4), Jonit was given orally after

Table 1
Efficacy of Bitoscanate (Jonit) in hookworm infection.

Stool Count before Treatment	No. of Subjects	Mean egg load before treatment with JONIT	Mean egg load after treatment with JONIT	% Egg Reduction	Increase of Haemoglobin	Increase of Haematocrit	Patients clear of egg in stool
1,500 - 2,000	10	1,740	60	96.6	1.5 gm % 12.9 %	1.8 % 4.7 %	9
2,000 - 3,000	6	2,633	233	91.2	0.7 gm % 6.3 %	0.8 % 2.3 %	1
3,000 - 4,000	6	3,533	300	91.5	3.5 gm % 42.2 %	6.3 % 23.2 %	4
4,000 - 5,000	2	4,400	-	100.0	2.2 gm % 23.7 %	5.5 % 17.7 %	2
5,000 - 10,000	9	8,200	911	88.9	2.0 gm % 23.8 %	5.9 % 21.2 %	2
10,000 - 15,000	6	11,933	1,767	85.2	1.4 gm % 15.5 %	3.5 % 11.5 %	-
15,000 + *	12	43,700	4,033	90.8	3.9 gm % 68.4 %	12.3 % 64.8 %	-
Average		10,877	1,043	90.4	2.2 gm %	5.2 %	

* 15,000 - 106,800

the main meal. All patients remained in the hospital as in-patients for 2 weeks before being discharged and instructed to return on the 4th week for the final stool examination.

RESULTS

The result of the therapy are shown in Table 1. There was a progressive fall in egg count in each group of patients. In 18 patients complete clearance was observed after 4 weeks. In 33 other patients, the fall in egg count ranged between 85.7 - 96.6 per cent. The haemoglobin level rose by between 1.4 to 3.9 gm per cent after four weeks, (average 2.2 gm %) haematocrit rose by between 0.8 - 12.3 per cent (average 5.2%).

SIDE EFFECTS

The side-effects occurred in 17 of 51 patients; loose stools occurred in 13 patients but did not require any kind of medication and lasting only twelve hours. Nausea, vomiting, dizziness and pain in abdomen were mild and transient.

Table 2
Side effects after Bitoscanate treatment.

Side effects	Number of cases	Per cent
Loose stools	13	29.5
Vomiting	3	5.9
Nausea	10	19.6
Dizziness	1	1.9
Pain in abdomen	1	1.9

DISCUSSION

The clinical trial showed the effective results of treatment in the adult patients with 150 mg single dose of Phenylene-di-iso-thiocyanate (1, 4), Jonit which is effective and sufficient to obtain a mean egg reduction in faeces of 85.2 - 100 per cent. The mean percentage reduction in egg load is excellent. This is a very favourable result compared with the mean 78 per cent reduction obtained from single dose of Bephenium hydroxynaphthoate, (Goodwin *et al.*, 1958), 69 per cent from Thiabendazole (Salunleke *et al.*, 1964) and 70 per cent from Tetrachlorethylene, (Goodwin *et al.*, 1958).

In 18 out of the 51 patients, 4 weeks after treatment no egg could be found in their faeces. Haemoglobin level rose by an average of 2.2 gm per cent and haematocrit by 5.2 per cent. All patients tolerated the drug well. Side effects were minimal and not significant. Out of the 51 patients, 13 had 2 to 5 times loose stools but did not interfere with their activities and needed no specific treatment. 10 patients complained of nausea which was transient. Dizziness was rare and found only in one case of this trial.

From this study, it can be stated that Phenylene-di-iso-thiocyanate (1, 4), Jonit is one of the most effective agent against hookworm at the present time. Side effects are minimal and transient. It is safe even in severe anaemic patients. A single dose of 150 mg is valuable for the treatment of patients in hookworm infected areas where curative treatment for complete eradication is not possible.

SUMMARY

Fifty-one adult patients (29 males and 22 females) infected with hookworm were treated with a single dose 150 mg of Phenylene-di-iso-thiocyanate (1, 4), Jonit orally. There was reduction of egg count by an average 90.4 per cent after 4 weeks. The haemoglobin level of all patients rose by an average of 2.2 gm. per cent, and 5.2 per cent of haematocrit. 18 patients (35.3%) were cleared of hookworm eggs after 2 to 4 weeks. Side effects were mild and transient and did not require any kind of medication.

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