SEVERE WHIPWORM INFESTATION IN CHILDREN

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The whip worm (trichuris trichiura) is a human helminth about 3-5 cm. long inhabiting the large intestine, mainly in the caecum. Its long thin anterior end is like a whip (hence its name) which threads itself into the intestinal mucosa. The posterior end is wider and in the male is coiled up like a watchspring. When infestation is extensive the worm may be found throughout the whole colon and rectum.

The life cycle is very simple. The immature egg with its characteristic shape (oval with 2 "lids" at the extremities) is passed in the stool, and embryonate in the soil under suitable conditions and become infective in a few weeks. A person becomes infected by ingestion of these ova with their infective larvae which then mature in the alimentary tract. Therefore, there is no visceral phase in the life cycle as happens in ascaris and ankylostoma. The adult female whipworm lays several thousand eggs a day.

Whipworm infestation in the adult and mild infestation in a child usually produce no symptomatology and in most text-books of tropical medicine, tricuris infestation is dismissed as of no consequence. But in children heavy infestation does produce pathology manifested by chronic dysentery (blood and mucus in stools with tenesmus) of long duration, severe anaemia, loss in weight, abdominal pain, rectal prolapse and ulceration of the mucosa of the rectum and colon. In fact, such patients have died in the past. It had been difficult to prove conclusively that trichuris infestation could produce such a pathology as no drug, till recently, had been found efficacious in getting rid of these worms in patients. Recently, a new drug has become available in the market, dithiazanine iodide ("Telmid"—Eli Lilly) and the following trial was designed to evaluate the existence of such a syndrome by effecting a cure by the use of this drug.

CLINICAL MATERIAL

Children with dysentery admitted to the Paediatric Unit, General Hospital, especially with a history of rectal prolapse were investigated. Several stool samples were examined microscopically for Entamoeba Histolytica and three successive stool samples were sent for culture of Entamoeba Histolytica, Shigella and Salmonella. Only when these results were negative were the cases included in the trial. 20 such cases with large amounts of trichuris ova in the stools were collected and form the basis of this report.

CLINICAL FEATURES

(a) **Age Incidence:**

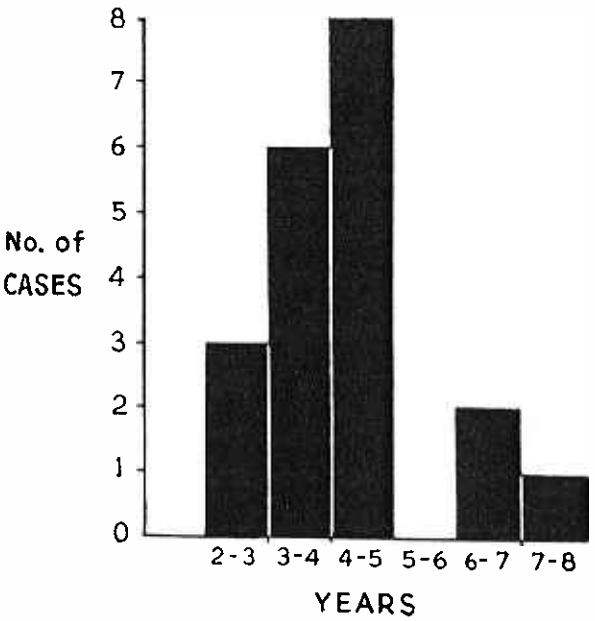

Fig 1. Age Incidence

As can be seen in Fig. 1, most of the cases were between the ages of 2-5 years. We have not found any patient above the age of 8 years. Winship and Hennessy (1959) in their South African series of 15 cases also found the same age group and their oldest patients were aged 6 years.

(b) **Sex Incidence:** There were 5 males and 15 females.

(c) **Racial Incidence:** Table I illustrates the fact that there seems to be more Indians involved than the Chinese and Malays when compared to the childhood population under the age of 6 years in Singapore. In the South African series there were 12 Indians and 3 Africans.

Table I

	Chinese	Indians	Malays
Number of cases:	11	6	3
% cases:	55	30	15
Population % (under 6 years)	75	7	16

Table I: Racial incidence of the three main races and comparison with the racial distribution under the age of 6 years in Singapore (Census of Singapore, 1957).

(d) **Duration of symptoms:**

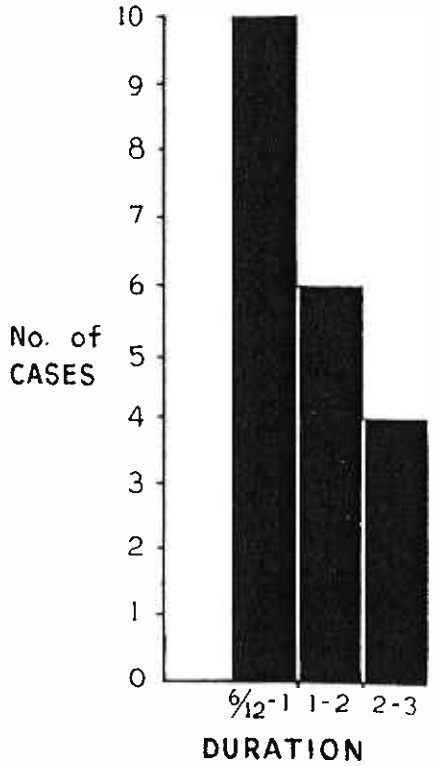

Fig. 2. Duration of symptoms in years.

Figure 2 shows that 10 patients had chronic dysentery for a period of 6 months to 1 year, 6 patients from 1-2 years and 4 patients had symptoms for as long as 2-3 years. Many of these patients had been sent to the Infectious Disease Hospital as cases of amoebic dysentery although no amoebae had ever been seen on microscopy or obtained on culture of the stools. Some of these patients had been treated with emetine without any relief of symptoms.

(e) **Anaemia:** The degree of anaemia varied, but 50% had a haemoglobin of less than 8.8 G%; 35% below 6 G% and 15% below 3 G%. The anaemia was a straightforward microcytic hypochromic iron deficiency anaemia due to bleeding per rectum.

(f) **Rectal prolapse:** 70% of the patients were admitted with rectal prolapse, and severe whipworm infestation is one of the commonest causes of rectal prolapse in Singapore children.

Fig. 3. Rectal prolapse with severe whipworm infestation. Note adult whipworms clinging to the rectal mucosa which is studded with ulcers. Severe bleeding is seen in top right hand corner.

Figure 3 shows prolapse of the rectum in one of the patients with small bleeding ulcers and adult whip worms clinging to the rectal mucosa.

(g) **Sigmoidoscopy:** This was done in every case and in 90% of cases bleeding ulcers were seen in the rectal mucosa and in all cases adult whip worms were visualised.

In summary, then, the patients usually gave a long history of passing blood and mucus in the stools and on examination these patients had an iron deficiency anaemia, often with

prolapse of the rectum with ulceration of the rectal mucosa and bleeding, and adult whip worms attached to the mucosa.

TREATMENT

1. All the patients were given iron for their anaemia and a blood transfusion if the haemoglobin was less than 3 G%.

2. Dithiazanine iodide was then given to the patients in 3 divided doses daily for a period of 5 days, the total daily dose being adjusted according to body weight as follows:

(a) 10-20 lbs.: 100 mg. a day.
(b) 20-30 lbs.: 200 mg. a day.
(c) 30-40 lbs.: 300 mg. a day.

The drug was given after meals, and the patients were not given any purgatives nor were they starved beforehand.

3. In some cases whip worm ova counts were kindly done by Professor Lloyd-Davies of the Social Medicine Department, University of Malaya in Singapore, before and after therapy.

4. Another sigmoidoscopy was done on the day after the course of treatment.

RESULTS

In most of the cases the following was observed. On the first day, the stools were coloured blue because of the drug. On the second day adult whip worms were expelled and concomitant round worms (ascaris) were also seen. Usually on the third day, the stools became firmer in consistency and less frequent and blood and mucus had disappeared. On the 5th day, rectal prolapse also disappeared, and sigmoidoscopy on the day after cessation of treatment revealed healing ulcers which no longer bled and absence of adult whip worms in the rectal mucosa.

WHIPWORM OVA COUNTS

No.	Before treatment	After treatment
1	47,400	300
2	34,700	900
3	7,400	600
4	19,600	NIL
5	19,400	900
6	8,500	1,700
7	19,100	NIL
8	14,500	600

Fig. 4. Whipworm ova counts before and after treatment with dithiazanine.

Figure 4 shows the results of whip worm ova counts per cu. mm. of faeces before and after treatment in 8 of the 20 cases. The marked reduction in the ova counts is specific.

Similarly, the haemoglobin improved as the bleeding was checked.

These patients have all been followed up for at least 6 months, and all have been well without any recurrence of symptoms except for 2 patients who had dysentery again 3 months after discharge. They were given another course of dithiazanine iodide with equally gratifying results and follow-up for another 3 months has not revealed any recurrence. These 2 patients probably were re-infected in the home environment.

DISCUSSION

We are convinced that severe whip worm infestation can produce symptoms in children resulting in dysentery, anaemia, malnutrition and rectal prolapse. Jung and Beaver (1951) described these symptoms and other workers have also considered that the whip worm is not so innocuous in man. Since the introduction of dithiazanine iodide, there have been reports substantiating the presence of such a syndrome and the efficacy of the drug in curing patients with severe whip worm infestation (Swartzwelder et al., 1958; Winship and Hennessy, 1959). One of us (W.H.B.) has seen 2 deaths from severe whip worm infestation in spite of blood transfusions before the days of dithiazanine. At post-mortem, the whole of the large intestine from the caecum to the rectum was studded with bleeding ulcers and adult whip worms, and the colon was filled with blood. Smears from the large intestine failed to reveal any Entamoeba Histolytica.

Dithiazanine (3,3¹—diethylthiadicarbocyanine iodide) is a cyanine dye and it is thought that its effect on whip worms is directed towards the oxidative and anaerobic metabolism of these helminths (Bueding and Swartzwelder, 1957). As very little of the drug is absorbed, its toxicity is very low. No side-effects were encountered in the present series, although vomiting had been reported by others but usually limited to only 1 or 2 doses which did not impair the efficacy of the treatment. Swartzwelder et al. (1958) reported on a 3 year old girl who accidentally swallowed 14 tablets (1.4

G.) at one time and did not vomit or become ill in any way. The drug is also effective against round worms as evidenced by the expulsion of these worms in these patients with concomitant ascaris infestation. Dithiazanine has also been found useful for enterobiasis (Miller et al. 1958) and strongyloidiasis in man (Swartzwelder et al., 1957).

Hexylresorcinol enemata had been used before for whip worm infestation (Jung, 1954) but the method is cumbersome and may cause severe burns if the solution is allowed to come into contact with the skin.

Although whip worm infestation is common —Stoll (1947) estimated that 355 million people harbour this parasite—the severe form of infestation as described above is not common. But when it does occur the pathology cripples the patient and sometimes causes death.

SUMMARY

1. 20 cases with severe whip worm infestation manifesting chronic dysentery, anaemia, malnutrition and rectal prolapse are described.

2. The treatment with dithiazanine iodide ("Telmid") and the good results obtained are discussed.

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