

Albendazole treatment in human taeniasis

Rina Girard de Kaminsky* *Dirección de Investigación Científica, Universidad Nacional Autónoma de Honduras*

Abstract

The results are presented of albendazole trials on human taeniasis infections in Honduras, involving 56 of 68 individuals (2% of the inhabitants) found to be infected during surveys conducted in 15 rural communities. Of the 3 methods used for diagnosis of infection, the Kato cellophane thick smear showed 80% reliability, a combination of Kato and 'Scotch' tape perianal swab 88%, and clinical history of proglottid expulsion less than 50%. Individuals were treated with a dose of 400 mg of albendazole per day for 3 d, followed for 5 d to verify tapeworm expulsion, and evaluated again at 60 and 90 d to assess drug efficacy. All 56 treated individuals remained stool-negative after 60 and 90 d; a partial strobila or segments were recovered from 21 of them (37.5%). Of these, *Taenia saginata* was identified from 4, and *T. solium* from 15; 2 specimens could not be specifically identified. Based on negative stool examinations and clinical history after 60 and 90 d, albendazole seems to be a well tolerated, very effective drug for treating infections with *Taenia* spp. However, confirmation of these results is needed due to the difficulty of making a reliable diagnosis of such infections.

Introduction

Albendazole is a relatively new broad spectrum anthelmintic drug which is effective against most common intestinal helminths (COULAUD *et al.*, 1982; DICKSON, 1984; BOTEY, 1984), two species of larvae nematodes (COULAUD *et al.*, 1982; CLINE *et al.*, 1984) and a larval cestode (ESCOBEDO *et al.*, 1988). Doses of 200 mg for children under 12 years old and higher doses of 400 mg/d for 5 d and 800 mg/d for 3 d are well tolerated by the patients and virtually free of side effects (COULAUD *et al.*, 1982). Reports of cure rates in human tapeworm infections vary. A single 400 mg dose was 57% to 70% effective (MISRA *et al.*, 1984; DICKSON, 1984), and a 400 mg dose for 3 consecutive days increased the success rate to 100% (MISRA *et al.*, 1984). We now report the results of attempts to confirm those findings during surveys on human taeniasis.

Materials and Methods

Surveys were conducted during a 3 year period in 15 rural communities to detect individuals infected with tapeworm and to determine the prevalence of infection (KAMINSKY, 1991). A history of proglottid expulsion, stool examination by the Kato cellophane thick smear technique and 'Scotch' tape perianal swabs (STPS) were the methods chosen on grounds of simplicity, reliability, availability of materials, possibility of sample transportation, and cost. Individuals

who reported being aware of tapeworm infection were requested to recover proglottids and bring them fixed in 10% formalin in labelled vials for permanent carmine staining for species identification.

All Kato and STPS preparations, as well as fixed proglottids, were transported to the University hospital for microscopical examination. Usually 2 months elapsed between the survey and laboratory examination. Infected individuals were offered treatment immediately after positive results became available. Each town was visited 3-4 times: for the initial survey; to offer treatment and recover the parasites; and at 60 d and sometimes at 90 d thereafter to verify the effectiveness of the treatment.

Individuals receiving treatment were given a complete physical examination; the only reason for treatment exclusion was pregnancy. One dose of 400 mg (2 Zentel® tablets) was administered each day for 3 consecutive days. No fasting or purgatives were required. Treated individuals were asked to provide a stool sample and STPS 5 consecutive days before treatment to verify egg excretion; they were also instructed to collect 24 h stools daily for 5 d after initiation of treatment. The stools were then separately washed through a sieve to collect tapeworms or segments; when present, these were fixed in 10% formalin and stained with carmine. Treated individuals were re-examined 60 d after treatment by at least 2 Kato and 2 STPS preparations and were questioned about their awareness of infection. Thirty patients (53%) agreed to a second verification of treatment effectiveness after 90 d.

Results

Sixty-eight individuals (2% of the population) were found to be infected with *Taenia* spp. during the surveys; 48 (70.5%) were women. Twelve persons (18%) could not be treated: 3 pregnant women, one mentally retarded person who refused, 5 who travelled away, 2 who had treated themselves, and one who was missed.

Eleven infections (16%) were diagnosed by both the Kato and STPS techniques; 46 (67.7%) were diagnosed by Kato alone and 8 (11.7%) by STPS only. One person insisted he was passing proglottids although he did not produce any and his examinations were negative. Two individuals were aware of passing proglottids, which they produced; their stools were not examined. No other patient brought in proglottids before treatment.

Of the 56 persons treated, not all provided samples 5 d before and 5 d after treatment. Partial tapeworm strobila or a few gravid segments were found in 24 h faecal collections from 21 (37.5%) of the 56 treated individuals within 1-3 d after initiation of treatment. Eleven (52%) of those 21 individuals were not aware of being infected. Of the tapeworms recovered, 4

*Address for correspondence: Apartado no. 1587, Tegucigalpa, Honduras.

Table. Results of treatment and verification of treatment at 60 and 90 days in 21 individuals with confirmed *Taenia* infection

Case no.	Sex ^a	Age (years)	Awareness of infection	Examination ^b at survey	Worm expelled		Subsequent examinations ^b	
					Stage ^c	Species ^d	60 d	90 d
1	F	22	Yes	0/+	P	sag.	0/0	ND
2	F	35	Yes	0/+	P	sag.	0/0	ND
3	F	40	Yes	+/+	G	sol.	0/0	ND
4	F	28	Yes	+/ND	G	sag.	0/0	ND
5	F	20	No	+/ND	G	sol.	0/0	ND
6	F	28	No	+/+	G	sol.	0/0	0/0
7	F	30	No	0/ND	G	sol.	0/0	0/0
8	F	30	Yes	+/ND	G	sag.	0/0	0/0
9	F	28	No	+/ND	G	NI	0/0	0/0
10	F	30	No	+/ND	G	sol.	0/0	0/0
11	M	12	No	+/0	G	sol.	0/0	0/0
12	F	68	No	+/0	G	NI	0/0	0/0
13	F	15	Yes	+/+	G	sol.	0/0	0/0
14	F	32	Yes	+/+	G	sol.	0/0	0/0
15	F	3	Yes	+/+	G	sol.	0/0	0/0
16	F	6	Yes	+/+	G	sol.	0/0	0/0
17	F	33	No	0/+	G	sol.	0/0	0/0
18	M	17	Yes	+/0	G	sol.	0/0	0/0
19	F	12	No	+/+	G	sol.	0/0	0/0
20	M	12	No	+/0	G	sol.	0/0	0/0
21	M	14	No	+/+	G	sol.	0/0	0/0

^aF=female, M=male.

^bExpressed as result of examination of Kato smear/result of 'Scotch' tape perianal swab (0=no parasite eggs detected; +=positive; ND=not done).

^cG=gravid segment(s), P=partial strobila.

^dsag.=*Taenia saginata*, sol.=*T. solium*, NI=not identified.

(19%) were identified as *T. saginata* and 15 (71.4%) as *T. solium*; 2 (9.5%) could not be identified to species. All 4 persons infected with *T. saginata* reported passing proglottids that crawled through the anus; only 6 of 15 infected with *T. solium* became aware of infection, after seeing proglottids in their faeces. The 2 patients who passed unidentifiable proglottids were not aware of infection. Two pregnant women brought in proglottids without treatment; one was infected with *T. saginata* and the other with *T. solium*. None of the 21 individuals was found to be positive at 60 d or 90 d after treatment by Kato or STPS techniques or by questioning.

Of the 35 individuals (62.5%) who did not pass proglottids but who were positive for *Taenia* sp. eggs by microscopical examination, 24 (68%) were not aware of being infected. Ten (28%) said to be aware of infection were positive for eggs by microscopical examination but did not pass any tapeworms after treatment. None of those who underwent examination after 60 d and 90 d were found to be infected. The results of treatment of the 21 individuals with confirmed *Taenia* infection are shown in the Table.

Discussion

In this investigation, the results of albendazole treatment could be interpreted as excellent, using as criteria the absence of eggs and proglottids from the treated individuals at 60 and at 90 d thereafter. Two major difficulties in assessing drug efficacy, however, were encountered. One was the poor worm recovery after treatment. Only 2 of 56 individuals expelled a

partial strobila and 19 passed a few gravid segments; in 35 nothing was recovered. The second difficulty was the unreliability of diagnostic methods to detect tapeworm infections. In our study more than half of all patients treated were unaware of being infected. Unless they are actively forcing their way and crawling out of the anal sphincter, tapeworm proglottids excreted with the faeces may go unnoticed by infected persons defaecating in latrines, flush toilets or in the open (HALL *et al.*, 1981; FARAHMANDIAN *et al.*, 1973). Finding *Taenia* eggs in stools may not be easy, since they are not deposited by the worm, as is the case in other helminthic infections, but are released from the gravid proglottids either by the active crawling movements of the latter or, more rarely, by the maceration of dead proglottids (GONNERT *et al.*, 1968). In the study by HALL *et al.* (1981), the efficiency of diagnosing *T. saginata* infections by faecal examination after formalin-ether concentration was 68%. In our study, the Kato method had a reliability of 80% and the combination of Kato and STPS was 88% efficient; the usefulness of the SPTS in surveys still has to be evaluated. We could not make conclusive observations on the daily pattern of occurrence of *Taenia* eggs in stools of infected individuals, since not all collaborated by providing stools 5 d before treatment. Among those who did, a few patients with infection confirmed by the finding of proglottids were negative by microscopical examination.

Within the constraints discussed and given the doubts about certainty and sensitivity of diagnosis, it

would be worthwhile to confirm our results under more controlled conditions with co-operative, trustworthy infected individuals.

Acknowledgements

We thank the People-to-People Health Foundation, Project HOPE/Honduras, for assistance with transportation and significant donations for the towns' medical dispensaries. Smith, Kline and French (SKF) provided a grant to carry out the surveys, as well as the Zentel® tablets for treatment. Special thanks are given to Dr Guido Jiménez, former SKF Regional Medical Director in Costa Rica.

References

- Botey, M. A. (1984). Clinical development of albendazole in Latin America. In: *Albendazole in Helminthiasis*, Firth, M. (editor). London: Royal Society of Medicine, International Congress and Symposium Series, no. 61, pp. 115-119.
- Cline, B. L., Little, M. D., Bartholomew, R. K. & Halsey, N. A. (1984). Larvicidal activity of albendazole against *Necator americanus* in human volunteers. *American Journal of Tropical Medicine and Hygiene*, **33**, 387-394.
- Coulaud, J. P., Duchatelle, C., Rouvillois, A. & Deluol, A. M. (1982). Le Zentel dans le traitement des helminthiases intestinales au Niger, en Guinée et à Paris. *Médecine d'Afrique Noire*, **29**, numéro spécial, 41-42.
- Dickson, B. (1984). Summary of albendazole clinical trials in the Middle East and Africa. In: *Albendazole in Helminthiasis*, Firth, M. (editor). London: Royal Society of Medicine, International Congress Symposium Series, no. 61, pp. 79-84.
- Escobedo, F., Penagos, P., Rodriguez, J. & Sotelo, H. (1988). Tratamiento de neurocisticercosis humana con Albendazole. Evaluación controlada con tomografía computarizada y con resonancia magnética. *Revista de la Asociación Guatemalteca de Parasitología y Medicina Tropical*, **3**, 24-26.
- Farahmandian, I., Sahba, G. H., Arfaa, F. & Movafagh, K. (1973). A comparison of stool examinations and mass treatment for indication of the prevalence of *T. saginata*. *Tropical and Geographical Medicine*, **25**, 171-173.
- Gonnert, F., Meister, G. & Thomas, H. (1968). Das freiwerden der Eier aus *Taenia*-Progottiden. *Zeitschrift für Parasitenkunde*, **31**, 282-288.
- Hall, A., Latham, M. C., Crompton, D. W. T. & Stephenson, L. (1981). *Taenia saginata* (Cestoda) in western Kenya: reliability of faecal examination in diagnosis. *Parasitology*, **83**, 91-101.
- Kaminsky, R. G. (1991). Taeniasis-cysticercosis in Honduras. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **85**, 531-534.
- Misra, R. C., Dewan, R. & Jagota, S. C. (1984). Treatment of human taeniasis with albendazole. *Current Therapeutic Research*, **36**, 1195-1197.

Received 2 October 1990; revised 13 March 1991; accepted for publication 14 March 1991

Announcement

X CONGRESO LATINOAMERICANO DE PARASITOLOGIA and I CONGRESO URUGUAYO DE PARASITOLOGIA Montevideo, Uruguay; 17-22 November 1991

This meeting is organized by the Federación Latinoamericana de Parasitólogos; its theme will be 'New strategies for parasitic diseases control', with special emphasis on hydatidosis, Chagas disease and enteroparasites.

Further information can be obtained from: Meetings, Av. 18 de Julio 1268/1105, 11100 Montevideo, Uruguay; telephone +(598) 2 91 52 31 and 92 20 83; fax +(598) 2 90 71 61.