other H_2-receptor antagonists will soon be available for clinical evaluation.

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Clinical Trial of Mebendazole, A Broad-spectrum Anthelminthic

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Summary

Eighty-five children aged 5-14 years who were infested with worms were treated with mebendazole 100 mg twice daily for three days. The percentage cure rates were ascaris 100%, trichuris 94%, hookworm 82%, and hymenolepis 39%. The drug was well tolerated and with its broad activity should be very useful in treating those with multiple infestations.

Introduction

Mebendazole has a wide spectrum of action and high activity against the helminths, particularly *Ascaris lumbricoides*, *Trichuris trichiura*, taenia, enterobius, hookworm, and to a lesser degree *Hymenolepis* spp.[1-3] It also has a definite effect against strongyloides.[4]

In Birmingham many immigrant children from all parts of the globe are examined before they enter school, and faecal examinations have shown that they are often infested.[5] The treatment of these children, however, has proved virtually impossible because of the lack of satisfactory drugs (the worm species commonly found were not particularly sensitive to a single agent), because many of the immigrants lacked general practitioners to take over their treatment, and because a language barrier made adequate communication very hard. Attempts were made to organize a single treatment session at a hospital when results of the faecal examinations were known, but the outcome of any treatment remained completely unknown because few of the treated patients ever returned to the hospital clinic.

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We report here the results of a trial of mebendazole (performed under D.H.S.S. Licence) in a small series of children of 5-14 years old. Reports had suggested that the drug was only slightly absorbed (5-10%) and no toxicity had been shown in extensive foreign studies.[2 4]

Methods

Children of both sexes aged 5-14 years were examined at the school clinic and brought with them a faecal specimen. As part of the examination they were given a Heaf test, and they returned seven days later for the test to be read, by which time the results of faecal examination were available. The modified formol-ether method[6] was used for detecting ova. If helminth ova were found the parent or guardian was given six 100-mg tablets of mebendazole with instructions to give one tablet to the child night and morning for three days; the first dose was given at the clinic. Between seven and 21 days later (median 14 days) a second faecal specimen was obtained by a home visit (M.V.P.P.) and inquiries were made about any possible ill effects of the drug. Results of the second examination were then collated with the first to assess drug efficacy. If ova were present in the second specimen which had not been detected in the first we assumed that they had been missed on first examination, as cross-infestation and its manifestation in so short a time is unlikely in Britain. The formol-ether method gives a positive result on a single examination in about 75% of infestations. The finding of *Giardia lamblia* cysts in faeces is capricious and stools may be repeatedly negative in spite of known infection. Nevertheless 25 children who had cysts of *G. lamblia* only were also treated. No attempt was made to control the trial with untreated cases.

Results

Eighty-five children harbouring helminths submitted a follow-up faecal specimen and were believed to have taken the tablets. Of these 65 (76%) seemed to have been dewormed. Of those with a single infestation the cure rates were ascaris 100%, trichuris 91%, hookworm 94%, and hymenolepis 50% (see table). Only a few children had multiple infestations. All four children with ascaris and trichuris were cured, as were all three with ascaris, trichuris, and hookworm. Of the three with ascaris and hookworm one was cured, of the three with trichuris and hookworm one was cured, but of the seven with hookworm and hymenolepsis only one was cured. The large variations in percentage cures probably reflected a large standard error (± 27% in the cases of mixed ascaris/hookworm and trichuris/hookworm infestations) rather than a real difference in the drug's effectiveness. This view is to some extent supported by the fact that the cure rate for the triple infestation ascaris/trichuris/hookworm was 100%. Except for hymenolepis the cure rates were most promising and similar to those of the single infestation group.

Response of 85 Worm-infested Children to Treatment With Mebendazole

Helminth	No. with Single Infestation	No. (%) Cured	Total Treated for any Infestation*	Total (%) Cured
Ascaris	9	9 (100)	19	19 (100)
Trichuris	23	21 (91)	33	31 (94)
Hookworm	17	16 (94)	33	27 (82)
Hymenolepis	16	8 (50)	23	9 (39)

*Includes children with multiple infestations (see text)

Twenty-five single infestations with *Giardia lamblia* cysts were treated and 10 (40%) were cured. A further 13 children who also harboured worms were treated and four responded, and thus the overall cure rate was 37%.

The survey yielded no evidence of drug toxicity or intolerance—diarrhoea, nausea, anorexia—on direct questioning. We were unable to do blood or biochemical studies on the children but there was nothing in the literature to suggest that such tests would have been justified.

Discussion

Our results seem highly promising and generally agree with those of other studies.[4] The whipworm (trichuris) is notoriously intractable and, moreover, may spread in hospitals for the mentally subnormal in Britain.[7] A cure rate of 94% by a drug with such low (? absent) toxicity would enable such units to be freed effectively of not only trichuris but also *Enterobius vermicularis* at a single stroke. Our cure rate for trichuris infestation of 94% after three days' treatment with mebendazole compares favourably with that of 81-88% found after five or 10 days' treatment with difetarsone.[7] Strict comparison between these studies is not valid, however, as the methods for detecting parasites were different, Lynch *et al.*[7] being able to do a much more thorough faecal examination than we found possible. Eradication of hookworm infestations (82%) was also an important result as many children suffer because of hookworms.

Our results suggest that giardia carriage may be influenced by mebendazole. In Brazil, however, Souza*et al.*[1] were unable to show any effect on this parasite, but their findings may have been biased by reinfestation due to a heavy load of the parasite in the environment and poor hygienic conditions. Clearly, our findings require confirmation, for though mebendazole would not be the drug of choice for treating infestation due to giardia alone (metronidazole would be better) it would be an advantage to know that deworming with mebendazole might incidentally eradicate *G. lamblia*.

While in the U.K. we neither have nor expect to have a worm problem such as exists in some parts of the world we can agree with Peña Chavarria *et al.*,[4] who treated Costa Rican patients with mebendazole in considering the drug "as a public health tool in mass therapy for helminth control." Certainly, mebendazole should prove useful in Britain for treating people with multiple infestations.

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Neuropathy in Latent Hereditary Hepatic Porphyria

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Summary

Peripheral nerve conduction velocities were measured in 20 patients with acute intermittent porphyria and five with variegate porphyria and in 25 controls matched for age and sex. None of the porphyric patients had acute symptoms on examination, and nine had never had symptoms. Compared with the controls, patients had a significantly slower conduction velocity of the slower motor fibres of the ulnar nerve ($P < 0.001$) and a slower sensory conduction velocity of the ulnar and median nerves ($P < 0.05$). There was no significant difference between the patients and controls in the maximum motor conduction velocity of the median, ulnar, deep peroneal, or posterior tibial nerves. Slight peripheral neuropathy seems to be associated with latent hereditary hepatic porphyria, even in patients who have never had symptoms.

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Introduction

All the symptoms in the acute phase of hereditary hepatic porphyria are probably due to damage to the autonomic, peripheral, or central nervous system.[1] In severe porphyria, neuropathy is a typical and well-known finding. Because of the intermittent character of hereditary hepatic porphyria, however, most patients are symptomless almost all their lives, showing only an increased excretion of porphyrins and their precursors. In lead poisoning, which resembles porphyria,[2] disturbances in nerve conduction without clinical symptoms have been noted.[3] The purpose of this study was to find whether similar changes occur in latent acute intermittent porphyria and latent variegate porphyria.