Chemotherapy of experimental echinococcosis

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Department of Parasitology, University of Zurich, Switzerland

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J. ECKERT, B. BURKHARDT

Introduction

Since 1974 it has been demonstrated that mebendazole, fenbendazole, flubendazole and some other benzimidazole derivatives exhibit certain anthelmintic effects against metacestodes of *Echinococcus granulosus* and *E. multilocularis* in intermediate host animals (Lit. see Barandun, 1978; Eckert et al., 1978; Burkhardt, in preparation).

Previous experiments (Eckert et al., 1978) with *Meriones unguiculatus* indicated that cysts of *E. granulosus* can be severely damaged or killed by long-term treatment of 80 days duration with 500 ppm mebendazole or fenbendazole applied in the food. Metacestodes of *E. multilocularis* were significantly inhibited in proliferation by long-term oral mebendazole treatments (500 ppm) over 60–200 days. In most cases, however, the parasites were capable to resume growth after termination of drug application as proved by transplantation experiments (Barandun, 1978; Eckert et al., 1978).

In recent studies the influence of chemotherapy on metastases formation of larval *E. multilocularis* in *Meriones* was examined.

Materials and methods

Ninety *Meriones unguiculatus*, 6 months old (75 males, 15 females) were used. Of these, 60 animales were infected by implantation of 0.1 g tissue of larval *E. multilocularis* (strain B) per animal into the subcutis of the neck region. Three experimental groups were formed: *Group I:* 30 *infected* animals, treated from day 7 postinfection (p.i.) for 300 days with 500 ppm mebendazole[2] applied in medicated food pellets. On the basis of food consumption the daily drug dosis was estimated to be about 30–50 mg/kg body weight. *Group II:* 30 *infected* animals served as *untreated* control. *Group III:* 30 *noninfected* and *untreated* animals.

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[2] 5(6)-benzoyl-2-benzimidazole carbamate (Janssen, Beerse, Belgium)

Correspondence: Prof. Dr. J. Eckert, Institut für Parasitologie der Universität Zürich, Winterthurerstrasse 266, CH-8057 Zürich, Switzerland

Survival rates of Meriones with subcutaneous E. multilocularis infection. Group I: treated from day 7-307 postinfection (300 days) with 500 ppm mebendazole, Group II: infected, untreated, Group III: uninfected, untreated.

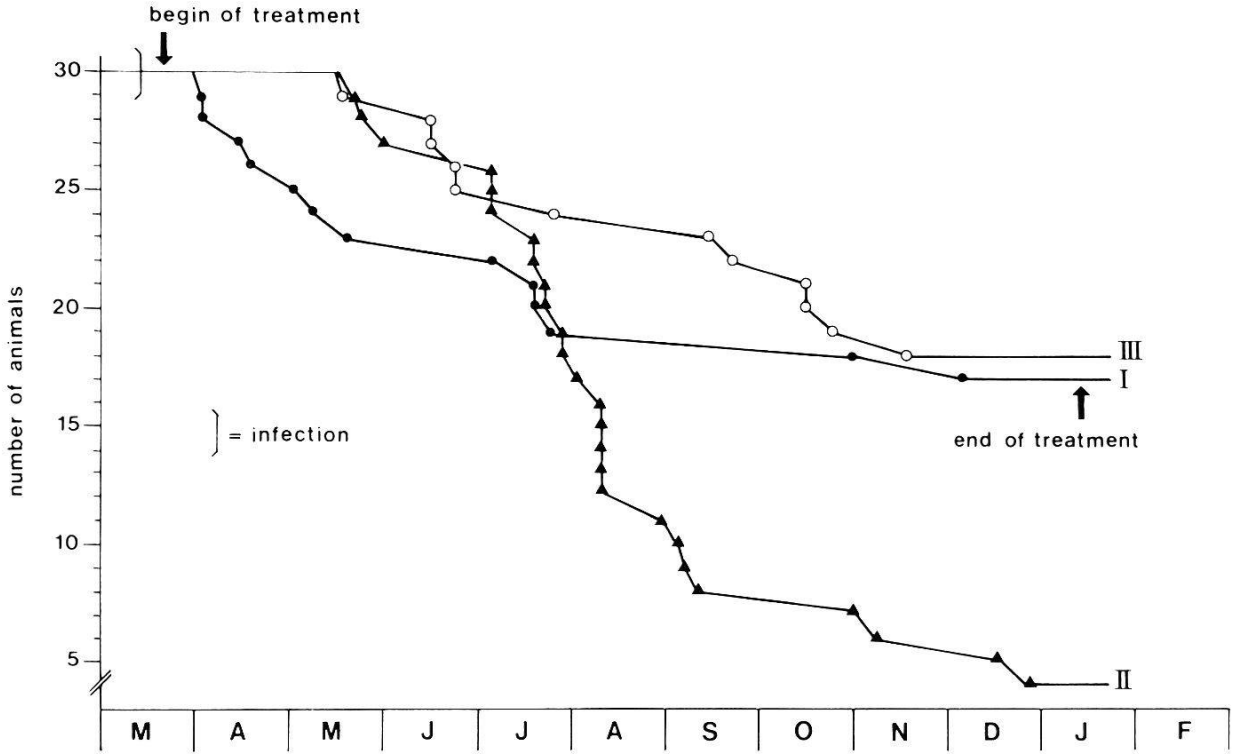

Fig. 1

Results and discussion

Survival rates (Fig. 1): Only 4 (13%) of the 30 infected but untreated animals of group II survived until the end of the experiment as compared with 17 (57%) of the infected and treated group I. The survival rate in the noninfected and untreated group III was 60% and thus not significantly different from the treated group I.

Metastases formation: Within 2–10 months p.i. most of the 30 untreated control animals of group II developed large parasite tissue masses in the subcutis of the cervical region, in the regional and thoracic lymph nodes and partly in the lungs (Fig. 2). The average group weight of metacestodes from all locations was 7.8 g with an individual maximum of 19.1 g (Fig. 3). Metastases in thoracic lymph nodes, in the lung tissue or the pleural cavity, respectively, were present in 21 animals or 70% ot the untreated control group II.

In 28 *Meriones* of the treated group I only small remnants of parasite tissue with an average weight of 0.03 g were detectable at the implantation site (Figs. 3 and 4). All organs were free of macroscopically visible metastases.

Transplantation experiments: Ten days after termination of treatment parasite tissue isolated from survived untreated and treated animals, respectively, was transplanted into the peritoneal cavity of helminth-free *Meriones.*

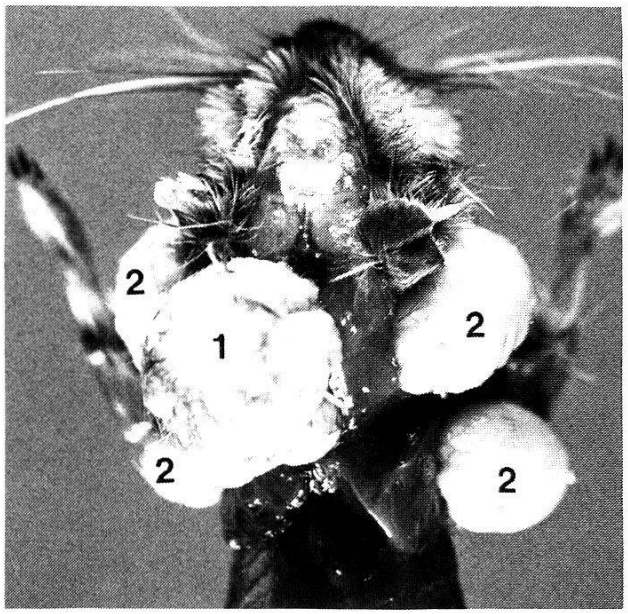

Fig. 2. *Meriones* (dorsal view) of untreated group II 134 days postinfection. Large parasite masses at implantation site (1) and in lymphnodes (2).

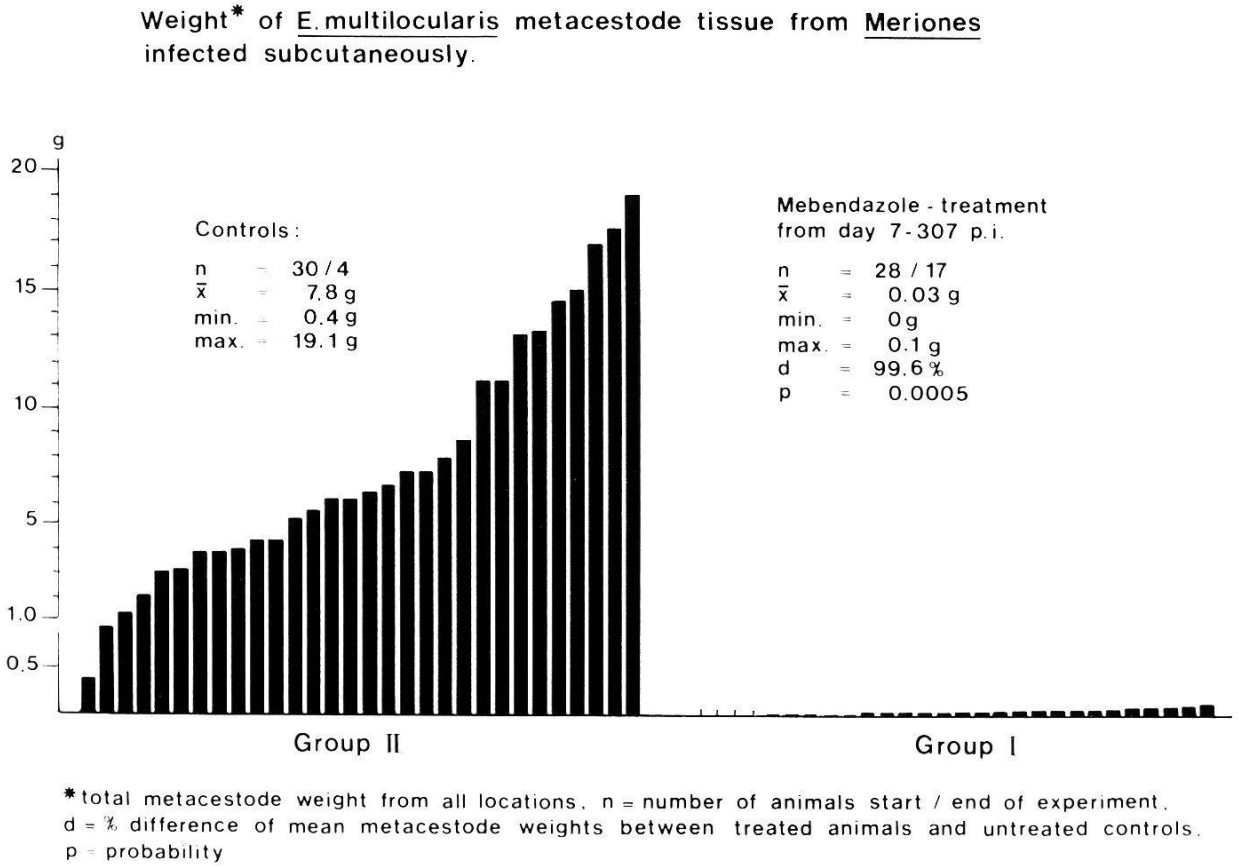

Fig. 3

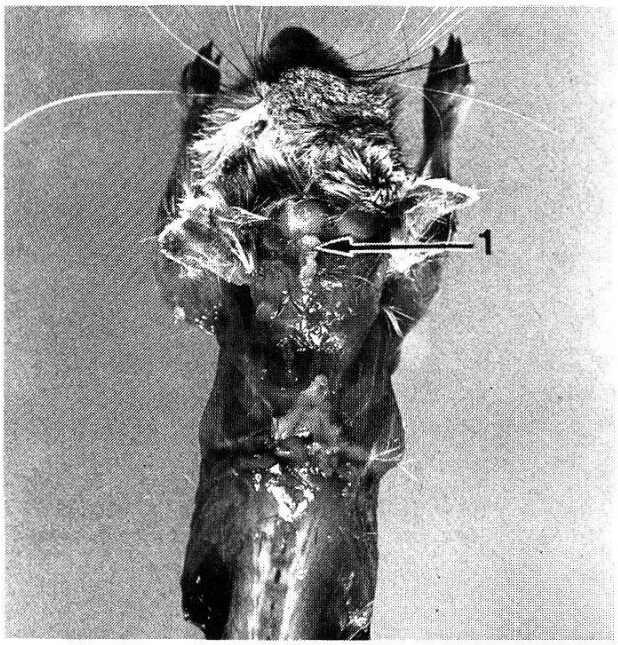

Fig. 4. *Meriones* (dorsal view) of group I 230 days postinfection and after 223 days of mebendazole treatment. Arrow 1: remnants of parasite tissue at implantation site.

After 70 days living parasite tissue was present in 8 animals which had been infected with transplants from untreated controls and in all 5 animals which had received transplants from *Meriones* treated for 300 days.

These results indicate that long-term treatment with high oral doses of mebendazole can prevent proliferation and metastases formation of larval *E. multilocularis* in *Meriones* under drug treatment, but it has no complete parasiticidal effect.

Barandun G.: Untersuchungen zur Chemotherapie der alveolären Echinokokkose und der *Mesocestoides corti*-Infektion bei Labortieren. Vet. Diss., Zürich 1978.

Burkhardt B.: Beiträge zur experimentellen Chemotherapie der larvalen Echinokokkose mit Untersuchungen zur biologischen Verfügbarkeit von Mebendazol bei Nagetieren. Vet. Diss., Zürich (in preparation).

Eckert J., Barandun G., Pohlenz J.: Chemotherapie der larvalen Echinokokkose bei Labortieren. Schweiz. med. Wschr. *108*, 1104–1112 (1978).