Neurosurg. Rev.
16 (1993) 35–37

Concentrations of albendazole in serum, cerebrospinal fluid and hydatidous brain cyst

Dag Moskopp[1] and Erich Lotterer[2]

[1]Neurosurgical Department, University of Münster, [2]Department of Internal Medicine, University of Erlangen, Fed. Rep. of Germany

Abstract

A young girl with cerebral echinococcosis was treated with albendazole (13 mg/kg/d, p. o.). The concentrations of albendazole sulphoxide were determined in serum, cerebrospinal fluid and hydatidous cyst over a month. The mean ratios of concentration were: CSF/serum = 50%, cyst/serum = 40%, cyst/CSF = 80%.

Keywords: Albendazole, brain cyst, cerebrospinal fluid, echinococcus granulosus, pharmacokinetics.

1 Introduction

Since the introduction of albendazole for the treatment of helminthosis of the human brain [1, 2, 8, 9, 10, 11] only a few data of the penetration of benzimidazole carbamates into the CSF [3, 7] has been collected. This has even provoked discussions on its dosage [5]. To our knowledge no data has yet been published on its penetration into intracerebral hydatidous cysts.

2 Patient and method

A Libyan girl (11 yrs, 30 kg) with multiple cerebral cysts of echinococcus granulosus and at least two earlier craniotomies abroad, suffered increasing intracranial pressure due to a temporo-parietal hydatidous cyst on her right side which occluded the mesencephalic aquaeduct. To prevent "coning" both, the ventricles and the cyst had to be shunted externally (Figure 1). By these routes 29 probes of CSF, cyst fluid, and serum were sampled before, during, and after the first cycle of albendazole treatment* (200 mg bid oral, without dexametha-

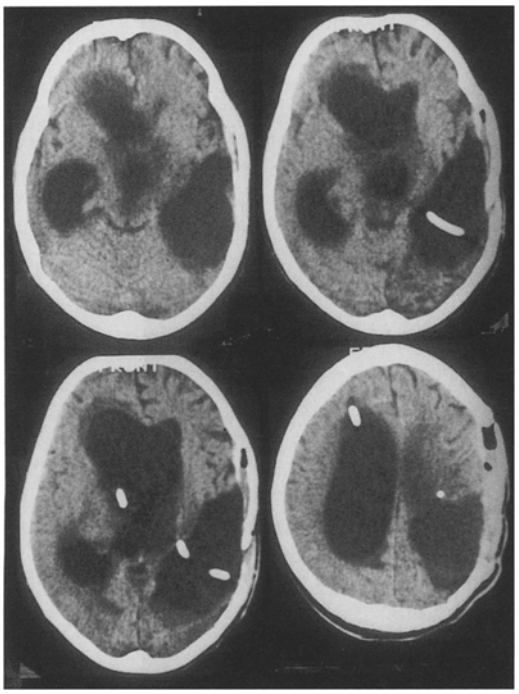

Figure 1. CT-scans of an 11 year old Libyan girl with drainage catheters of both enlarged cerebral ventricles and a right temporo-parietal hydatidous cyst.

* Kindly supplied by Smith Kline Dauelsberg GmbH, Munich.

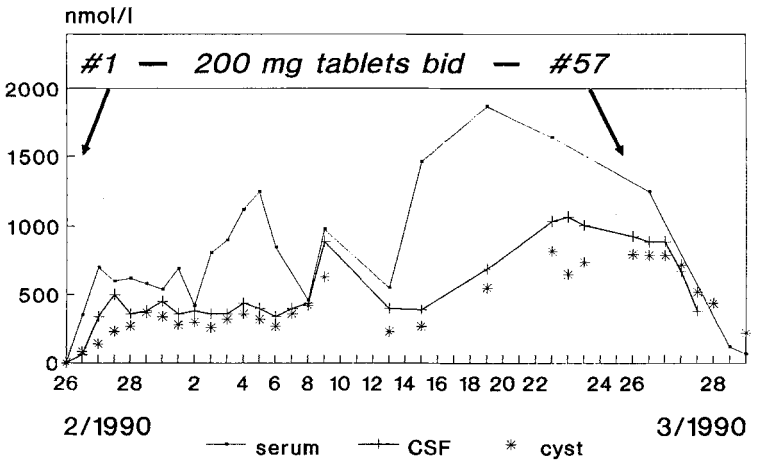

Figure 2. Albendazole sulphoxide: concentrations in serum, CSF & echinococcal brain cyst.

sone [6]). It was not possible to take these samples at constant intervals to the oral intake of the tablets. The concentrations of the active metabolite, albendazole sulphoxide, were measured by HPLC [4].

3 Results (Figure 2)

The cells of the CSF ranged from 14/3 to 560/3, and those of the cystic fluid from 22/3 to 355/3. The protein content of the CSF was between 161 and 228 mg/dl, and of the cystic fluid between 460 and 984 mg/dl. One day after the initial dose, the concentrations of albendazole sulphoxide (nmol/l) ranged from 450–1870 in serum, 350–1070 in CSF, and 140–820 in the cystic fluid.

4 Discussion

To the best of our knowledge, these are of the first data on the penetration of albendazole across both the blood-brain-barrier and the membranes of an intracerebral hydatidous cyst under clinical conditions. The mean ratio of drug penetration from serum to CSF was 50%, from serum to cyst 40%, and from CSF to cyst 80%. A variance of the compartmental concentrations (Figure 2) may be due to the differing intervals between the sample collection and the intake of the last tablet (range: 65–470 minutes). But also JUNG and coworkers [5] reported on ample interindividual variations, which are not related to age, sex, or presence of inflammatory signs.

5 Conclusion

These data support the need for a well-balanced decision between medical and neurosurgical therapy of intracerebral echinococcosis, especially in eloquent regions. Yet, if these lesions, in spite of medication do increase the intracranial pressure progressively, e. g., by disturbing the CSF circulation, there is no alternative to emergency surgery to prevent coma and death.

Acknowledgements: We thank KARIN MUTLAQ and KARL SCHNITZLER for their help.

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Submitted November 11, 1991. November 22, 1991.

Dr. med. Dag Moskopp, Senior registrar
Neurosurgical Department
University of Münster
Albert-Schweitzer-Straße 33
W-4400 Münster 1
Fed. Rep. of Germany