

CNS Cysticercosis—A Problem of Differential Diagnosis

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Abstract. Although a well-known disease worldwide, cerebral cysticercosis in European countries is a rare event. Due to increased travel to East-Asian and Latin American countries it is possible that the occurrence of brain cysticercosis will become more frequent. These facts should remind us of the possibility of cysticercosis of the nervous system.

A case of cerebral and spinal cord cysticercosis is presented, causing symptoms of progressive dementia with ventricular occlusion and hydrocephalus. Differential diagnosis causes a major problem. It is shown that myelography may demonstrate characteristic features of the disease.

Key words: Cysticercosis – Central nervous system – Spinal cord myelography

Introduction

Cysticercosis and other larval tapeworm cerebral infections are rare diseases in European countries but worldwide they are very common. Latin American authors especially have drawn attention to clinical and morphological changes in cysticercosis (Arana and Asenjo 1945; Dixon and Lipscomb 1961). In these countries a large number of neurosurgical hospital admissions are due to larval tapeworm infections (Cardenas and Cardenas 1962; Lombardo and Mateos 1961; Stepien and Chorobski 1949) and many of these admissions are with symptoms of cerebral tumours (Arana and Asenjo 1945; Olive and Agulo-Rivero 1962). With the influx of Mexican immigrants cysticercosis has been seen with increased frequency in California (MacAlpine et al. 1965). The increase in travel and holidays to “the Far East” and “the Far West” may also give rise to infections with cysticercosis in Europa. Our report therefore recalls the possibility of brain cysticercosis causing symptoms of progressive dementia; some signs seen on myelography seem characteristic of spinal cysticercosis, comparable to the cysts sometimes seen in the brain.

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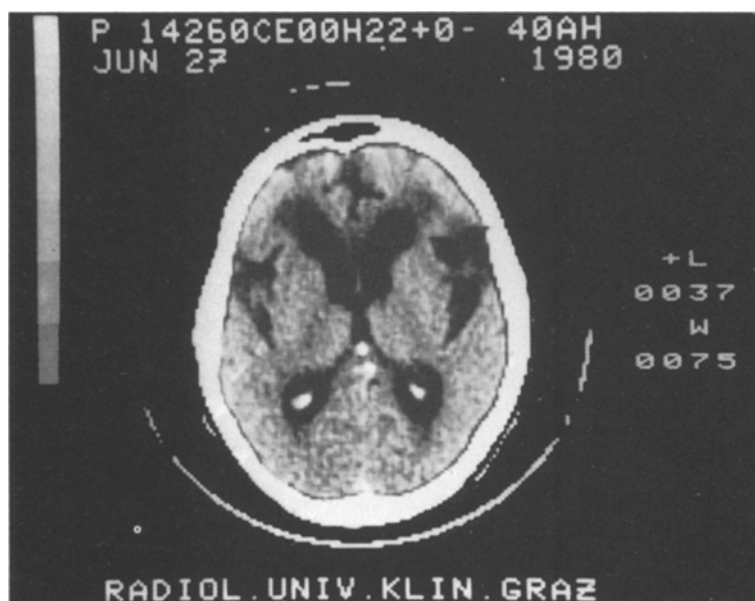


Fig. 1. Computer assisted tomography of the brain. Note the severe dilation of the lateral ventricles and symmetrical hypodense areas around the frontal cornes

Case Report

A 69-year-old woman who lost consciousness for 10 min was admitted to hospital. Neurological examination showed vestibular ataxia and giddiness. There was an history of lumbalgia and progressive dementia had occurred during the previous 6 months. All blood parameters, including eosinophils, were within the normal range, and the EEG revealed bilateral slow-wave foci. Computer tomography (CT) showed a severe dilation of both lateral ventricles with a slight dilation of the third ventricle (Fig. 1). Symmetrical periventricular hypodense areas existed especially around the frontal cornes. The sulcus laterales of both sides and the fissura interhemispherica were dilated. The CSF perfusion was normal, the CSF contained 84 cells per mm³ and total protein of 7.75 g/l. The cell population was composed of 71% lymphocytes, 12% monocytes, 12% neutrophilic and 2% eosinophilic granulocytes and 3% plasma cells.

Due to the development of a paraparesis of both legs ascending myelography was performed. This brought to light multiple intradural extramedullary "tumours" up to 1 cm in diameter (Fig. 2). Following the organic psycho-syndrome, adynamia and thrombophlebitis in both thighs occurred. With symptoms of pneumonia and attacks of fever the patient died 3 weeks following hospital admission.

Methods

The brain and the spinal cord were fixed in 10% neutralized formaldehyde for 3 weeks. Different parts of the spinal cord and the brain were taken for histological investigation and stained with HE, PAS-reaction and Masson's trichrome-reaction. All other organs were carefully examined for cysts or adults worms and histological sections were made, if there was any doubt.

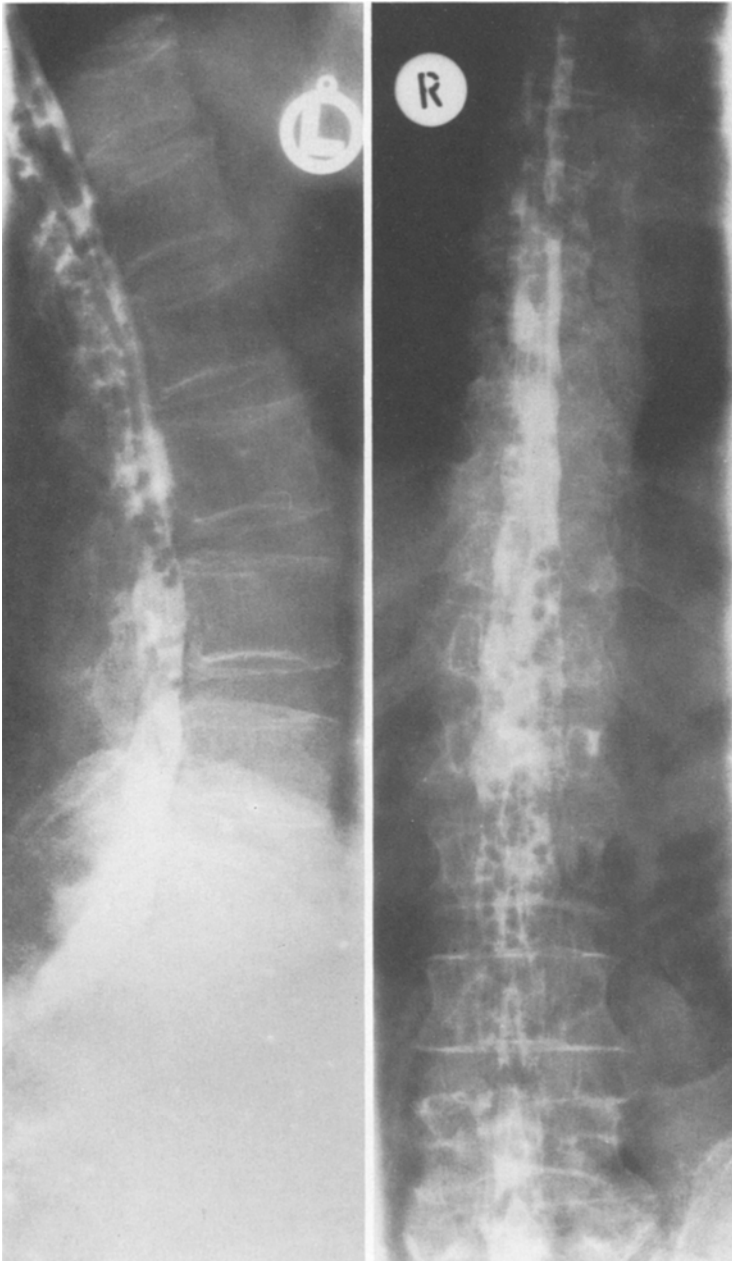


Fig. 2. Ascending myelography. Note the multiple intradural cysts of *Cysticercus cellulosae*

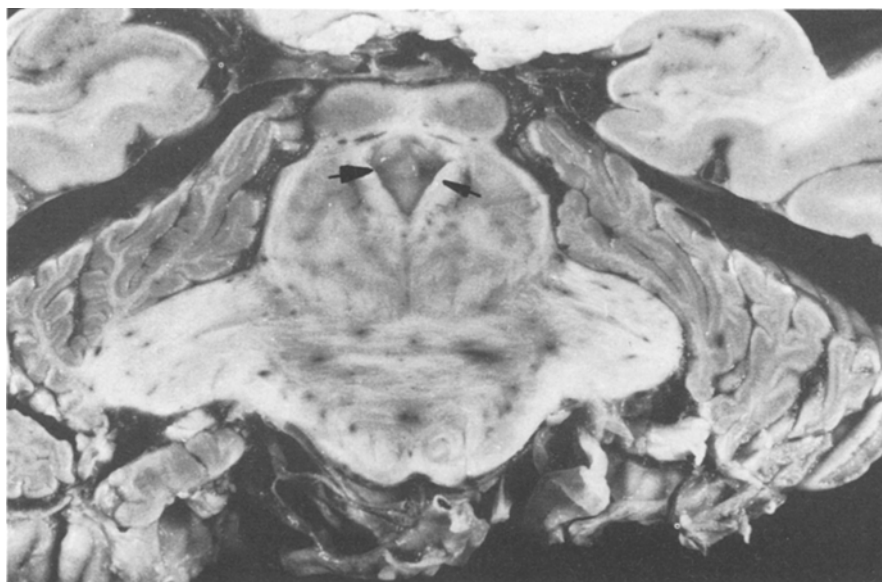


Fig. 3. Frontal section of the brain demonstrating one cyst lying in the orifice of the aqueduct (arrow) and some cysts in the basal meninges

Results

The brain weight was 1,250 g. Macroscopically leptomeningeal fibrosis at the base of the brain from the cisterna chiasmatis down to the region of the cisterna cerebellomedullaris and the foraminae Luschkae and Magendi was found. Within the fibrosis lay round or sometimes cylindrical cysts (up to 2.5×1 cm), filled with clear fluid. On frontal sections we found a marked dilation of the three ventricles and the aqueduct, caused by a cyst lying in the caudal orifice of the aqueduct and closing it completely (Fig. 3). Within the subarachnoidal space of the spinal cord multiple cysts were also found especially in the lumbosacral part and the cauda equina.

Due to the aqueduct occlusion there was a marked internal hydrocephalus, a high-grade oedema of the brain and spinal cord and an atrophy of the brain cortex. Even after careful examination neither adult worms of *Taenia solium*, *Multiceps multiceps* or *Echinococcus* nor larval stages or cysts were detected in the small or large intestine, the liver or other organs. Histological examination of brain and spinal cord sections revealed numerous so-called sterile cysts (acephalocysts without scolices) and some cysts containing the larval tapeworm (Fig. 4). There were only a few localized inflammatory areas with perivascular infiltrates, these being predominantly lymphocytes. From macroscopic and microscopic examinations it was concluded that the patient's illness was caused by a *Cysticercus cellulosae*, although a *Coenurus cerebralis* could not be excluded but was unlikely because coenurus-infections are even more rare.

The patient died from a pulmonary embolism originating from thromboses in the right femoral and iliacal vein and in the pelvic veins.

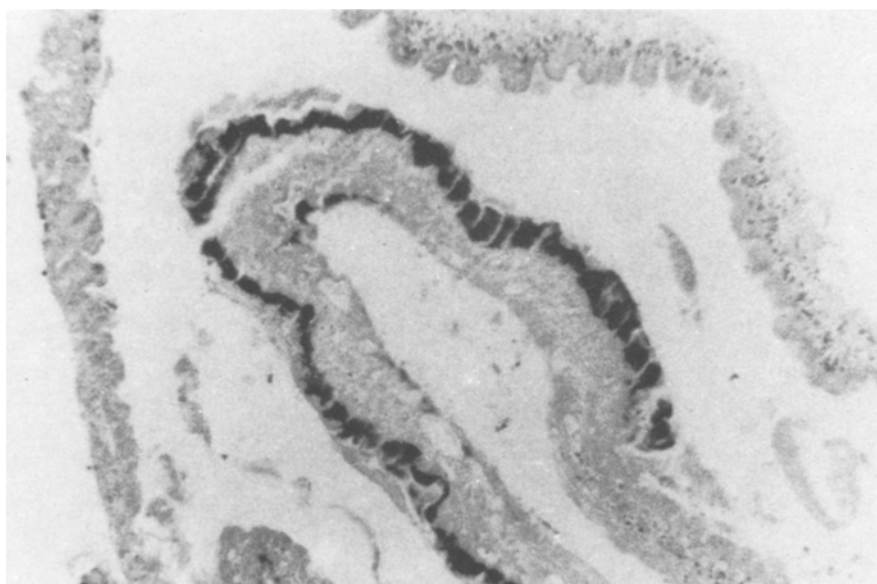


Fig. 4. Histological section of a cyst containing larval tapeworm with muscular layer (*dark band*) and cuticula. Trichrome, $\times 100$

Discussion

Alzheimer's degeneration and cerebrovascular disease are the commonest reasons for dementia at our patient's age (Wells 1978). In the presented case there were neither signs of cerebrovascular disorders nor risk factors. Therefore, from a clinical examination the patient's symptoms were interpreted as Alzheimer's dementia. The CT showed atrophy of the brain and severe dilation of the ventricles. The development of a paraparesis led to the hypothesis of a spinal tumour. The multiple small "tumour-like" pattern seen in ascending myelography seemed to support this hypothesis, although this has not previously been reported. A final myelographic diagnosis however, could not be established with certainty. Cytological examination of the spinal fluid was not significant. Eosinophilia is only to be expected when cysts have ruptured resulting in close contact between the antigen and microglial or other macrophage derived cells or T-lymphocytes; the cyst membrane itself is not strongly antigenic. Thus, the only characteristic intravital feature was the multiple cysts seen on myelography, which once seen would never be misinterpreted. Of interest in our case is the short duration of illness beginning with an organic psycho-syndrome. The history of lumbalgia is another sign of the spinal infection. The cysts at the base of the brain are a plausible cause of the ataxia and the cyst occluding the aqueduct of Sylvius provoked the hydrocephalus with concomitant psycho-syndrome. In retrospect, a long residence in the Phillipines 33 years ago was the only suggestion as to when and where the infection possibly started. An incubation time of years (Jehn 1921; MacArthur 1933) or even decades (Dixon and Hargraeves 1944; Edwards 1946; Pilz and Müller 1972) is well-known.

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