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Neurocysticercosis causing sudden death: a case report

Martinez Fernanda, Seley Celeste, Marchesi Liliana, Fontanarossa Victoria, Rodriguez Dominique, Troncoso Alcides*

Department of Microbiology, Parasitology and Infectious Diseases, School of Medicine, Buenos Aires University

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ABSTRACT

We report an acute case of a native man from Bolivia suffered from cephalalgia which rapidly worsened and ended in his sudden and unexpected death. Magnetic resonance imaging (MRI) of the brain was obtained. Features demonstrated on brain MRI scan were consistent with a diagnosis of neurocysticercosis (NCC). An autopsy showed the presence of intraventricular *Taenia solium (T. solium)* cysts which caused blockage of cerebrospinal fluid and secondary hydrocephalus. Due to the increasing travel movements of people neurocysticercosis must be considered as a cause of unexplained sudden death.

1. Introduction

Cysticercosis is a systemic parasitic infestation caused by the pork tapeworm, *Taenia solium (T. solium)*. The symptoms of this illness are caused by the development of characteristic cysts (cysticerci) which most often affect the central nervous system (neurocysticercosis), eyes and skeletal muscle. Many individuals with cysticercosis never experience any symptoms[1].

Neurocysticercosis is now recognized as a common cause of neurologic disease in developing countries in Latin America, Asia, and sub-Saharan Africa[2]. The incidence of cysticercosis has increased in the United States due to increased immigration from developing countries. Travelers to endemic areas represent another source of cysticercosis, although such infection accounts for a minority of cases in the United States. Neurocysticercosis (NNC) is a leading cause of adult-onset seizures worldwide[3].

2. Case report

A 30-year-old man, originally from Bolivia, presented to the ED with a 6-weeks history of progressive headache for several months. His family indicated that he had a history of a seizure disorder. A MRI scan of the brain demonstrated multiples cysts consistent with NCC (Figure 1). An immunoblot testing of serum was positive for cysticercosis. On admission he was immediately treated with intravenous dexamethasone and praziquantel therapy (1 500 mg/day). Two days later, he suffered a cardiac arrest, and despite resuscitation, he died. Neuropathologic examination revealed the presence of intraventricular taenia solium cysts which caused blockage of cerebrospinal fluid and secondary hydrocephalus (Figure 2).

3. Discussion

Cysticercosis is a zoonotic larval cestode infection endemic in many regions of Central and South America, sub-Saharan Africa, India, and Asia[2]. Individuals with no history of pork consumption or travel to endemic areas can also develop NCC. Human cysticercosis, however, develops after humans ingest *Taenia solium* eggs. The eggs are typically spread via food, water, or surfaces contaminated with infected feces. Oftentimes, the eggs may be spread from the hands of infected food handlers who do not clean their hands or from foods fertilized/irrigated with water containing infected human feces. Though the source of this fecal-oral transmission often occurs from other infected individuals, it is also possible for individuals who carry the tapeworm to autoinfect themselves[4].

Cysticercosis is caused by the larval stage of the tapeworm *Taenia solium*; clinical syndromes include neurocysticercosis(NCC). It is a disease of poverty and underdevelopment. Approximately 50 million people worldwide are estimated to have cysticercosis infection, although estimates are probably low since many infections are subclinical and there are relatively few population

*Corresponding author: Alcides Troncoso, Tropical Disease Unit, Faculty of Medicine, University Building, Bartolome Mitre 1906, Buenos Aires, Argentina.
E-mail:microbiologiayparasitologia@yahoo.com.ar

based data on prevalence[5-7].

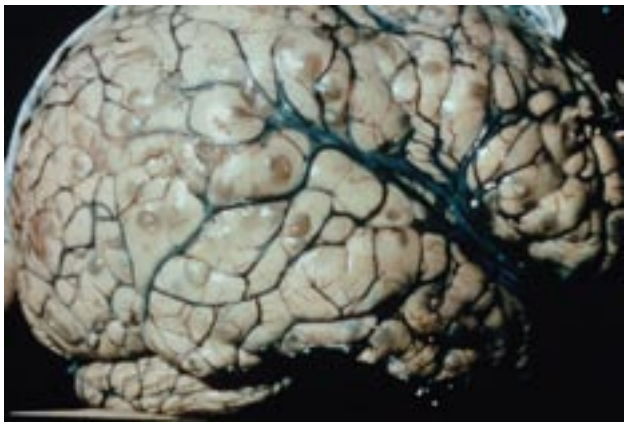

Figure 1. Magnetic resonance imaging scan of the patient at presentation. Numerous hypodense lesions are evident bilaterally in the cerebral parenchyma consistent with neurocysticercosis. There is no edema around any of these lesions.

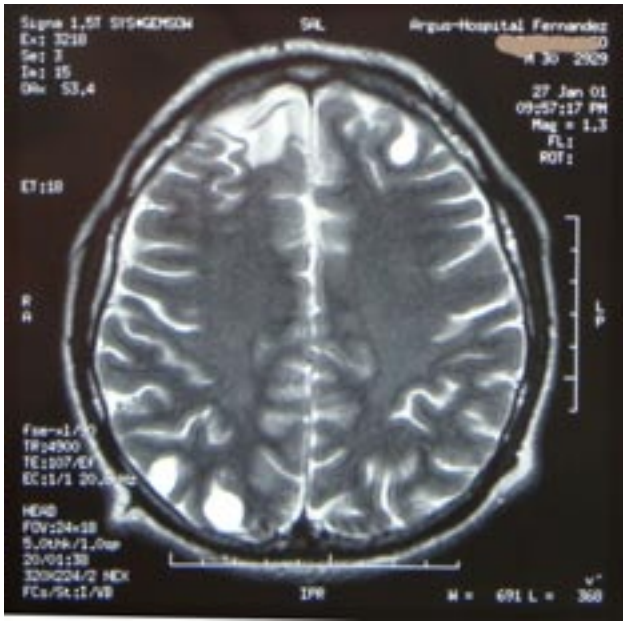

Figure 2. Clinical aspects of the brain.

Cysticercosis is a preventable fecal-oral transmitted infection that can cause severe neurologic disease and death and result in substantial cost to the healthcare system. Additional information is needed on the prevalence and incidence of cysticercosis-related deaths in developing countries[3]. Published studies from large facility-based case series have reported that the cysticercosis death rate is relatively low. These studies suggest that, although uncommon, cysticercosis-related deaths routinely occur among persons born in South America. Alternatively, cysticercosis among U.S.-born persons may reflect travel-related exposure and infection. Travel by U.S. and Europe residents to cysticercosis-endemic areas is common, and exposure to food and water contaminated with the eggs of *T. solium* may readily occur. The discovery of *Taenia spp*. eggs from several varieties of vegetables obtained in local markets in the northeastern Mexican state of *Tamaulipas*, which borders the United States, has been reported[8]. *Taenia* eggs can survive for long periods in the environment, and human feces used as fertilizer or contaminated water employed for irrigation can contaminate crops prior to importation[9].

Studies to evaluate the possible impact of access issues on cysticercosis deaths would be useful. Cysticercosis must be recognized and diagnosed for it to be listed on the death certificate. This would require confirmation of infection through biopsy or autopsy[10]. Consequently, some cases of fatal cysticercosis are likely undiagnosed and unrecognized; this would results in the miscoding of cysticercosis-related deaths as other conditions. For this reason, death records likely possess moderate sensitivity for identification of true cysticercosis deaths[11].

To better define the extent of cysticercosis, state and local health authorities should consider instituting a requirement for the mandatory reporting of this infection. Such surveillance systems should include aggressive efforts to identify possible tapeworm carriers among household members and other close personal contacts. Treating such tapeworm carriers can eliminate sources of infection and prevent additional transmission[12]. While transmission of cysticercosis from a commercial food handler has never been documented, such transmission may occur and any food handler with taeniasis (infection with adult *T. solium* or *Taenia* of unknown species) should be precluded from handling food until successfully treated. Cysticercosis can be prevented by educating individuals about proper food handling, avoidance of raw or undercooked pork, and good personal hygiene[13].

Conflict of interest

The authors have no conflicts of interest.

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