



Low seroprevalence of systemic cysticercosis among patients with epilepsy in Kerala – South India

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KEYWORDS

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Abstract

Purpose: Neurocysticercosis (NCC) is considered to be rare in Kerala state, India, although it is an important cause of epilepsy in many other parts of India. Our objective was to test this notion by determining the seroprevalence of cysticercosis (CC) in an unselected sample of persons with epilepsy and comparing it to that of persons without epilepsy living in Kerala.

Methods: Individuals with active epilepsy (AE) who had never resided outside Kerala state for more than one month and were attending our center for epilepsy care constituted the cases. Sex-matched persons without epilepsy who had never resided outside Kerala state for more than one month constituted the controls. The demographic details, occupation, and food habits (for the cases and controls), as well as clinical characteristics and imaging (for cases only) were recorded. Sera separated from blood drawn by venipuncture from the cases and controls were assayed for cysticercal antibodies by enzyme-linked immunoelectrotransfer blot (EITB).

Results: Of the 80 persons with AE, 12 were seropositive for cysticercus antibodies (15%; 95% CI: 8.8–24.4); among the 68 controls, 7 were seropositive (10.3%; 95% CI: 5.1–19.8). The odds ratio (OR) for seropositivity in the epilepsy group (1.54) was not statistically significant (95% CI: 0.6–4.2). Among the 69 patients who had a brain computed tomography (CT) scan or magnetic resonance imaging (MRI), none had

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features diagnostic of NCC. Gender, diet (vegetarian vs non-vegetarian, consumption of raw vegetables), drinking water status (clean vs unclean), residence (rural vs urban), exposure to manure, and animal rearing including pigs did not have any association with seropositivity.

Conclusion: Among the residents of Kerala, most epilepsy is not related to cysticercosis.

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Introduction

Neurocysticercosis (NCC) is caused by the larval stage of the tapeworm *Taenia solium* in the nervous system. It is the single most common (26.3–53.8%) cause of acquired epileptic seizures in India and other developing countries [1,2]. NCC is now an emerging health problem in industrialized countries due to increased population movement and migration [3]. Although NCC presents as seizures in nearly 70% of patients [4], there are only a few case–control studies on the prevalence of NCC among patients with active epilepsy (AE). The prevalence of NCC in different studies available in India and other countries vary widely according to the methodology. The socioeconomic and cultural-religious backgrounds of the population are likely to influence the prevalence of NCC. It is generally considered that NCC is uncommon in the state of Kerala, where educational and health standards are high, and in Kashmir, where people do not rear pigs or eat pork due to religious customs [5,6].

There are limitations in establishing NCC as the cause of epilepsy in community studies. Brain imaging by computed tomography (CT) scan or magnetic resonance imaging (MRI) is most likely the best method to diagnose NCC but may not be feasible in community studies because of their high cost and limited availability. Seroprevalence for cysticercosis can be estimated by ELISA or enzyme-linked immunoelectrotransfer blot (EITB) techniques. The estimation of antibodies by EITB has higher sensitivity than ELISA (92.2 vs 51.6%) when serum is sampled [7]. Most studies in India and other countries indicate increased seroprevalence among persons with epilepsy [1]. We tested the hypothesis that there is no increase in the seroprevalence of cysticercus antibodies in persons with epilepsy compared to those without epilepsy in Kerala state. We estimated the seroprevalence of cysticercal antibodies by EITB in an unselected sample of persons with AE attending a tertiary hospital in Kerala State and compared it with the value for sex-matched persons without epilepsy.

Materials and methods

This study was carried out in Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum, Kerala, a tertiary referral center for epilepsy and other neurological disorders. The samples were analyzed at Christian Medical College (CMC), which is also a tertiary referral center at Vellore, Tamil Nadu. The study was conducted between January 2010 and October 2011.

The selection criteria for the epilepsy group were persons with active epilepsy and 18–60 years old. Epilepsy was defined as an enduring predisposition to generate seizures due to recurrent and unpredictable interruptions of normal brain function [8]. The diagnosis of epilepsy was confirmed by history, while the etiology was determined by clinical examination and data from EEG, CT, or MRI abstracted from the patients' medical records. Active epilepsy was defined as two or more seizures in the past five years or a history of recurrent seizures and currently being seizure free while using antiepileptic drugs [9]. All had at least one year duration of epilepsy prior to enrolment. The comparator group included sex- and age-matched persons without epilepsy. Both groups should have lived continuously in Kerala state and not traveled outside the state for more than one month in their lifetime. Migrant populations were excluded. Controls were identified from the families of epilepsy patients. Controls were also evaluated by history and examination. A standard questionnaire in the local language (Malayalam) regarding food habits (consumption of salads and uncooked vegetables and meat, particularly pork), agricultural activities, and pig/cattle/pet rearing was administered to all patients and controls. The study protocol was approved by the Institutional Ethics Committee and informed consent was obtained from every subject in the local language. The investigators analyzing the serum samples were blinded to the clinical details.

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