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Case Report: Three Cases of Neurocysticercosis in Central Africa

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Abstract. Neurocysticercosis (NCC) is an infection prevalent in developing countries; however, it is neglected in the Democratic Republic of the Congo (DRC) and in sub-Saharan Africa. Here, we present three different cases seen in a consulting room in Lubumbashi. These cases are evidence that NCC is more common than it was previously thought in sub-Saharan Africa. Neurocysticercosis is a pathology-neglected and ignored infection, not only by the population but also by health professionals and health authorities in the DRC, and because of that, it is important to increase the research about NCC in the DRC to assess the prevalence and risk factors for NCC to assess the severity of the phenomenon and to help designing appropriate prevention and control measures.

INTRODUCTION

Neurocysticercosis (NCC) is a neurological infection, prevalent in most developing countries, caused by the ingestion of the eggs from the pig tapeworm *Taenia solium*.[1] In endemic areas, NCC contributes to 30% of the cases of epilepsy. The diagnosis of NCC is based on epidemiological, clinical, radiological, and serological criteria, with neuroimaging (computed tomography or magnetic resonance imaging) being crucial for the diagnosis.[2]

The distribution of the disease has changed little since 2010. The endemic regions are Latin America, south and Southeast Asia, and sub-Saharan Africa.[3–9] In the Democratic Republic of the Congo (DRC), it is estimated that more than 800,000 people suffer from epilepsy.[5] Although NCC seems to be present in the DRC, it is seldom diagnosed mostly because of poverty and lack of access to brain imaging, and no prevalence assessments exist, although a few case reports have been published.[8–10] The first report described a single case of NCC, and a second one reported seven cases of NCC, in the territory of Madimba, Bas-Congo, in a period of 15 months. In a study conducted in Kinshasa (DRC), of a total of 4,233 brain scans were performed in 15 years, 11 NCC cases were diagnosed.[10] As a result, NCC is a neglected disease, not only by the population but also by the health professionals and authorities. This study reports three different cases, seen in a consulting room in Lubumbashi, to provide evidence of current endemic transmission of NCC in the DRC.

CASE 1

The first case included a 53-year-old man, native from the city of Kipushi in the DRC, who was a farmer. He presented with behavioral disorders associated with visual hallucinations that dated back to 3 months. He did not have a prior history of head trauma, nor febrile encephalopathy, nor chronic illness. On neurological examination, he revealed a typical frontal lobe syndrome characterized by impaired attention, memory, and reasoning. He also presented with euphoria and an overall quantitative and qualitative reduction in psychic activity and behavior. He had sucking and palmomental reflexes. The march was marked by footsteps stuck to the ground. The patient's hand and mouth were irresistibly attracted to any object presented in the visual field; added to this, he had urinary incontinence. Blood examination demonstrated marked hypereosinophilia (3,600/mm^3). The standard electroencephalography (EEG) showed predominantly frontal slow waves. Brain computerized tomography (CT) scan showed lesions compatible with NCC in the frontal, parietal, and occipital lobes in both hemispheres, including intraparenchymal calcifications and vesicular lesions with eccentric hyperdense scolices, without hydrocephalus (Figure 1). He received reatment with albendazole 15 mg/kg/day and prednisolone 1 mg/kg/day per 10 days. After a follow-up of 6 months, the patient had no symptoms. No follow-up CT scan has been performed.

CASE 2

The second case included a 31-year-old woman, native from the city of Kipushi in the DRC and living near a farm where pigs were raised. She had a history of 2 years of moderate-to-severe bilateral frontotemporal headache, aggravated by noise and movements of the head, accompanied by nausea that was relieved with rest and analgesics. She did not have a prior history of head trauma, nor febrile encephalopathy, nor chronic illness. General examination was normal. The hemogram showed hypereosinophilia (4,000/mm^3), and HIV serology was negative. Standard EEG was unremarkable. A brain CT scan showed multiple small cystic lesions disseminated in both cerebral hemispheres (Figure 2). Albendazole (800 mg/day for 7 days), prednisolone (1 mg/kg/day for 10 days), and ibuprofen (400 mg twice daily) were prescribed. The evolution was marked by a clinical improvement; the headaches had decreased in frequency and intensity. No follow-up CT scan has been performed.

CASE 3

The third case included a 33-year-old man, native from the city of Lubumbashi in the DRC, who was a farmer, who presented to the hospital with a history of multiple episodes of generalized tonic–clonic seizures. Blood counts were normal, and HIV serology was negative. Neurological examination was normal. Standard EEG showed a layout with bilateral slow waves. Brain CT showed four well-defined cystic parenchymal

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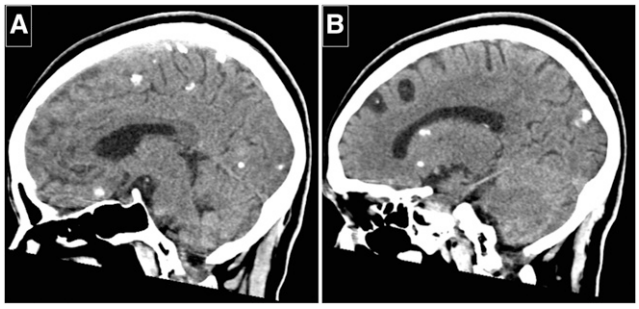

FIGURE 1. Computed tomography showing multiple calcifications and vesicular lesions in the frontal lobe (case 1).

lesions with scolices (Figure 3). He received sodium valproate (500 mg/day) and antiparasitic treatment with albendazole 15 mg/kg/day and prednisolone 1 mg/kg/day for 10 days. The patient's evolution along the next 6 months was marked by a cessation of epileptic seizures. No follow-up CT scan has been performed.

DISCUSSION

Neurocysticercosis is the most common helminthic infection of the central nervous system worldwide, and it contributes to 30% of epilepsy in endemic countries.[11] In the DRC, an estimated 800,000 people live with epilepsy, of which 450,000 children are younger than 15 years.[4] Overall knowledge of epilepsy, as well as access to adequate treatment in low-income and remote areas, is very poor.

In sub-Saharan Africa, NCC is a neglected disease, and a large part of the population and even the health system ignores its existence. The DRC is one of the largest African countries, surrounded by countries known to be endemic to cysticercosis. Even so, data on human cysticercosis in the DRC are rare and restricted to certain regions (Figure 4).[3,12] A study conducted in the territory of Madimba (province of Bas-Congo) reported a 21.6% prevalence of active human cysticercosis by circulating antigen detection with a 12.7% adjusted prevalence of active epilepsy and 0.3% prevalence of taeniasis by coprology, although no neuroimaging confirmation of NCC cases was provided.[3] In a study conducted in Lubumbashi, they enrolled 177 patients with epilepsy, the etiology was found in 38.4% (68/177), and 26.5% (18/68) of them had NCC.[13]

The diagnosis of NCC depends on brain imaging, which is expensive (about US$300) in Lubumbashi where there is no magnetic resonance imaging device (only CT scan) and patients do not have access to this examination, which is only available in two hospitals. As for the serology, it is not available throughout the city of Lubumbashi; we were however able to collect serum samples and obtain serological confirmation by sending these for an enzyme-linked immunoelectrotransfer blot assay to another country (Zambia), and the results came after patients had been managed as described. All three samples were strongly positive for specific antibodies to *T. solium*. We report three different cases of NCC seen in a consulting room in Lubumbashi, where we received patients with several diseases. Although the limited number of cases reported here does not allow us to conclude on frequency of disease subtypes or symptoms, their heterogeneity illustrated the wide spectrum of clinical presentations in NCC. Unlike larger reports where seizures are the predominating manifestation, in this series, only one of three cases presented with seizures. Our patients were treated with albendazole and steroids. In patients with many viable parenchymal cysts, the inflammatory response to antiparasitic treatment may be severe and life threatening,[14] and these patients are not usually included in randomized trials.[15,16] Albendazole treatment is

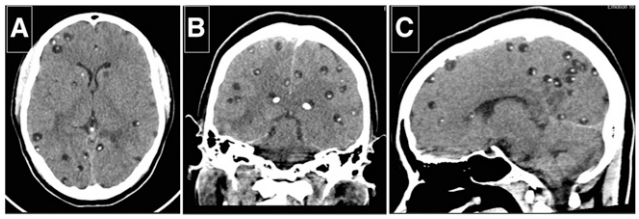

FIGURE 2. Computed tomography showing multiple vesicular lesions (case 2).

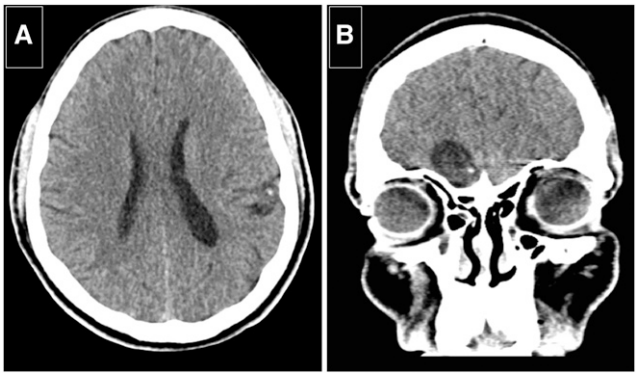

FIGURE 3. Computed tomography showing a vesicular lesion in the parietal region of the left hemisphere and in the anterior temporal region (case 3).

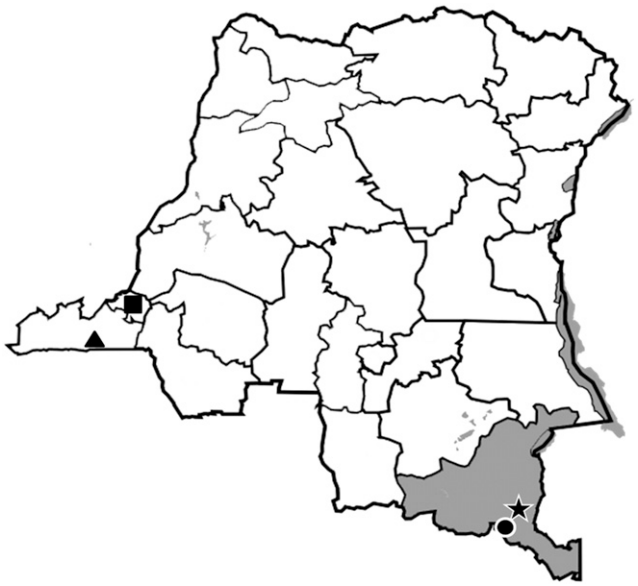

FIGURE 4. Map of Lubumbashi, the Republic Democratic of Congo. The circle represents Kipushi, the star represents Lubumbashi, the square represents the capital Kinshasha, and the triangle represents Kimpese.

sometimes avoided, and instead, patients are managed with corticosteroids alone. Mainly because of costs, none of our patients had neuroimaging in the follow-up, and they were monitored by clinical visits only. The lack of follow-up scanner in these cases reflects the day-to-day reality in the DRC. Health insurance systems are almost nonexistent, and the population has to take care of itself for medical care. Each of the three cases configured a definitive diagnosis of NCC according to the standard Del Brutto diagnostic criteria,[2] and the joint clinical practice guidelines for the diagnosis and treatment of NCC of the Infectious Diseases Society of America and the American Society of Tropical Medicine and Hygiene.[17]

The patients described here were diagnosed in a general clinic, not in a specialized neurological clinic. Our patient management system is not computerized. As such, we cannot provide reference denominators such as numbers of patients who had a brain CT scan or numbers of patients with epilepsy: that would have been useful to better assess the magnitude of the problem. Through these clinical cases, we wanted to not only show the existence of this pathology in our environment and its clinical presentation but also highlight the difficulty of diagnosing it because of lack of equipment. Neurocysticercosis is a pleomorphic disease, not only presenting with recurrent seizures but also causing more severe clinical manifestations. These neurological pathologies are often considered to be of mystical origin, and the people who suffer from them are often brought to traditional healers in the first place. Given the supposedly mystical origins of epilepsy, patients may want to preferentially address local healers rather than conventional care structures.[18] The hope of being treated quickly and the belief that modern medicine is powerless in the face of epilepsy also encourage patients to use more traditional medicine.

The confluence of nonspecific clinical manifestations, absence of laboratory tests, and high costs/poor availability of neuroimaging result in significant underreporting and poor estimates (if any) of its prevalence in the DRC. Research to assess the prevalence and risk factors for NCC is required to assess the severity of the phenomenon and to help designing appropriate prevention and control measures.

CONCLUSION

This report from the DRC presents three cases of NCC, a disease that is neglected in our country and along sub-Saharan Africa. Increasing awareness on the presence of NCC should contribute to a better diagnosis, treatment, and hopefully also to reduce the burden of neurological disease resulting from this zoonosis. It is important to increase the research about NCC in the DRC, not only to increase the knowledge but also to understand how to prevent NCC in these settings, and improve the diagnosis and the treatment.

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