

# Neurocysticercosis in Nepal and It's Global Perspective

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The WHO has classified neurocysticercosis (NCC) as the most important neurologic disease of the parasitic origin in humans.<sup>1</sup> About 50 million people are infected worldwide and 50000 die from NCC yearly.<sup>1</sup> NCC is a major cause of adult onset symptomatic epilepsy in areas where pork tapeworm *Taenia solium* is endemic.<sup>2</sup>

Before 1990s, reliable data on the prevalence of NCC were limited. Neuro imaging studies, biopsy or autopsy studies needed to confirm the diagnosis, were not easily available in areas where the infection was endemic. Serological assay performed with unfractionated antigens were both insensitive and non-specific.<sup>3</sup> Enzyme-linked Immuno electrotransfer blot (EITB) was the first specific assay for *T. solium* infection that could be used in large field studies.<sup>1</sup> With the increasing availability of neuroimaging studies in the area of endemicity and the use of EITB assay in epidemiological studies, it has become evident that the global morbidity and mortality associated with cysticercosis have been grossly underestimated.<sup>3</sup> Concepts regarding the prevalence of infection, associated morbidity and mortality, treatment and epidemiology have changed dramatically over the past two decades.

NCC is endemic in Central and South America, Sub-Saharan Africa, in some regions of Far East including Indian Sub continent, Indonesia and China. It is rare in Eastern and central Europe, North America with exception of South Coast of USA and Australia, Japan, New Zealand and is non-existence in Israel and in Muslim countries of Africa and Asia.<sup>4</sup>

There are very limited data on epidemiology of cysticercosis from Nepal. Heap (1990) reported that NCC is a common cause of epilepsy among Nepalese soldiers stationed with British Army in Hongkong.<sup>4</sup> The available data suggest that the prevalence ranges from 0.002 -0.1 % in general population in Nepal.<sup>5</sup> Many clinical studies reported from Nepal had variable presentations, outcome in terms of diagnosis and treatment response.<sup>5-11</sup> Most of the studies were hospital based retrospective and diagnosis was based mainly on clinical presentation and neuroimaging. EITB serology was hardly used in any study except one.<sup>10</sup> However the results were not mentioned.

NCC may be asymptomatic but may produce a broad range of clinical manifestations. Seizure is by far the most common clinical manifestation and occurs in 70-90% of cases. Less common manifestation include headache alone; symptoms of raised ICP and altered mentation (cysticercal encephalitis) and acute psychosis. Only a minority of patients present with cranial nerve palsies or other focal neurological deficit. The clinical spectrum of the disease depends upon the location, number and viability of the cysts as well as host response.<sup>3</sup>

NCC may have extra parenchymal locations such as ventricular NCC presenting with symptoms of obstructive hydrocephalus, dysequilibrium and altered mentation. Subarachnoid cysticercosis may have additional symptoms of arachnoiditis. These patients may present with meningeal signs and CSF finding suggestive of meningitis. Ocular cysticercosis remain asymptomatic or present with visual symptoms. Spinal cysticercosis may present with compressive myelopathy and radiculopathy. Availability of good resolution MRI scanner facility has made it possible to diagnose these cases. Patients with seizures and calcifications alone on neuro imaging studies are not thought to have viable parasites. Rarely, a patient with NCC may present with stroke.<sup>3</sup>

The treatment of NCC should be individualized on the basis of the pathogenesis of the disease in each patient. Factors used to tailor therapy should include the location of the NCC, symptoms, viability of the cysts and the degree of host response.<sup>3</sup> Antiparasitic drugs are effective against viable cysts. Praziquantel was the first antiparasitic agent reported to be active against cysticercosis. Albendazole is a broad spectrum antihelminthic agent that was subsequently studied in patients with cysticercosis. However, there is controversy regarding the use of antiparasitic drugs as most of the studies on specific treatment are from Central and south America where the inflammatory response reported is far less than the observations from Indian sub continent including Nepal. In our experience, patients who need antiparasitic therapy need close monitoring and a short course of steroids is needed as acute inflammatory response are quite common which may lead to encephalitic syndrome, visual impairment etc.<sup>9</sup> Carefully controlled trials of these agents are still needed.

The increased ease of international travel, the increasing number of immigrants from developing countries and the wide spread use of improved diagnostic techniques have led to widespread recognition of NCC as a common infection not only in developing countries but also in developed world as well. Low degree of suspicion may lead to unnecessary investigations and other interventions. A case was reported in New England Journal of Medicine as correspondence to the editor in 2007 where a 73 years old lady visiting from Nepal, presented to a health centre in USA with multiple tonic-clonic seizure.<sup>12</sup> The patient was admitted in ICU and treated with anticonvulsants. Neuroimaging revealed an enhancing lesion with surrounding vasogenic edema. A neurosurgical opinion led to excisional biopsy with suspicion of malignant tumor which however turned out to be NCC. Similarly a 33 years young man was diagnosed to have NCC in Nepal and went to Australia where he had recurrence of seizure and the lesion seen on neuroimaging was diagnosed to have malignant tumor and biopsy was suggested. Patient refused the biopsy and came back to Nepal and responded well to albendazole therapy. These two examples reflect that high degree of suspicion of NCC is very important especially in immigrant population.

With improved level of suspicion, awareness of wide variations in presentation, improved neuroimaging techniques and serodiagnostic techniques and available treatment, a new interest has been generated in management of NCC. However, as this is an eradicable disease of public health importance, preventive aspects have to be addressed as well.

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