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Original Research Article

Clinical, socio-demographic profile and outcome of neurocysticercosis in children: a hospital based study

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ABSTRACT

Background: Neurocysticercosis (NCC) is perhaps the most common parasitic infection of human nervous system. The objective of this study was to study the spectrum of clinical, socio-demographic profile and treatment outcome of 60 paediatric neurocysticercosis cases over a mean duration of two years from September 2006-August 2008.
Methods: Diagnosis was made mainly on the basis of clinical features, ring enhancing lesions on Computed Tomography scan of brain and exclusion of other causes. Patients were treated with Albendazole for 28 days, Prednisolone and anticonvulsant.
Results: 10-14 years was the most affected age group with no sex predilection. Seizure was the most common initial presentation (86.66%) followed by headache and vomiting. Generalized tonic clonic seizure was the most common type of seizure. Four patients returned with relapse.
Conclusions: Neurocysticercosis is a disease of lower socioeconomic group with poor sanitation and poor hand hygiene. Generalized tonic clonic seizure is the main presentation. Anticysticercal therapy has a good outcome.

Keywords: Neurocysticercosis, Ring enhancing lesion, Seizure

INTRODUCTION

Neurocysticercosis (NCC) is perhaps the most common parasitic infection of human nervous system. The World Health Organization (WHO) has estimated that NCC accounts for more than 50,000 deaths per year and is responsible for active epilepsy in a significant number of people. Human NCC is caused by the larval stage (Cysticercous) of the pork tape worm, Taenia solium.[1,2] It affects mainly the adult population but the paediatric infection is well recognized. Most of the cases have been reported from Southeast Asia region including India, Central and Latin America.[2,3] This study attempts to assess the clinical feature and sociodemographic profile of NCC patients and their outcome following specific therapy.

METHODS

This observational study was carried out in the department of Paediatrics, Patna Medical College and Hospital, Patna, during the period of September 2006 to August 2008. Children in between the age group of 1 year to 14 years were enrolled in this study. Ethical clearance was taken from institute ethical committee.

Only those neurological patients were included in this study who had evidence of active and ring enhancing

lesion or mixed lesion on Computed tomography scan (CT- scan) of brain. Detailed history was taken from Children (where possible) or their parents and witnesses regarding the neurological symptoms specially seizures. Patients were evaluated about the neurological manifestation like, focal neurological deficit, headache, vomiting, papilledoema and neuropsychiatric presentation. As no separate diagnostic criteria have been laid down for paediatric neurocysticercosis, so modified form of criteria of Del- Brutto et al was followed in this study.[4] These criteria is a combination of absolute, major, minor and epidemiological components. A total of 60 children were diagnosed as NCC based on these criteria. Patients were divided into lower, middle and upper socioeconomic classes as per modified Kuppuswamy scale. Patients were asked about their food sources, vegetarian and non-vegetarian diets, hand washing practices, consumption of partially or uncooked food or pork in any form and sources of drinking water supply. Serum immunoglobulin IgM and IgG, ELISA against cysticercous were done both for CSF and serum. CT scan was done in each and every case because this was one of the important inclusion criteria. CT scan was supported by other investigations like magnetic resonance imaging (MRI) and electroencephalogram (EEG). MRI was done in 16 cases only. Stool microscopy for Ova, cysts and parasites and absolute eosinophil count were done in all cases. As tuberculosis is a very common and close differential diagnosis of NCC in India, so chest X-ray, Mantoux test, sputum examination and gastric lavage for acid fast bacilli (AFB) were also performed to rule out Tuberculosis.

CT-scan of brain was evaluated for number of lesions and disease activity (active, transient or inactive). All patients were treated with oral Albendazole (15 mg/kg/day) in two divided doses for a period of 28 days as a definitive therapy. All patients were also given Prednisolone (1 mg/kg/dose) 48 hours before starting Albendazole therapy to prevent inflammatory reactions by the breakdown of cysts.[1] Prednisolone was continued with Albendazole therapy. Patients were followed up for improvement or deterioration of signs and symptoms of disease and also for the resolution in CT scan. To control seizure oral Phenytoin and carbamazepine were commonly used. Status epilepticus was treated by I.V. Diazepam and Phenytoin.

RESULTS

A total number of 60 patients were diagnosed as NCC in which most commonly involved age group was 10-14 years (53.3%). There was no predilection for any sex in this study, as 51.67% cases were male and 48.33% were female. Most of the cases belonged to lower socioeconomic class (81.66%).

80% cases were non-vegetarians. No patient has had history of pork consumption. Only 6.66% cases were positive for eggs of Taenia solium in stool. Peripheral blood eosinophilia was seen in 22 cases. The youngest child having NCC was 4 years old. Seizure was the most common initial presentation and was seen in 52 (86.66%) cases. Generalized tonic clonic seizures were the most common form of seizure in this study, observed in 36 cases (60%) while simple partial seizure was seen in 12 cases (20%). 6.6% cases presented with complex partial seizure. In spite of focal nature of lesion, large number of generalized tonic clonic seizure cases were probably due to secondary generalization of the focal seizures. Among 52 cases of seizure, 3 cases presented by status epilepticus. Symptoms of raised intracranial tension like headache and vomiting were observed in 34 cases (56.6%). Two children presented with neuropsychiatric manifestation as violent activity and irrelevant talking. 12 cases had EEG abnormalities mainly in the form of slowing and spikes.

Table 1: Sociodemographic profile of children diagnosed with NCC.

Socio demographic profile	N=60 (100%)
Age	
01-04 years	04 (6.6%)
0 5-10 years	24 (40%)
10-14 years	32 (53.3%)
Sex	
Male	31 (51.66%)
Female	29 (48.33%)
Socioeconomic class	
Lower	49 (81.66%)
Middle and upper	11 (18.33%)
Source of water supply	
Safe	14 (23.33%)
Unsafe	46 (76.66%)
Eating habit	
Vegetarian	12 (20%)
Non-vegetarian	48 (80%)
Raw vegetables	36 (60%)
Hand washing practice	16 (26.66%)
Presence of Ova of T. solium in stool	04 (6.6%)
Peripheral blood eosinophilia	22 (36.6%)

Table 2: Clinical features of NCC at the time of presentation.

Clinical features	Number N=60 (100%)
Seizures	
GTCS	52 (86.66%)
Simple Partial	36 (60%)
Complex Partial	04 (6.6%)
Headache	34 (56.66%)
Vomiting	26 (43.33%)
Neuropsychiatric presentation	02 (3.3%)
Focal neurological deficit	01 (1.6%)
Combination of symptoms	38 (63.3%)

All cases recovered well and seizure controlled on anti-epileptic drugs and drugs like Albendazole and Prednisolone except 4 cases (6.6%) who presented with relapse of symptoms and imaging finding.

DISCUSSION

In an endemic area NCC should be considered as first diagnosis when CT brain showing a ring enhancing lesion of less than 2 cm and patient present with seizure with no focal neurological deficit and there is no evidence of systemic diseases.[5]

In a classical teaching, Cysticercosis is said to be acquired through ingestion of undercooked pork. But in clinical practice, this is seldom seen. Infection in children happen by consumption of food and water contaminated with eggs of Taenia solium. Children infected with adult worm may also self-infect with eggs by faeco-oral route. Other mode of auto infection is by reverse peristalsis of eggs.[1]

Generalized seizure was the most common clinical feature in this study which is different from other studies worldwide.[6,7] Generalized seizure was also a common presentation in a study from Nepal and India.[8,9] Status epilepticus was seen in 5% of cases. Incidence of headache (59%) and vomiting (43.33%) in this study was higher than previous studies of Singhi et al and Kalra et al.[6,10] Our study has no sex predilection but higher female predominance was observed in a study.[6] As most of the patient in our study belonged to lower socioeconomic class with poor hand washing practice and none of them were consuming pork, so there is a chance of infection acquired mainly via consumption of contaminated food and water.

EEG abnormalities were reported in only 20% of cases in this study. EEG changes was seen in 15-30% cases of NCC in other studies also. Co-relation between type of seizure and EEG changes was reported in only 7-20% of cases.[11] Indian Academy Pediatrics has recommended at least 12-18 months of anticonvulsant therapy however some authors advocate continuation of therapy until the resolution of lesion.[12] Albendazole is the main anticysticercal drug for NCC and is generally used for a duration of 28 days. However, there are proponents of no Albendazole therapy, 7 days chemotherapy and 28 days full dose Albendazole therapy. It should be remembered that Albendazole and other anticysticercal drug are contraindicated in ocular and spinal NCC.[1,12]

CONCLUSION

In this study 10-14 years age group was the most common affected population. Generalized tonic clonic seizure was the commonest form of seizure at the time of presentation. Poor socioeconomic profile was mainly associated with this study in the form of poor hand hygiene, poor sanitation and consumption of unsafe drinking water. Recovery was almost complete with no residual illnesses except in 4 cases where patients relapsed with similar illness.

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