

## Human neurocysticercosis managed at Nepalganj Medical College, Teaching Hospital, Kohalpur, Nepal

Piryani RM<sup>1</sup>, Kohli SC<sup>2</sup>, Shrestha G<sup>3</sup>, Shukla A<sup>4</sup>, Malla TB<sup>5</sup>

<sup>1-4</sup>Assistant Professor, <sup>2</sup>Professor, <sup>3</sup>Professor & Head of Department, <sup>1,4</sup>Department of Medicine, <sup>5</sup>Medical Recorder Assistant, Nepalganj Medical College, Teaching Hospital, Kohalpur / Nepalganj, Nepal

---

### Abstract

**Introduction:** Neurocysticercosis is the most common parasitic infection of the central nervous system. It is endemic in Central Europe, South Africa, South America and parts of Asia including Nepal.

**Objective:** This study has been conducted with the objectives to know the diagnostic criteria for neurocysticercosis and the outcome of treated cases.

**Methodology:** This retrospective study was done at Nepalganj Medical College, Teaching Hospital, Kohalpur, by reviewing the record of the patients managed as case of neurocysticercosis in one financial year,

**Results:** All patients presented with seizure as a main symptom started in adult life. The mean age was 21 years; 80% were male and 20% female. The diagnosis seemed to be based on clinical presentation, CT scan findings and high index of suspicion. All were put on albendazole, steroids and anticonvulsant drugs; 93% was discharged when fits got controlled, one patient left against medical advice. Follow up record was not available to comment on resolution.

**Conclusion:** Neurocysticercosis is difficult to diagnose and has a significant socioeconomic impact because of chronic morbidity, variable mortality, decreased productivity of affected persons, and high cost of medical diagnosis and treatment. It is therefore suggested to develop criteria for diagnosis of neurocysticercosis to be followed at national level.

**Key words:** Neurocysticercosis, Seizure, Nepalganj Medical College, Nepal

---

Neurocysticercosis is the most common parasitic infection of the central nervous system. Human cysticercosis acquired by ingesting egg/s of *Taenia Solium* from contaminated fingers or by eating contaminated food. The larvae liberated from eggs in the stomach penetrate intestinal mucosa are carried to many parts of the body where they develop and form cysticerci. (1, 2)

Common locations are subcutaneous tissues, skeletal muscles and brain. Neurological manifestations are the most common; seizure being the commonest symptom. (1, 2, 3, 4)

*Taenia Solium* is common in Central Europe, South Africa, South America and parts of Asia including Nepal. (3, 4) This retrospective study was conducted with the objectives to know the diagnostic criteria for neurocysticercosis and the outcome of treated cases.

### Methodology

This retrospective study conducted in Nepalganj Medical College, Teaching Hospital, Kohalpur (NGMC THK) by reviewing the record of the patients who were diagnosed and managed as a case of Neurocysticercosis in one financial year from

Magh 2063 to Asar 2064 (July 17, 2006/ July 16, 2007). Entries were done in Microsoft Excel of Window XP and analysis was done subsequently.

### Results

During one financial year between Magh 2063 to Asar 2064 (July 17, 2006/ July 16, 2007) 14118 patients were admitted at Nepalganj Medical College, Teaching Hospital, Kohalpur. Patients admitted in medical wards with seizure and those diagnosed and managed as Neurocysticercosis are shown in table 1.

---

### Correspondence

Dr. Rano Mal Piryani  
Assistant Professor / Consultant  
Nepalganj Medical College, Kohalpur/Nepalganj, Nepal  
r\_piryani@yahoo.com

**Table 1:** Admissions at NGMC THK in year 2063/2064 (2006/2007)

	Number	Percent
Indoor patients in one year at NGMC THK	<b>14118</b>	
Indoor patients in one year in Medical Wards	<b>2843</b>	<b>(20.13%)</b>
Patients admitted with seizure in Medical Wards in one year	<b>112</b>	<b>(4.0%)</b>
Neurocysticercosis cases diagnosed and managed in Medical Wards in one year	<b>15</b>	<b>(13.4%)</b>

All patients presented with seizure as a main symptom started in adult life; 33.3% (5 patients) had headache. The mean age was 21 years (Range 15-56 years); 80% (12) were male, while 20% (3) female.

The diagnosis seemed to be based on: a) clinical presentation, b) CT scan findings and c) high index of suspicion as *Taenia Solium* is endemic in catchments of hospital. None of the patient was referred for eye examination.

All were put on albendazole, steroids and anticonvulsant drugs. They were discharged when fits got controlled and headache subsided, with the advice to be followed up in medical outpatient department. Average length of stay was 5.95 days.

Fourteen patients (93.3 %) showed improvement; one left against medical advise (LAMA). Follow up record was not available to comment on resolution.

### Discussion

The diagnosis of Neurocysticercosis is not easy. Diagnostic certainty is possible only with definite demonstration of the parasite, but not possible in most of the cases. In fact clinical diagnosis is made on the basis of combination of clinical presentation, radiographic studies, serologic tests and exposure history<sup>1, 5, 6, 7</sup>.

A consensus conference in USA in 2001 has proposed absolute, major, minor and epidemiologic criteria for diagnosis<sup>1, 3, 5</sup> (Table 2).

Diagnosis is confirmed in patients with either one absolute criterion or combination of two major

criteria, one minor criterion and one epidemiologic criterion<sup>1</sup>.

A probable diagnosis is supported by the fulfilment of: a) one major criterion plus two minor criteria, or b) one major criterion plus one minor criterion and one epidemiologic criterion or c) three minor criteria plus one epidemiologic criterion.

In this study it seems that diagnosis was probable made on the basis of:

- ✓ Clinical manifestation suggestive of neurocysticercosis
- ✓ Neuroradiologic lesions suggestive of neurocysticercosis and
- ✓ Residence in a cysticercosis endemic area

Visualization of parasite in the eye by funduscopy is one of the absolute criteria for diagnosis involved no cost but none of the patient was referred for eye examination in this series of cases. Enzyme linked immunoelectrotransfer blot and ELISA test are not being done in the hospital.

There was remarkable improvement at the time of discharge with medical treatment; seizure almost controlled. Data of this series is comparable with other studies in this regard. (8, 9, 10) Follow up record was not available to comment on resolution.

Neurocysticercosis has a significant socioeconomic impact because of chronic morbidity, variable mortality, decreased productivity of affected persons, and high cost of medical diagnosis and treatment<sup>3</sup>. It is therefore suggested to adopt the mentioned criteria with modification for diagnosis of neurocysticercosis countrywide or develop own criteria to be followed at national level.

**Table 2:** Proposed Diagnostic Criteria for Human Neurocysticercosis

	Criteria
1.	<ul style="list-style-type: none"> <li>• <b>Absolute Criteria</b></li> <li>a) Demonstration of cysticerci by histologic or microscopic examination of biopsy material</li> <li>b) Visualization of parasite in the eye by funduscopy</li> <li>c) Neuroradiologic demonstration of cystic lesions containing a characteristic scolex</li> </ul>
2.	<ul style="list-style-type: none"> <li>• <b>Major Criteria</b></li> <li>a) Neuroradiologic lesions suggestive of neurocysticercosis</li> <li>b) Demonstration of antibodies to cysticerci in serum by enzyme linked immunoelectrotransfer blot</li> <li>c) Resolution of intracranial cystic lesion spontaneously or after therapy with albendazole or praziquantel alone</li> </ul>
3.	<ul style="list-style-type: none"> <li>• <b>Minor Criteria</b></li> <li>a) lesions compatible with neurocysticercosis detected by neuroimaging studies</li> <li>b) Clinical manifestation suggestive of neurocysticercosis</li> <li>c) Demonstration of antibodies to cysticerci or cysticercal antigen in CSF by ELISA</li> <li>d) Evidence of cysticercosis outside CNS (cigar shaped soft tissue calcification)</li> </ul>
4.	<ul style="list-style-type: none"> <li>• <b>Epidemiologic Criteria</b></li> <li>a) Residence in a cysticercosis endemic area</li> <li>b) Frequent travel to cysticercosis endemic area</li> <li>c) Household contact with an individual infected with <i>Taenia Solium</i></li> </ul>

Ref.: Harrison's Principle of Internal Medicine, 16<sup>th</sup> Ed. 2005

### Acknowledgement

We acknowledge the support of Dr. S K Kanodia (Managing Director, LBEA), Dr. S M Mishra (Principal NGMC), Dr. J Mahaseth (Director, NGMC, TH, Kohalpur), Dr M C Jain (Assistant Director, NGMC, TH, Kohalpur) and TR Bhatta (Biostatistician, NGMC, TH, Kohalpur).

### References

1. A Clinton White Jr., Peter F Weller. Cestodes, Infectious Diseases chapter p1273-1275. Harrison's Principle of Internal Medicine, 16<sup>th</sup> Ed. 2005, edited by Anthony S Fauci, Dan L Longo, Eugene Braunwald, Stephen L Hauser, J Larry Jameson. Mc GrawHill Medical Publishing Division, USA.
2. WTA Todd, DNJ Lockwood, S Sunder. Cysticercosis- Infections caused by Helminths Infectious Diseases chapter 13 p Davidson's Principle & Practice of Medicine, 20th Ed. (International) 2006, edited by Nicholas A Boon, Nicki R Colledge, Brain R Walker, John AA Hunter. Churchill Livingstone, Elsevier, printed in India.
3. Marcot Medina, Christopher M. Degiorgio, Introduction to neurocysticercosis: a worldwide epidemic. Neurosurg Focus 12 (6):June 2002,
4. Christopher M. DeGiorgio, Marco T. Medina, Reyna Durón, Chi Zee, Susan Pietsch Escueta. Neurocysticercosis. Epilepsy Curr. 2004 May; 4(3): 107- 111.
5. Del Brutto OH, Rajshekhar V, White AC. Proposed diagnostic criteria for neurocysticercosis. Neurology. Jul 24 2001; 57(2):177-83. [Medline].
6. Serpa JA, Yancey LS, White AC Jr. Advances in the diagnosis and management of neurocysticercosis. Expert Rev Anti Infect Ther. Dec 2006; 4(6):1051-61. [Medline].
7. Shandera WX, Kass JS. Neurocysticercosis: current knowledge and advances. Curr Neurol Neurosci Rep. Nov 2006; 6(6):453-9. [Medline].
8. Garcia HH, Pretell EJ, Gilman RH et al. A trial of antiparasitic treatment to reduce the rate of seizures due to cerebral cysticercosis. N Engl J Med 2004; 350:249-258.
9. Ong, S., Talan, D., Moran, G., et al. Neurocysticercosis in radiographically imaged seizure patients in U.S. emergency departments. Emerging Infectious Diseases 2002;8:608-613
10. Jefferson V. Proaño, Ignacio Madrazo, Francisco Avelar, Blas López-Félix, Genaro Díaz, Israel Grijalva. Medical Treatment for Neurocysticercosis Characterized by Giant Subarachnoid Cysts. NEJM, Volume 345:879-885, Number 12, September 20, 2001