Neurocysticercosis

Sharad Saxena¹, Aditya Chaudhary², Nikhil Bansal², Medha Gupta³

Department of General Medicine, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur
Department of Radio Diagnosis, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur
Department of General Medicine, Bharti Vidhyapeeth Deemed University, Pune

I. Introduction

Cysticercosis caused by larval stage of the tapeworm Taenia solium, is a major public health problem.¹ Humans are only definitive host of T. solium harbouring the adult tapeworm in the intestine (referred to as, taeniasis). Both humans and pigs act as intermediate hosts and harbour T. solium larvae in different internal organs (referred to as, cysticercosis) including the brain (referred to as, neurocysticercosis - NCC).²

Neurocysticercosis is central nervous system (CNS) infection with T. Solium, it is identified as the single most common cause of community acquired active epilepsy cases in the developing world including India. It is also becoming more common in the developed world because of increased migration of people with the disease or Taenia solium carriers and frequent travel to the endemic countries.

II. Materials and Methods:

The study was done on 40 patients who were referred to Radio-diagnosis department from neurology OPD, detected to have intra-cranial lesions on MRI of brain in Mahatma Gandhi Medical College & Hospital, Jaipur between Jan 2014 to May 2014.

Exclusion criteria: HIV patients.

Data Acquisition: Patients referred for MRI of brain, underwent the examination after contraindications for MRI were excluded.

Observation & Results: The present study was carried out to describe the clinical presentation and neuroradiological imaging, mode of treatment and outcome of patients with NCC.

Data Analysis: 40 cases of NCC were included in the study. The observations of these 40 patients were compiled and analysed.

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Age and sex distribution: In our study, maximum no of patients encountered in age group of 20 to 39 years (22), followed by 10 to 19 years (10) and >40 years (8). There were 21 males and 19 females.

Clinical Presentation: Seizure was the most common clinical presentation. 18 patients present with generalized tonic clonic seizures, 13 patients had partial seizures and 9 patients presented with status epilepticus.

Others symptoms were headache with vomiting, double vision, reduced vision, sudden onset of weakness and loss of consciousness. Some have combination of one or more symptoms.

Neuroradiological Investigations
MRI alone was used in diagnosing patients.

<table>
<thead>
<tr>
<th>Lobes</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parietal</td>
<td>16</td>
</tr>
<tr>
<td>Frontal</td>
<td>9</td>
</tr>
<tr>
<td>Temporal</td>
<td>4</td>
</tr>
<tr>
<td>Occipital</td>
<td>7</td>
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</table>

<table>
<thead>
<tr>
<th>Lobes</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>frontal + occipital</td>
<td>2</td>
</tr>
<tr>
<td>frontal + temporal</td>
<td>1</td>
</tr>
<tr>
<td>parietal + temporal</td>
<td>1</td>
</tr>
</tbody>
</table>

Stages: MRI findings
CT has a higher sensitivity and specificity and superior to MRI in identifying calcified granuloma. However intraventricular cysts might be difficult to identify with CT due to similar attenuation of CSF and cyst fluid. The main advantage of MR over CT is its higher contrast resolution, which makes for better lesion conspicuity. This higher resolution is particularly helpful in evaluation of ventricular involvement.

It is well recognized that in neurocysticercosis in any location, the attenuation or signal intensity of the cyst fluid depends on the viability of the parasite. Live cysts have a signal intensity and (as mentioned earlier) attenuation similar to those of CSF. However, with degeneration, the cyst fluid becomes more proteinaceous and gelatinous. This change manifests as increased signal intensity on T1-weighted MR images.

MRI appearance of various stages in MRI

**Vesicular stage** - Cyst signal intensity similar to that of CSF on T1- and T2-weighted images; cyst wall is well defined and thin, with little or no enhancement on gadolinium-enhanced images; scolex (hole with dot appearance)

**Colloidal vesicular** - Cyst contents hyperintense on T1- and T2-weighted images (proteinaceous fluid), cyst wall is thick and hypointense, pericystic edema, pericystic enhancement on gadolinium-enhanced images.

**Granular nodular** - Similar to colloidal vesicular stage but with more oedema and thicker ring enhancement.

**Calcified nodular** - Hypointense nodules, no edema, no enhancement

Treatment
Out of 40 patients 23 were treated with antiepileptics, steroids and albendazole. 6 were treated with antiepileptic only and 11 were treated with antiepileptic and steroids.

Follow Up
36 patients followed for 1 month, 27 patients showed no recurrence of presenting symptoms in the month of treatment, while 9 patients had recurrent seizures in spite of the treatment given.

III. Discussion
Neurocysticercosis is one of the leading causes of adult-onset seizures in developing countries caused by Tinea solium. Seizures in NCC are commonly due to inflammation caused by degenerating cysticerci and uncommonly due to vasculitis etc. In our study which was done on 40 patients, majority were males 21 (52.5%) with most common age group of 20-39 years. 18 patients present with generalized tonic clonic
seizures, 13 patients had partial seizures and 9 patients presented with status epilepticus. These findings are similar to the ones found in our study.

Majority of the studies done have dealt with single lesion neurocysticercosis. These have shown a presence of a solitary granuloma in 60.8-76% of their patients. In our study, 90% patients had presence of solitary nodule.

Parietal lobe was the commonest site of nodule in our study (44.4%), followed by frontal lobe (25%).

Studies done by Baranwal AK et al and Singhi P et al had reported a 41% and 57.3% parietal lobe involvement, respectively.

In our study, antiepileptics, steroids and albendazole were treatment of choice with 57% patients receiving it.

Steroids have a dual role as they not only reduce the perilesional edema but also increase the plasma concentration of albendazole.

IV. Conclusion:

In a developing country like India most of the middle age group patients presented with new onset seizures, on neuroimaging showing a solitary or multiple ring enhancing lesion one should always be suspect for neurocysticercosis and managed on albendazole, steroids and antiepileptics.

MRI FLAIR axial image showing lesion with perilesional edema in left occipital lobe

MRI FLAIR axial image showing lesion with perilesional edema in left occipital lobe
MRI ADC axial image showing lesion with perisional edema in left occipital lobe

MRI T1W axial image showing hypointense lesion in left occipital lobe

MR DWI axial image showing lesion with no diffusion restriction in left occipital lobe
MRI T2W axial image showing lesion in right occipital lobe

MRI T2W sagittal image showing lesion in right occipital lobe

MRI T2W coronal image showing lesion in right occipital lobe
MRI FLAIR axial image showing lesion in right occipital lobe

MRI T1W sagittal image showing lesion in right occipital lobe

MRI T2W coronal image showing lesion in right hir lateral region.
MRI FLAIR segital image showing lesion in right hi parital region.

MRI T1W axial image showing lesion in right hi parital region.

MRI T2W axial image showing lesion in right hi parital region.

Bibliography:

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