



## COMPUTED TOMOGRAPHY SCAN AND THERAPEUTIC RESPONSE IN PATIENTS WITH NEUROCYSTICERCOSIS.

### Radiodiagnosis

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### ABSTRACT

Neurocysticercosis (NCC) is the most common parasitic disease of the nervous system with varied clinical and imaging spectrum. This study was conducted to describe the clinical, CT finding and response to therapy of NCC.

**Materials:** Hundred (100) patients of NCC presenting in department of medicine, PMCH, Patna were evaluated on preset proforma containing detailed demographic data, dietary habits, clinical features and neuroimaging findings and its therapeutic response. Patients were treated with 28 days course of albendazole and repeat CT scan was done in 2 months after treatment.

**Results:** Out of 100 patients of NCC, 56 (56%) were male with most common age group being 21-30 years (36%). Only Seizure is the most common presentation followed by Seizure with features of increased intracranial pressure (70 and 14% respectively). Multiple ring enhancing lesions either alone or in combination were seen on computerised tomography scans in 56 (56%) cases and parietal lobe involvement is the commonest site. Complete resolution of CT scan lesions in 72 (72%) and partial resolution occurred in rest of patients.

**Conclusions:** Neurocysticercosis is common public health problem and one of the common cause of seizure. It has varied imaging finding being ring enhancement is most common. Albendazole is highly effective therapy and should be started at earliest to prevent morbidity and mortality.

### KEYWORDS

Albendazole, CT Scan, NCC, seizure

#### Introduction:

Cysticercosis, the infection caused by larval stage of tapeworm *Taenia solium*, is the most common parasitic disease of nervous system in human and single most common cause of acquired epileptic seizure in developing world<sup>1</sup>. NCC is the result of invasion of the central nervous system (CNS) by larvae of *Taenia Solium*. Oral ingestion leads to cysticercosis, when embryos cross to the blood stream & reach body tissue. Larva show great preference for muscle, brain & cerebrospinal fluid (CSF) cavity due to extensive blood supply including choroid plexus. Its prevalence, presentation, imaging finding and response to therapy varies greatly according to the geographical region and is not yet precisely known. This study was carried out to describe radiological features and response to therapy of NCC in tertiary care centre.

#### Material and methods –

The present prospective study was conducted in department of medicine, Patna Medical College, Patna. Fifty patients were included in this study. The diagnosis of neurocysticercosis (NCC) was made on the basis of following criteria-

1. CT finding of single/multiple, low/high attenuating lesion, disc or ring enhancing lesions with minimal perilesional edema.
2. ELISA test for cysticercosis antibody in serum.
3. CSF examination

All patients of NCC were evaluated clinically on preset proforma and subjected to routine haematological and biochemical investigations. CSF examination for biochemical and cytology with particular reference to eosinophil was done. Plain and contrast cranial CT was done in all cases. ELISA for cysticercus antibody was done. Patients were treated with 28 days course of albendazole in divided doses in addition to symptomatic treatment and response to therapy were evaluated after two month with clinical and CT scan imaging.

**Observations-** Out of 100 patients of NCC, 56 (56%) were male with most common age group being 21-30 years (36%). Only Seizure is the most common presentation followed by seizure with increased intracranial pressure (70 and 14% respectively). Other presentation are seizure with psychotic symptoms, meningo-encephalitis and ICSOL (table 1). Hyperreflexia (16,16%), papilloedema (10,10%), disorientation, nuchal rigidity are common signs. Most common

seizure pattern were partial seizure with secondary generalisation (50, 55.5 %) followed by generalized tonic clonic seizure (36, 40%). Simple seizure was present in only four patients. ELISA for NCC is positive in 60 (60%) patients and CSF is inflammatory in half of cases.

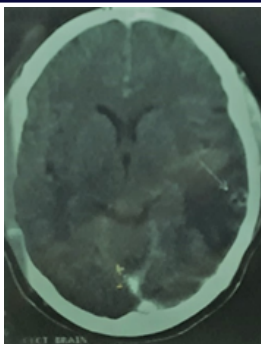
**Table 1: Symptoms at Presentation of NCC-**

Symptoms	Number	Percent
Epilepsy	90	90
Partial seizure with SG	50	55.5
GTCS	36	40
Simple seizure	4	4.5
Headache	24	24
Nausea± vomiting	20	20
Altered sensorium	08	08
Psychiatric features	08	08
Visual disturbance	10	10
fever	06	06

Thirty patients (30%) presented with ring enhancing lesion only and 26 (26%) patients with ring enhancing lesion in combined form, together they constituted maximum number of cases (Table 2). Equally common was pin head hyperattenuated lesion found in 16 (16%) and in combined form enhancement in 38 (38%) patients. Calcified lesions with combined form enhancement was found in 28 (28%).

**Table 2 CT scan lesion in 50 patients of NCC**

Type of lesion	Number	Percent
Ring (R)	30	30
Disc(D)	-	-
Pin head (P)	16	16
R+D	10	10
P+C	14	14
D+P	10	10
R+D+P	06	06
R+D+C	06	06
R+P+C	04	04
C+D+P	04	04



**Fig-1 CECT show a ring enhancing pattern lesion with mild perilesional odema at left temporal lobe.**

NCC may affect any part of brain but the most common site of lesion was parietal lobe (table 3). Occipital lobe involvement was second most common site followed by frontal lobe. Involvement of multiple lobe was common.

**Table 3 Site of lesion on CT Scan**

Site of lesion	Number
Frontal lobe	20
Parietal lobe	40
Temporal lobe	10
Occipital lobe	25
Cerebellum	05

Majority of ring enhancing lesion measured 5-10 mm whereas calcified lesion were of size less than 5 mm. Generalised brain edema was present in 26 (26%) patients and focal edema was present in 52 (52%) patients. During drug therapy, side effect of drug was observed in 48 patients which included headache, anorexia, vomiting and fever. Resolution of CT scan lesion occurred completely in 76 (76%) patients.

## DISCUSSION

Neurocysticercosis is one of the most serious/common problem of public health in developing nation. It has different clinical presentation. In this study, maximum number (36%) of patients were encountered in age group of 21 to 30 years and approximately 80 % patients belongs to 11-40 years group. Verma A and Gaur KJ<sup>2</sup> from Uttaranchal reported that majority of cases were in the 21-30 age group. Male outnumbered female (M:F:: 1.27:1). According to Arseni and Sarnitca<sup>3</sup>, 37 were males (59.6%) and 40.2% were female.

Seizure was the most common (90 pts, 90%) presentation in our study. Seizure was the lone presentation in 70 (70%) of cases. Incidence of seizure was found in 50-55% in the reports available from outside India<sup>4,5</sup> whereas incidence varies from 59-94% in studies reported from India<sup>6,7</sup>. In this study partial seizure with secondary generalization was present in 50 (55.5 %) and is the commonest seizure type. Trelles and Trelles<sup>8</sup>, Sotelo et al<sup>1</sup> found partial seizure with secondary generalization to be the commonest clinical presentation. Second most common seizure type is generalized tonic-clonic (36, 40%). Kuruvilla et al<sup>9</sup> reported generalized seizure as a presenting symptoms in 36% cases. Feature of raised intracranial tension was present in (14 pts, 14%). Mukherjee et al<sup>10</sup> in a study of 30 cases reported an incidence of raised intracranial tension in 19% cases.

Seizure was the most common symptoms followed by headache (12,24%), nausea/ vomiting in 20(20%) . Sotelo et al.<sup>1</sup> observed headache in 43.4% and nausea/vomiting in 27.2%. Among the signs, hyperreflexia (16%) and disorientation (10%) were the commonest. Sotelo et al<sup>1</sup> observed hyperreflexia in 21% and bilateral papilledema in 28%. Svetlana Agapejev<sup>11</sup> reported hyperreflexia in 13(59.1%) and bilateral papilledema in 17(73%) cases. Discrepancies in the incidence of signs and symptoms in our study as compared to others may be due to less number of patients in this study.

Peripheral blood smear examination revealed leukocytosis in 30(30%) cases and peripheral eosinophilia in 20 pts (20%). McCormick et al<sup>5</sup> reported leukocytosis in 10% and eosinophilia in 3.1% cases where as Grisolia<sup>12</sup> et al reported in 35 and 17.6% cases respectively. CSF was inflammatory in 50% cases. Sotelo et al<sup>1</sup>

observed that when CSF is inflammatory 80% cases show eosinophil. Grisolia et al<sup>12</sup> reported eosinophilia in CSF in 20% cases. CT scan is helpful not only in suspecting the etiology but also in finding the number, localization and extent of lesion. In our study of 100 patients, 30(30%) presented with ring enhancing lesion alone and 26 (26%) patients with ring enhancing lesion in combination, together they constituted maximum number of cases. Equally common was pin head hyperattenuated lesion found in 16 patients(16%) and in combination in 38 patients(38%). Bhatia<sup>13</sup> in a series of 20 patients of NCC found 7 cases with ring enhancing lesion alone and 6 patients in combination. Majority of ring lesion either isolated or in combination measured 5-10 mm whereas pinhead and calcified lesion were <5 mm in size. Bhatia reported similar finding regarding size of lesions. In our series, parietal lobe involvement was the commonest site (90%) whereas frontal lobe was affected in 50 (50%). Majority of patients had also shown perifocal edema. Extensive edema frequently seen with NCC helps to distinguish it from cerebritis, small abscesses or metastasis.

Complete resolution of CT scan lesion was seen in 76 patients. This is in agreement with the observation of Sotelo et al(1988)<sup>1</sup>. Sanchettee et al (1994), in their study of 30 patients of NCC, showed 61.5% improvement in CT finding after treatment<sup>14</sup>. During drug therapy adverse reaction were observed in 48 patients. In all these patients, reactions were observed between day 1 and 10. These reactions are not due to drug therapy but due to strong host inflammatory reaction due to destruction of parasite. All these symptoms abate after a few days and if severe managed by giving steroid and/or mannitol as reported by Sanchettee et al<sup>14</sup> and Mukherjee et al.<sup>10</sup>

## Conclusion:

Neurocysticercosis is one of the most serious public health problem and it has varied clinical presentation, seizure being the most common. Most commonly affected age group is 11-40 years. Peripheral leucocytosis and eosinophilia are found in small number of patients. Parietal lobe is most common site of involvement and ring enhancement pattern is the commonest CT finding. Albendazole is effective therapy and it leads to resolution of imaging finding in substantial number of patients.

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