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A Case Study Conducted on Neurocystercosis in a Tertiary Care Hospital Odisha - Response to the Treatment and a Literature Review

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1. Introduction

Neurocysticercosis (NCC) is a major cause of neurological disease world-wide.[1, 2.]

It is one of the seven neglected endemic zoonoses targeted by the World Health Organization

It is an important cause of epilepsy in the tropics and was found to be the commonest cause of focal seizures in North Indian.[3]

It is mostly seen in developing countries because of increasing number of immigrants.

It belong to the CYCLOPHYLLIDEAN CESTODES.[4]

Taenia species cause two types of manifestations in humans- INTESTINAL TAENIASIS AND CYSTICERCOSIS.[5]

2. Classifications

TAENIA SAGINATA also called beef tapeworm that cause intestinal taeniasis in man.[6, 7, 8]

TAENIA SOLIUM also called pork tapeworm causes both intestinal taeniasis and cysticercosis in man.[6, 7, 8]

Habitat
Adult worm of TAENIA SAGINATA and TAENIA SOLIUM reside in small intestine of humans.[9]
Larva of TAENIA SOLIUM (cysticercuscellulosae) reside and form cystic leisons in the muscle, brain, eye.[10]

Epidemiology
It is more prevalent in Bangalore, Vellore, Bihar, Uttar Pradesh, Pondicherry, Chandigarh. Recent studies with the help of stool examination, CT and MRI scan suggested the disease burden in India is more and varies from 18 to 31 % of suspected case of epilepsy.[11, 12]

Morphology
It exits in three forms- adult worm, egg, larva[13, 14]
1) Adult Worm – T.saginata is more longer than T.solium
2) Egg- T.saginata is acid fast positive
3) Larva- Cysticercusbovis present in cattle s musle but not in man

Cysticercuscellulosae present in pig s muscle also in man.

Neuro Cysticercosis NCC
Based on the site of involvement NCC has 2 types-
1) Parenchymal – Involves the brain parenchyma
2) Extraparenchymal – Involves the meninges, ventricles and spinal cord.

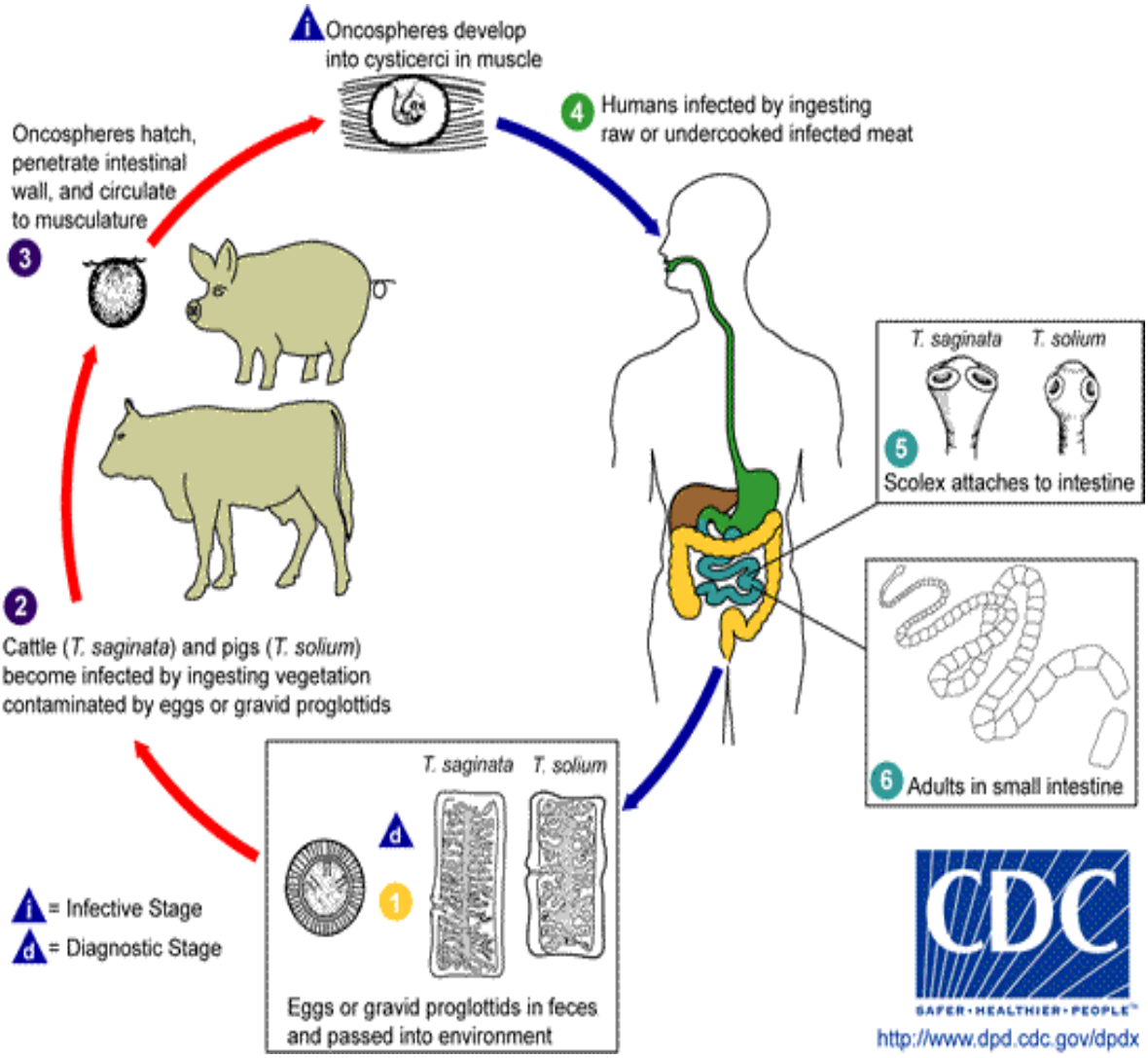
Recent studies shown that subarachnoid space is the most common site followed by brain parenchymal.

Asymptomatic NCC

Manifestations –
1) Seizures 80 %
2) Hydrocephalus
3) Increase in the Intra cranial pressure
4) Chronic meningitis
5) Focal neurological Defecit
6) Psycological disorders and Dementia.[15, 16]

3. Life Cycle

Life cycle: The life cycle of T solium depends on the disease it causes. When it causes intestinal taeniasis the life cycle is exactly similar to that of T.saginata except- The intermediate host is pig that's why it is called pork tapeworm. Men harboring the adult worm excrete the eggs in feces which can infect the same individual by autoinfection. In pigs the development time is shorter 7-9 weeks. But when it cause cysticercosis the life cycle is different and mentioned here- Host man act as both definitive and intermediate host. Infective stage_ eggs of T.solium.[17]



Del Brutto's Diagnostic criteria [34]

a) Absolute Criteria

1) Histology of tissue biopsy to detect cysticeri.
2) Visualization of parasite in the eye by fundoscopy.
3) CT / MRI of brain – Detects the leisons confirmatory of NCC.

b) Major Criteria

1) CT / MRI of brain – detects leisons suggestive of NCC
2) Serum / CSF antibody detection by western blot
3) Resolution of leisons after albendazole or praziquantel treatment.

c) Minor Criteria

1) CT / MRI of brain – detects the leisons compatible with NCC
2) Clinical manifestations suggestive of NCC
3) Serum / CSF antibody detection by ELISA
4) Evidence of Cysticercosis outside the CNS – cigar shaped soft tissue calcifiactions.

d) Epidemiological criteria

1) Residing in endemic area
2) Frequent Travel to endemic area.
3) History of contact with another patient with NCC.

It is purposed for the diagnosis of NCC based on clinical, imaging, immunological and epidemiological data-

Confirmed diagnosis-

1) One absolute Criterion OR
2) Two major criteria + one minor criterion + one epidemiologic criterion

Probable diagnosis

1) One major Criterion + two minor criterion OR
2) One major criterion + one minor criterion + one epidemiologic criterion
3) Three minor criteria +one epidemiologic criterion [34]

4. Case Report

We reported a case of 40 years old man presented to the Emergency department with H/O seizures 4-6 episodes lasting for more than 2-5 minutes each, fever associated with chills and rigors, loose motions multiple episodes that is watery in nature non foul smelling non blood stained, decrease in the sensorium and drowsy since 4 days.No h/o co morbidity.

Day 1 Emergency Department

Seizures were generalized and tonic-clonic associated with tongue bite and micturition. Historical information includes history of trauma, and no dental work or foreign travel. He was on a restricted diet though on asking he told that sometime he used to take pork meat if available. There was

no history of chronic cough, abdominal pain, weight loss, decreased apetite or any past history of diabetes, hypertension, T.B.

On Examinations
HR – 120 B/M
RR- 24 /M
BP- 120/80 MMHG
TEMP- 104 F
SPO2- 99 % RA
CBG- 135 MG/DL
GCS- E 4 V4 M 5

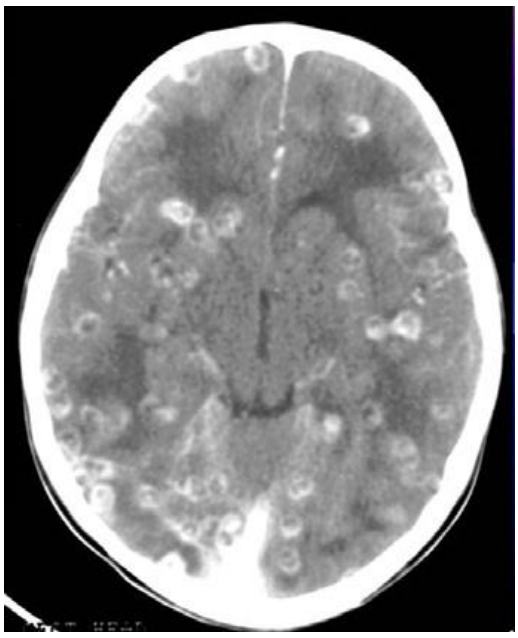
Systemic Examinations

a) Central Nevous system Examination
1.O/E- symmetrical generalized hypertrophy of limbs, trunk, neck and face muscles.
Muscles were non-tender and the overlying skin could be easily pinched.
No myotonia.
The patient was conscious though disoriented with an incoherent and slurred speech.
All the cranial nerves were normal.
The muscle tone was normal and the power 3/5 in all muscle groups.
Deep tendon reflexes were diminished. Superficial reflexes were present and plantars showed a flexor response.
Fundus examinations were within the normal.

Abdominal, respiratory, cardiovascular examinations were within the normal limit

In Emergency Department he was started with Injfosolin 150 mg iv stat tds, InjDexona 4 mg iv stat qid, Injkabimol 1 gm iv stat followed by IVF NS /RL.

Investigations were send CBC, LFT, RFT, ABG, CT Brain



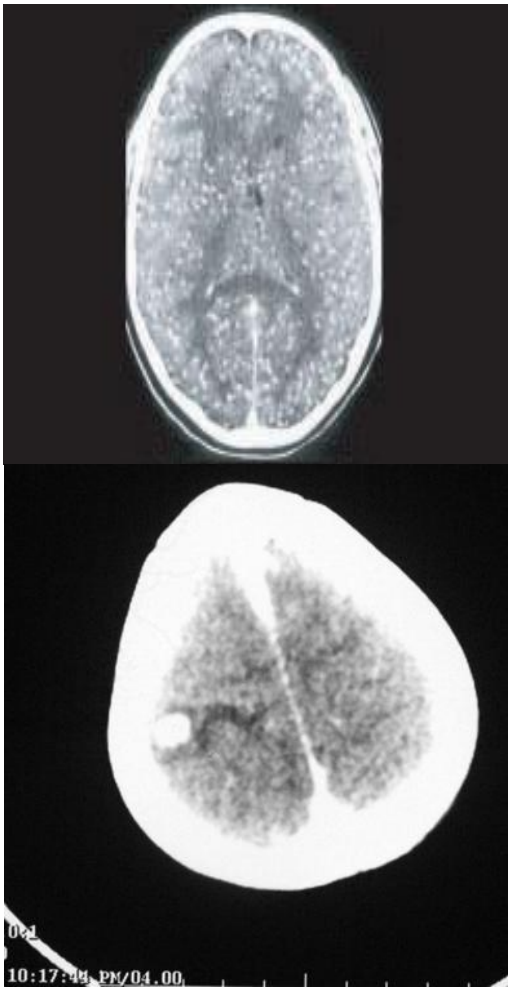


Figure: CT scan showing Multiple Nodular Cystic leisons

Patient was shifted to ICU under the Critical Care management.

Intensive Care Unit

Day 1 –2
The following blood parameters were deranged in CBC, LFT Sodium level. Urine routine showed plenty of pus cells. Adviced for Stool routine examination, Blood culture, CSF study, Scrubtyphus, Dengue Test NS1 Ag,

Day 3-4
Stool routine examination showed bile stained egg, spherical shaped, thick lined by prominent striations. Embryonatedonchosphere possesses three pairs of hooklets.

Figure: Taenia egg in Stool routine examination

Blood culture, CSF study, Scrubtyphus, Dengue Test NS1 Ag were negative

Serum sodium and potassium levels were reach to the normal limit

The patient was started with tab Albendazole 15 mg/kg/day PO in two daily divided dose with anti-epileptic drug was continued.

Adviced for AFB staining to confirm the diagnosis

Day 4-5
AFB stain showed Negative which differs the T.saginata from T.solium

Day 5-6
Patients condition was improved and discharged with the following advice
1) Tabepsolin 100 mg tds
2) Tab Albendazole 15 mg/kg per day for 8-28 days
3) TabParacetamol 650 mg tds

5. Discussion and Literature Review

Cysticercosis is a major public health problem, especially in the developing countires. According to the survey T.solium infection is endemic in India, Southeast Asia, Philippines, Central America, Mexico.

NCC is considered as the most common parasitic infection affecting the CNS and most common cause of epilepsy.[18]

Modes of transmission -1.Ingestion of contaminated food or water with eggs of T.solium 2.Auto infection.

In Our case study we believe that the these are the possible sources of tapeworm infection 1.contamination of the food with eggs of T. solium 2.self infection or auto infection from poor hand-washing after her enemas. This case possible presents a unique method of Contaminated food and self-infection due to inappropriate personal hygiene.[19]

The main features of NCC include intractable epilepsy, dementia, and focal neurological signs or raised intracranial pressure depending on the amount and localization of the cysts. The differential diagnosis of cystic cerebral lesion on CT or MRI includes abscess, tubercle, metastasis and glioblastoma[20]

In our case study we found that the patient was a worker and regularly he used to have pork meat because it was easily available and low cost. He developed headache after few months later it was associated with loose motions and finally he landed into generalized tonic clonic seizures. Initially he got treatment at local clinic but the symptoms didn't improve. Later he was referred to higher center for further evaluations.

His stool routine showed bile stained eggs and CT scan showed multiple

Nodular Cystic lesions. Based on **Del brutto's Diagnostic Criteria** the diagnosis was confirmed and it belongs to absolute Criteria. [34]

He was started with anticysticercal treatment.

His symptoms were come down and he was discharged.

Similar Case was conducted by Matthew J Booker et al on a28 year-old man from the Punjab region with a first presentation of seizures. At the time of examination the patient had no significant past medical history, but complaining of severe headache. The CT scan of his head showed a single area of subcortical low attenuation initially suggesting ischemia. A lumbar puncture and CSF examination was unremarkable. Further investigation revealed discrete calcified gluteal lesions on pelvic X-ray, and serum immunology which was positive for cysticercosis. The diagnosis of neurocysticercosis was confirmed, and the patient was started on dexamethasone and a short course of vermicide. The patient 'condition was improved and discharged.[21, 22, 23, 24]

In second case Balvinder S. Arora et al conducted the study on 60 patients presenting to the department with h/o headache, seizures Generalised seizures were the most predominant clinical presentation. On examination he found that the majority of the patients had single lesions in parietal

lobe in CT head. 90% of the patients showed perilesionaloedema on CT scan. After detailed history they found that none of the patient were pork eater.

There was also no correlation of diet with CT findings of number of lesions (p=0.260) was less. Their findings reaffirm the observation that vegetarians are equally susceptible to NCC &, as customarily believed, pork consumption is not a requisite for this infection. The patient was treated with albendazole which showed good response against the disease and discharged.[25]

In third case Ajay Kumar et al conducted a study on Disseminated Cysticercosis (DCC), Only 22 cases have been reported worldwide and 4 were from India; 4 of these cases were reported in children and having diffuse involvement of the central nervous system and muscles with cysticerci.

The syndrome of DCC is characterized by pseudomuscular hypertrophy palpable subcutaneous nodule, seizures and abnormal mentation. CT scan and magnetic resonance imaging are useful in anatomicallocalisation of the cysts. MRI is more sensitive than CT as it identifies scolex and live and live cysts.[26]

Serological tests are useful for detecting antibodies against cysticercosis and are used to confirm the diagnosis. Enzyme linked immunotransfer blot is more sensitive and specific than ELISA

Management of DCC is symptomatic start with antiepileptics and steroids, surgical (removal of cysts and ventriculoperitoneal shunt) and cysticidal. They concluded that the patients with active cyst are at risk of serious complications. It is recommended that all patients with multiple cysts should receive treatment with cysticidal drugs.

After 3 months the efficacy of treatment should bemonitored by repeating CT Scan.[26, 27, 28, 29, 30]

In fourth case Ravindra Kr Garg et al conducted a study on Intramedullary spinal cysticercosis: response to albendazole:

The medical treatment depends on the efficacy of the drugs for cerebral cysticercosisand spinalcysticercosis. It was found that the Bothpraziquantel and albendazole drugs were more effective in both forms of spinal cysticercosis.

It should be started as soon as possible after the diagnosis is confirmed or suspected. Concomitantthe corticosteroids must be given along with anticysticercal treatment to avoid further damage of the spinal cord because of the subsequent infllammatory reaction in the cyst wall.[31, 32, 33]

6. Conclusion

In India cestode infection `**neurocysticercosis**' is the commonest parasitic disease of the central nervous system; it may involve the brain parenchyma, themeninges or ventricles and, infrequently it involves the spinal cord. It is mostly due the accidental ingestion of eggs of Taenia solium **pork tape worm** usually due to the contaminated of food. Patients presents with headache, seizures, loose motions. Due to the number illiterate people they consume pork meat without proper cooking which is cheap and easily available. **Stool routine** should be performed as soon as possible in a suspected case of Taenia and treatment should be start before the progression of the disease. **CT** and **MRI** is the best method to identify and localize the anatomical localisations of the cysts.

The anticysticercal drugs like albendazole and praziquantel are easily available and it cost less as compared to the other drugs. According to the research they found that Albendazole is cheaper, having Good CNS penetration with more Efficacy as Compared to the Praziquantel.

Albendazole does not have any drug interaction with anti convulsant and steroids. Albendazole act on the giant cysts and resolve it completely with no side effect

The **Efficacy of treatment** should be monitored by repeating CT after 3 months. Simultaneously corticosteroids must be given along with anticysticercal treatment to avoid further damage due to subsequent inflammatory reaction in the cyst wall.

The diagnosis can be set up with the help of **Del brutto's Diagnostic Criteria.**

The pork meat should be cook more than at least 160 degree F and then allow the meat to rest for 3 minutes before consuming.

In rural areas people should be warned about the improper way of eating pork meat and there should undergo the following _ Health promotion, Specific Treatment, early diagnosis of the disease.

References

[1] White AC. Neurocysticercosis: A major cause ofneurological disease worldwide. *Clin Infect Dis* 1997; 24:101-115.
[2] Roman G, Sotelo J, Del Brutto O *et al.* A proposal to declareneurocysticercosis an international reportable disease.*BullWorld Health Organ* 2000; 78: 399-406.
[3] WHO. Seven neglected endemic zoonoses – some basic facts [Online]. Available at: http://www.who.int/zoonoses/neglected_ zoonotic_diseases/en/. [Accessed on 1st April, 2015].
[4] WHO. Taeniasis/Cysticercosis [Online]. Available at: http://www. who.int/mediacentre/factsheets/fs376/en/. [Accessed on 1st April, 2015].
[5] Carpio A: Neurocysticercosis: an update. Lancet Infect Dis. 2002; 2:751-762.
[6] King CH. Cestodes (Tapeworms). In: Mandell GL, Bennett JE, Dolin R, editors. Mandell, Douglas and Bennett's Principles andPractice of Infectious Diseases, 5th ed, Vol 2. Churchill Livingstone. 2000; 2956-2964.
[7] Prasad K N, Prasad A, Gupta R K, Pandey C M and Uttam S. Prevalenceand associated risk factors of T. soliumtaeniasis in a rural pig farming community of North India; *Trans R Soc Trop MedHyg*2007;101:1241–1247.

[8] Escobar A and Neito D. Parasitic diseases; in Pathology of the nervous system (ed.) J Minckler (New York: McGraw-Hill)1972;2503–2521.
[9] Wadia, NH, Singh, G. "TaeniaSolium: A Historical Note" Taenia SoliumCysticercosis: From Basic to Clinical Science CABI Publishing, 2002; 157-168.
[10] Ancient Hebrew Medicine.
[11] White AC. Neurocysticercosis: A major cause of neurological disease worldwide. *Clin Infect Dis* 1997; 24: 101-115.
[12] Roman G, Sotelo J, Del Brutto O *et al.*A proposal to declare neurocysticercosis an international reportable disease. *BullWorld Health Organ* 2000; 78: 399-406.
[13] Textbook Essentials of Medical Parasitology
[14] White AC. Neurocysticercosis: A major cause of neurological disease worldwide. *Clin Infect Dis* 1997; 24: 101-115.
[15] Roman G, Sotelo J, Del Brutto O *et al.* A proposal to declare neurocysticercosis an international reportable disease.*Bull World Health Organ* 2000; 78: 399-406.
[16] Psarras TG, Zour A, Coimbra C. Neurocysticercosis.Aneurosurgical perspective.South Med J. 2003;96(10):1019-22.
[17] GarciaHH, Evans CAW, Nash TE. Current consensus guidelines for treatment of neurocysticercosis.ClinMicrobiol Rev.2002;15:747-56.
[18] Singh G, Singh I, Rani A, Kaushal S, AvathiG.Epidemiologic classification of seizures associated with neurocysticercosis: observations from a sampleof seizure disorders in neurologic care in India. ActaNeurol Scand. 2006;13(4):233-40.
[19] Antoniuk S, Bruck I, Santos LH, Souza LP, Fugimura S. Neurocysticercosis in children: clinical study and follow-up of 112 paitients. Rev Neurol.2006;42:S97-01.
[20] Gogia S, Talukdar B, Choudhury V, Arora BS. Neurocysticercosis in children: clinical findings and response to albendazole therapy in a randomized, double-blind, placebo-controlled trial in newly diagnosed cases. Trans R Soc Trop Med Hyg. 2003;97(4):416-21.
[21] Carpio A: Neurocysticercosis: an update. *Lancet Infectious Diseases* 2002, 2:751-62.
[22] Kraft R: Cysticercosis; an emerging parasitic disease. *American Family Physician* 2007, 76:91-6.
[23] Garg RK: Diagnostic criteria for neurocysticercosis: some modifications are needed for Indian patients. *Neurology India*2004, 52:171-77.
[24] Pal DK, Carpio A, Sander JW: Neurocysticercosis and epilepsy in developing countries. *J NeurolNeurosurg Psychiatry* 2000, 68:137-43.
[25] *Arora BS et al. Int J Res Med Sci. 2016 Feb;4(2):519-523*
[26] Wadia N, Desai S, Bhatt M.Disseminatedcysticercosis. Brain1988, 111: 597-614.
[27] Sawhney BB, Chopra JS, BanerjiAK, Wahi PL. Pseudohypertrophic myopathy in cysticerosis. Neurology 1976, 26: 270- 272.
[28] Shandera WX, White Jr. C, Chen JC, Diaz P, Armstrong R.Neurocysticercosis in Houston, Texas. Medicine 1994, 73: 37-51.
[29] Monteiro E, Almeida-Pinto J, Stacker A, Sampairo-Silva M. Active neurocysticercosis, parenchymal and extra-parenchymal: a study of 38 patients. J Neurol 1993, 241: 15-21.
[30] St Geme JW. Consensus: diagnosis and management of neurocysticercosis in children. Pediatr Infect Dis J 1993, 12: 455-461.
[31] Del Brutto OH, Sotelo J. Neurocysticercosis. An update.Rev Infect Dis 1988; 10: 1075 ± 1087.
[32] Del Brutto OH. Diagnosis and management of cysticercosis.J Trop GeogrNeurol 1992; 2: 1 ± 9.
[33] Agrawal V, Thomas M, Maheshwari MC. Intramedullarycysticerci. J Assoc Physicians India 1995; 43: 138.
[34] DelBrutto OH, Santibanez R, Noboa CA *et al.* Epilepsy due to neurocysticercosis: Analysis of 203 patients. *Neurology*1992; 42 : 389-392.