

Cysticercosis: A Cause Of Rising Global Ocular Morbidity In India

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ABSTRACT

Background and Objectives: Cysticercosis is a major public health problem in India. Human cysticercosis predominantly affects the central nervous system (CNS) causing neurocysticercosis followed by eye involvement known as ocular cysticercosis. A lot has been done to decrease prevalence of blindness in India since the National Program for Control of Blindness (NPCB) was established in 1976. However, the focus has been on curable causes of blindness like cataract and less attention has been given to preventable causes like glaucoma and parasitic diseases like cysticercosis. Cysticercosis is one of the neglected tropical disease causing blindness and visual impairment in India and other developed and developing countries. At present disease burden of cysticercosis is rising and can be totally eradicated by advocating simple measures. The aim was to screen for cysticercosis cases in the community to prevent blindness and treating them to reduce morbidity and blindness due to cysticercosis so we used a strategic plan starting from PHC with participation of community to screen the cases. The available manpower at PHC is utilised with their training and supply of logistics. It is preventable, if we create proper awareness by health education and by giving proper training to the PHC staff including private practitioners for screening of taeniasis and cysticercosis.

Key-words: Taeniasis, Cysticercosis, Blindness.

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INTRODUCTION

Cysticercosis of the eye is a parasitic infection caused by *cysticercus cellulosa*, (the larval form of *Taenia solium*, a cestode). It is caused by ingestion of fecally contaminated food, water or vegetables containing eggs of *T. Solium*. Therefore people consuming vegetables only can also acquire cysticercosis.¹ Approximately 50-100 million people are infected with cysticercosis worldwide and is considered as “tool ready disease” according to WHO (World Health Organisation).² International Task Force for disease eradication in 1992 reported that cysticercosis is potentially eradicable.³ It is feasible because there are no animal reservoir besides humans and

pigs. Human cysticercosis predominantly affects the central nervous system (CNS) (neurocysticercosis) and also the eye.⁴ Ocular or adnexal involvement occurs in 13-46% of infected patients.⁵ The condition is endemic in various parts of the world including India.^{6,7}

Cysticerci can be found anywhere in the body but are most commonly detected in the brain, cerebrospinal fluid (CSF), skeletal muscles, subcutaneous tissue or eye. The clinical presentation of cysticercosis is variable and depends on the location and number of cysticerci. It also depend on the extent of associated inflammatory response on scarring. Neurological manifestations are primarily seizures (most common), features of

increased intracranial pressure and neurological deficits.¹ Ocular manifestations occur in about 40% of patients.⁵ Involvement of orbital tissues (orbital cysticercosis) can lead to proptosis, diplopia or extra ocular muscle restriction, recurrent episodes of redness, swelling and pain that may mimic orbital pseudotumor or even orbital cellulitis. Extra ocular muscles are the most common site of involvement of orbital cysticercosis (orbital myocysticercosis).⁸ Intraocular cysticercosis can be present in subretinal, intravitreal or in anterior chamber. In several studies comprising more than 500 cases of ocular cysticercosis, in 68% cases posterior segment (41% subretinal/intraretinal and in 27% vitreous) are involved, in 20% subconjunctival, in 8% anterior segment and in 4% cases orbits or eyelids were found to be involved.⁹ While another study conducted by Kruger Leite et al showed that 35% of the cysts were found in the subretinal space, 22% in the vitreous, 22% in the subconjunctival space, 5% in the anterior segment and 1 % in the orbit. Intraocular cysticercosis is associated with a very poor prognosis for vision.¹⁰

Visual morbidity and blindness in cysticercosis can occur due to papilledema (raised intracranial pressure due to hydrocephalus) leading to optic atrophy, fluctuating vision due to intraocular cyst, chorioretinal scar, retinal edema, haemorrhage; massive inflammation due to death or degeneration of larva in cyst, diplopia (double vision) due to orbital myocysticercosis. Person with seizure may have traumatic injuries to the eye. The pork tapeworm (*T. Solium*) can cause two distinct forms of infection in humans. Adult tapeworm in the intestine (as definite host) causing taeniasis and larval form in the tissues (intermediate host) causing cysticercosis. Humans are the only definite hosts for *T. Solium* while

pigs are the usual intermediate host.¹ Therefore Cysticercosis is a major public health problem and is most common parasitic infestation of the CNS and the single most common cause of epilepsy in developing countries. Problem for investigation or detection of cysticercosis is that many of the cases are either never diagnosed or found incidentally during imaging procedure. Disease is underestimated in India because due attention has not been given to this neglected disease and systematic population based studies are lacking.¹¹ However recent studies using neuroimaging technique have concluded that the disease burden in India surpasses many other developing countries.

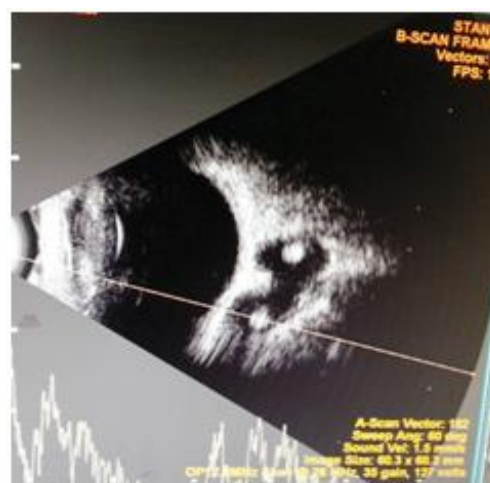


Fig 1: USG B scan of eye showing myocysticercosis

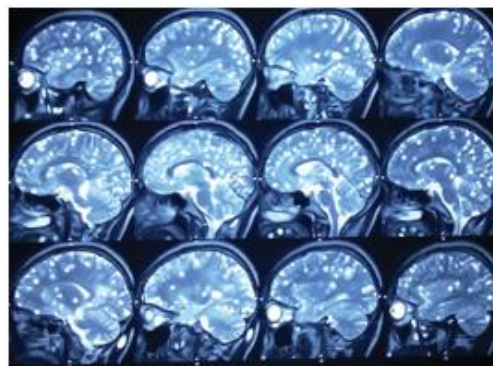


Fig 2: MRI brain and orbit showing multiple cysticercosis

Diagnosis:

Diagnosis of cysticercosis and taeniasis requires high index of suspicion and therefore a comprehensive examination should be done. Presumptive diagnosis is based on a combination of clinical presentation, radiographic studies, serologic tests and exposure history.

1. Taeniasis- In true sense it is a different disease and is due to eating of cysts containing cysticerci in poorly cooked pork. It can be diagnosed by detection of eggs or proglottids in feces (at primary level). More sensitive methods including antigen capture enzyme linked immunosorbent assay (ELISA), polymerase chain reaction (PCR) and serology for tapeworm stage specific antigen are currently available as research technique (at tertiary level).

2. Cysticercosis- Diagnostic certainty is possible only with defined demonstration of parasite.

This can be accomplished by histological observation of the parasite in excised tissue, by fundoscopic visualisation of the parasite in the eye (in the anterior chamber, vitreous or subretinal space) or by neuroimaging studies demonstrating cystic lesions containing a characteristic scolex.

Preventive and Control Strategies:

I. Measures for the prevention of intestinal *T. soleum* infection consists of:

- Proper inspection of pork and avoiding consumption of insufficiently cooked pork
- Adequate cooking of pork viscera by exposure to temperatures as low as 56deg C for 15 min, refrigeration or salting for long periods or freezing at -10 deg C for 9 days kills the cysticercus in pork.

II. Prevention of cysticercosis involves minimizing the opportunities for ingestion of faecally derived eggs by means of

- Good personal hygiene and sanitation practices
- Effective faecal disposal and
- Treatment of tape worm carriers

III. Mass chemotherapy of infected individuals and educating the people is the the major ways to break the cycle, in which eggs from human faeces are transmitted to other humans and or pigs.

IV. Treatment or vaccination of pigs.

V. The separation of pigs from human faeces by confining them to enclosed piggeries.

VI. Identification of persons suffering from taeniasis (human carriers) at grass root level by PHC workers by examination of faeces and imparting treatment.

Recommendations:

The following guidelines are to be followed to prevent ocular morbidity due to cysticercosis

1. Creating awareness of cysticercosis and taeniasis among people, increase awareness by community involvement, eye health education using attractive educational aids and patient education booklet on preventive strategies like improved personal hygiene, effective faecal disposal, avoiding open field defecation, adequate washing of fruits and vegetables, proper pork inspection and cooking, separation of pigs from human faeces.

2. the governing authorities should frame rules and regulations on how human and animal waste is disposed of, for example to prevent polluting rivers and the sea, as well as freshwater lakes by proper excreta disposal.

3. Giving due importance regarding cysticercosis in undergraduates and postgraduate training education, encouragement for health providers of PHC to attend CMEs so that they acquire knowledge or training manual for PHC and paramedical health worker and making of logistics available to PHC including lab facilities for detection of intestinal *T. Soleum* in faeces, ophthalmoscope (for detection of ocular cysticercosis), ultrasound machine for ocular detection of cysticercosis,

neuroimaging and report to be upload in telemedicine for higher centre for their opinion.

4.To break the life cycle following interventions can be adopted

-Building toilets for safe and effective faecal disposal

-Mass chemotherapy of infected individual and educating people regarding personal hygiene

-Proper meat (pork) inspection by govt agencies and appropriate cooking advice.

-Separation of pigs from human faeces

-Mass chemotherapy of people eating porks and vaccination to prevent porcine cysticercosis

5. Honarable govt of India should provide structural and financial assistance like

-Availability of website for registration and follow up of cases

-qualitative research

-publishing guidelines on diagnosis and management, for information, referral, communication and staff management.

CONCLUSION:

Cysticercosis is increasingly common medical problem and one of the neglected tropical diseases. It is potentially eradicable because there are no animal reservoirs besides humans and pigs. The only source of *T solium* infection for pigs is from humans. If we create awareness of health education and use medical facilities, we can reduce the prevalence and morbidity and disability due to cysticercosis. There is a need for services to diagnose and treat early (especially taeniasis). Various strategies to control it can be integrated into existing national programmes in rural and urban settings i.e. PHC and effective use of human resources as well as financial assistance.

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