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Original Research Paper

Pathology

A STUDY ON OCULAR CYSTICERCOSIS IN A TERTIARY CARE HOSPITAL OF JHARKHAND – A CASE SERIES

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ABSTRACT **PUPOSE:** To study the clinical presentation , histopathology and treatment outcome of patients with ocular cysticercosis in Jharkhand. **METHODS:**This study included 7 patients who were diagnosed to have ocular or adnexal cysticercosis over a period of one year (2018) in Jharkhand, India.The clinical presentation, results of investigations and treatment outcome of the cases were analysed retrospectively. **RESULTS:** Age of the patients ranged from 13 to 50 years with female preponderance.Two patients presented with symptoms of foreign body sensation in the eyes, two other cases presented with irritation in eyes, two with swelling in eyelid and one with cystic swelling. ELISA for cysticercus antibodies in serum was positive in all cases except one. Medical treatment (Albendazole and Prednisolone) along with surgical excision was done in three cases. While direct excision was done inremaining 4 cases. **CONCLUSION:** While ELISA for anticysticercal antibodies helps to establish the diagnosis of ocular cysticercosis, definitive diagnosis can only be made by histopathological examination. A combination of oral albendazole and corticosteroids is found to be effective in confirmed cases.

KEYWORDS : Ocular Cysticercosis, ELISA, Anticysticercal Antibodies.

INTRODUCTION

Human cysticercosis is a parasitic infection caused by *Cysticercus cellulosae* ,the larval form of the cestode, *Taenia solium*. Cysticercosis in humans is aquired by the ingestion of faecally contaminated food, water or vegetables containing ova of *T. solium*. Cysticercosis occurs globally, but the highest cases are reported from Latin America, Asia and Africa. In India, ocular involvement is seen in approx. 12.8% of all cases of cysticercosis with the majority located in the subconjunctival space.The condition is endemic in certain parts of the world including Mexico, Africa, South-East Asia, Eastern Europe, Central and South America and India.[1-3] *Cysticercus cellulosae* may become encysted in various bodily tissues usually the central nervous system, eyes, muscles and subcutaneous tissues producing various symptoms.[4] Ocular cysticercosis may be extraocular (subconjunctival, orbital or palpebral tissue), or intraocular (In the vitreous, subretinal space or anterior chamber).There is no sex predilection for cysticercosis, the most common age group affected is 10-40 years for ocular cysticercosis while cysticercal encephalitis is more common in children and young adults.

Pathophysiology:- Humans are the intermediate host for *T. solium* while pigs are definitive hosts. The tapeworm larval cyst (cysticercus) is ingested with poorly cooked infected pork, the larva escapes the cyst and passes to small intestine where it attaches to the mucosa with the help of scolex suckers.

The larva develops into adult having up to 1000 proglottids each having approx. 50000 eggs, in 3-4 months which may live in intestine for as long as 25 years without symptoms and pass gravid proglottids into faeces.Eggs extruded from the proglottids contaminate the vegetation where pigs consume them. Inside the pig, the *T.solium* embryo penetrates the gastrointestinal mucosa and hematogenously disseminates to peripheral tissues with resultant formation of larval cyst (cysticercus). Human cysticercosis occurs when *T. solium* eggs are ingested by humans. The oncospheres (primary larva) penetrate the small intestinal mucosa and disseminates hematogenously to neural, cutaneous, ocular and muscular tissues where these oncospheres develop into secondary larva, the cysticerci.

Clinical presentation:- About 80% of cysticercal infections are asymptomatic[5]. Many cases are never diagnosed or found incidentally during imaging procedures.The symptoms of neurocysticercosis include seizures, elevated ICP (causing nausea, vomiting, altered mental status, dizziness and altered visual acuity due to papilledema), psychiatric disorder, stroke, and radiculopathy or myelopathy, if involves spinal cord. The extraocular muscle location of the cyst may result in strabismus, diplopia or proptosis.[6] Optic nerve compression may lead to decreased vision and disc edema.The subconjunctival cysticercosis presents as painful yellowish nodular mass with surrounding congestion[7]. Spontaneous extrusion is reported in some cases. It may also present as eyelid nodule if present below the palpebral conjunctiva. Intraocular cysts can be visualized ophthalmoscopically. It can lead to disc edema, retinal hemorrhage, retinal detachment, proliferative vitreoretinopathy.[8] The anterior chamber cyst may lead to secondary glaucoma.

Differential diagnosis:-

Coats disease (a rare congenital disorder causing partial or complete loss of vision due to abnormal development of blood vessels behind the retina).
Retinoblastoma
Retinal detachment
Retinopathy of prematurity
Persistent fetal vasculature
Thyroid ophthalmopathy
Sarcoidosis
Toxocariasis

MATERIAL AND METHOD :

It was a 1 year study done retrospectively from January 2018 to December 2018. It was done in the histopathology section of Department of Pathology, Rajendra Institute of Medical Sciences, Ranchi. Retrospective analysis of the specimen was done. All data pertaining to those specimen was retrieved and reviewed. Histology slides stained with Hematoxylin and

Eosin was analysed. Each case was analysed with respect to age, sex, clinical presentation, microscopic diagnosis and treatment outcome.

OBSERVATION :

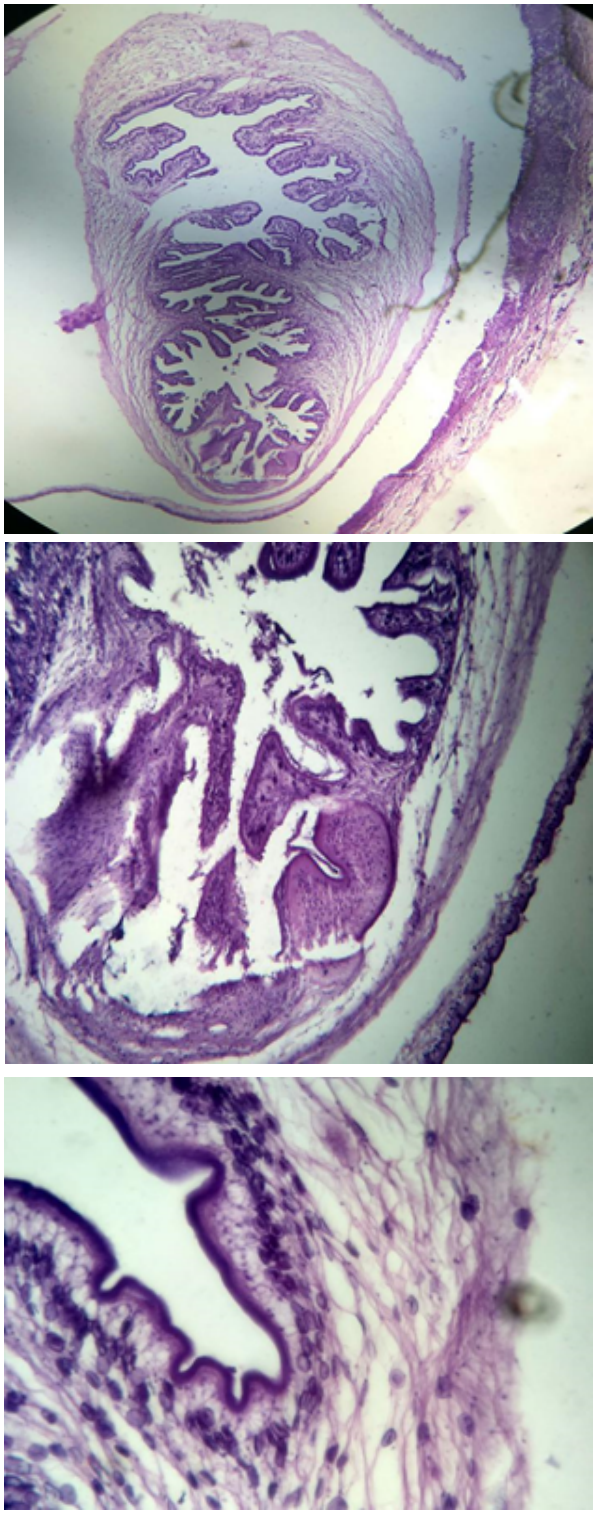
Table :- Clinical profile of Ocular cysticercosis in 7 cases

Case	Type	Age/ Sex	Symptom	ELISA	Intervention
1.	Subconjunctival	50/Female	Foreign body sensation	Positive	Surgical Excision
2.	Subconjunctival	35/Male	Irritation in eyes	Positive	Surgical excision
3.	Palpebral	13/Female	Cystic Swelling	Positive	Medical treatment + Surgical excision
4.	Subconjunctival	27/ Female	Foreign body sensation	Positive	Surgical excision
5.	Orbital	30/ Male	Swelling in eyelid	Negative	Medical treatment + Surgical excision
6.	Orbital	45/ Female	Swelling in eyelid	Positive	Medical treatment + Surgical excision
7.	Subconjuctival	18/ Male	Irritation in eyes	Positive	Surgical excision

Histological findings:- Histopathological features confirmed the diagnosis of cysticercosis. Histological examination revealed a cystic cavity, surrounded by a capsule of fibrous connective tissue with minimal inflammatory reaction and the *Cysticercus cellulosae*. Worm morphology showed thick cyst wall thrown into duct-like invagination, lined by homogeneous membrane along with the scolex.

The body of cysticercus is divided into the bladder and the parenchymatous portion. The parenchymatous portion contains the invaginated scolex. The body wall is made up of relatively horizontally arranged fibrils and distinct, minute, spindle-shaped cells. The folded wall of the invaginated canal is covered with a high, relatively homogeneous cuticle with numerous marked grooves. There are calcareous corpuscles present in the folds of the wall.

The gross specimen was a globular cystic mass measuring 1×0.6×0.5 cm. with blood mixed slimy material over it, pearly white in color, soft in consistency .



Low and high power views of ocular cysticercosis

DISCUSSION :

Ocular Cysticercosis (OCC) has been reported from different parts of India with variable frequency. Here we report a series of patients of Ocular cysticercosis seen over a period of 1 year at a tertiary care center in Jharkhand (a eastern province in India). A few recently reported series of cases from India include 25 cases from Vellore [9], 44 from Chennai [10], 35 cases in a more recent report from Chennai [11], 18 from New Delhi [12], and 43 from Chandigarh[13]. A case of AIDS patient with subretinal cysticercosis has also been reported from Chennai[14]. Some earlier studies also described many more cases of ocular

cysticercosis from South India[15]. Intraocular and extraocular cysticercosis has also been reported from Northern India during last many decades including recent reports from New Delhi and Uttar Pradesh[16]. Cases of intraocular and orbital cysticercosis have also been reported from Bombay[17]. All these studies show an increased reporting of OCC from different parts of India including South India, which indicates that OCC is emerging as a far commoner disease than previously considered.

In the present series the cysticerci are found in the extraocular location in 42% cases. The conjunctiva and sub conjunctiva are the other major sites (58% cases). The site of infection differs in different geographical locations; most common site of localization being the posterior segment of the eye in most Western reports[18] whereas the ocular adnexa is the common site of localization in most Indian studies. Ocular cysticercosis involving both the anterior and posterior segments of the eye is more frequent but anterior chamber cysticercosis is considered rare in India[19]. No case of anterior chamber cysticercosis is recorded in the present series.

Though only few cases of optic nerve infection had been reported in the world literature, the majority are from India[20].

The ELISA using *T.solium* metacestode somatic and ES antigens is evaluated for diagnosis and treatment follow-up of OCC. Overall in our study, serum IgG-ELISA using somatic and ES antigens detected antibodies in 86% among clinically suspected cases. Though several serological assays have been developed and evaluated for detection of Cysticercus antigen and antibody in serum for diagnosis of Neurocysticercosis in human with varying degree of sensitivity and specificity; reports on serodiagnosis of OCC were only few and restricted to detection of antibody in serum[21]. Also the nature of antigens used for detection of antibodies is not clear in those reports. Seropositivity was found to correlate with clinical profile of OCC in few studies while other studies did not find so. However, in our study the IgG-ELISA particularly using ES antigens, showed a higher sensitivity during diagnosis. The lower sensitivity of the ELISA using somatic antigens can be justified because the parasite usually remains viable in eye when cases attend the clinic and is it postulated that the living parasite escapes from the immunity by masking its somatic antigenic epitopes. Also it has been reported earlier that there is a correlation of viability with serum IgG antibodies specific to the parasite ES antigens as seen in NCC. In some previous study on OCC, the anti-Cysticercus IgG antibodies could be demonstrated in serum with a moderate sensitivity and high specificity. However, IgA-antibody assay showed 100% sensitivity and absolute specificity in tear fluid[22]. But this assay has its limitations that there is chance of dilution of the antibodies in tear resulting from any irritation to the eye while collecting the specimen and also there may be need of an immediate processing due the minute quantity of the specimen being unsuitable for storage. When we compare between two clinical forms of cysticercosis, serum IgG-ELISA shows comparatively lower sensitivities in diagnosis of OCC than NCC.

Sensitivity of the serum IgG-ELISA in patients with intraocular and extraocular cyst differed. The ELISA using ES antigen was positive more frequently with extraocular location compared to the cases with intraocular location.This poor sensitivity of the antibody tests in intraocular cases than extraocular cases may be due to the privileged situation of eye with regard to immunology; more precisely due to avascularity of the cornea and lens and the physiological selectivity of blood-aqueous barrier as well as absence of lymphatic channels within the globe itself as mentioned earlier.

Medical therapy is the recommended mode of treatment for the cases of extraocular and retro-orbital cysticercosis . In the present study, the albendazole with prednisolone therapy in cases with orbital cysticercosis is found to be extremely effective and achieves clinical resolution in most patients. Despite clinical resolution, only a few numbers of patients have residual deficits. Reports of earlier Indian studies have also shown the promising results in treatment of extraocular cysticercosis with oral albendazole[23]. The post treatment follow up of OCC is usually done by monitoring the cases clinically based on physical examination, ophthalmoscopy or imaging[24]. There was no information available on serological monitoring of the cases of OCC following therapy. Nevertheless, serological monitoring has been found to be useful in monitoring cases of NCC following treatment, by detection of both antigen as well as antibodies.

USG alone is not useful to confirm the diagnosis in presence of a cysticercus cyst in eye. It may suggest a probable cystic mass; it always does not provide a confirmed diagnosis in case of orbital cysts unlike the floating intraocular cysts. Also ophthalmoscopy may not be helpful in diagnosis of peripherally located parasite and also in cases of severe inflammation . Moreover, in the cases of sub conjunctival cysts sometimes, parasitic cysts appear like dermolipoma[25]. Hence, there is need of an alternative and suitable laboratory based diagnosis to confirm the clinical diagnosis based on imaging.

In the present study we can see that histopathological examination is indispensible in the diagnosis of Ocular cysticercosis.

CONCLUSION :

This was a study evaluating an antibody ELISA based diagnosis of clinically suspected cases of Ocular cysticercosis. A sequential release of antibodies specific to either somatic or ES antigens during the parasite degeneration was observed. It might be possible that when the parasite is alive, the somatic antigens are masked due to parasitic adaptation. However, upon death the parasite somatic antigens start degenerating activating immune system to develop anti-somatic antibodies in peripheral blood. Hence, the serum Ig G-ELISA evaluated in our laboratory for diagnosis of the medically treated extra ocular forms of Ocular cysticercosis might be beneficial and used as an adjunct to existing tools.

From this study we can conclude that while ELISA for anticysticercal antibodies helps to establish the diagnosis of ocular cysticercosis, definitive diagnosis can only be made by histopathological examination. A combination of oral albendazole and corticosteroids is found to be effective in confirmed cases.

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