

Histopathological Spectrum of Cysticercosis and their Demographic Study in Tertiary Care Hospital at N.M.C.H., Patna, Bihar

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ABSTRACT

Introduction: Cysticercosis is a systemic manifestation caused by dissemination of larval form of *Taenia solium*, also called as pork tape worm, is a major public health problem in developing countries. The aim of present study was undertaken to evaluate the histopathological spectrum of cysticercosis with their demographic pattern in our tertiary care hospital.

Material and methods: A total of 3055 patients of different age, sex and religions with nodular swelling in different parts of their body were attending in different OPD. From all the patients, a total of 3055 specimens were received in our department for histopathological evaluation.

Results: Out of 3055 specimen received for biopsy, 8 (0.26%) cases were diagnosed as cysticercosis. Out of which 50% cases (4 cases) were of less than 20 years of age group and 62.5% cases were female patients. The disease was found in both religions Hindus and Muslims (87.5% in Hindus)

Conclusion: Even fine needle aspiration cytology (FNAC) has very limited value in diagnosis of cysticercosis in most of the cases and could not be recommended due to poor diagnostic value and in cases of neurocysticercosis as well as ocular or orbital cysticercosis, FNAC could not be attempted due to risky procedure with very limited diagnostic value, although serological tests are done for the serious complications of cysticercosis, but the final diagnosis is Histopathological study which is justified and the ultimate diagnostic technique for correct diagnosis.

Key words: Cysticercosis, *Taenia solium*, Histopathology

INTRODUCTION

Cysticercosis is endemic in South East Asia, South and Central America and Africa¹. The high prevalence has been reported from the developing countries because of the co-existence of poor sanitary conditions and domestic pigs without proper veterinary control or surveillance system². Cysticercosis is common in communities where pigs are allowed to roam freely and the residents consume undercooked pork with lack of basic sanitary facilities.

Cysticercosis is an infestation caused by the larval stage of the tapeworm, *Taenia solium*, a cestode measuring about 2.5-3.0 m.

Human is the only definitive host of the *Taenia solium*, harbouring adult tape worm in their intestine, where as both men and pigs can act as intermediate host and harbour the larvae in different internal organs.

Humans and pigs both acquire cysticercosis due to ingestion of eggs through faecal-oral transmission from a host having tape worm. In humans, the organism penetrates the intestinal wall and invades subcutaneous tissue, brain, eye, muscle,

heart, liver, lungs, peritoneum as well as spinal cord etc.

The clinical manifestations of the patient suffering from cysticercosis varies depending upon the site of the larval encystment, numbers of cyst and the extent of associated inflammatory response

Neurological manifestations, accepted as Neurocysticercosis, are the most clinically important condition where the cysts are present within the parenchyma of brain, usually 5-20 mm in diameter. It may manifest as acute seizures, headaches, hydrocephalous, chronic meningitis, focal neurological deficits. Cysts in spinal cord present the neurological ministrations according to the involved level of spinal cord. Cysticerci can develop in any voluntary muscles by invading the muscles causing myositis, myalgia, muscular pseudohypertrophy or abscesses Cysticerci^{3,4} may be found in eye ball, extraocular muscles as well as under the conjunctiva. Depending on the locations, they cause visual difficulties such as fluctuation in eye ball position, retinal oedema, retinal haemorrhages as well as decrease in vision or visual loss. Subcutaneous cysts may be found in the form of firm, mobile nodular swelling mainly on trunks or extremities.

MATERIAL AND METHODS

Present study was conducted in the Department of Pathology Nalanda Medical College, Patna with the help of Department of Microbiology, Surgery and Ophthalmology during the period of January 2016 to December 2018. A total of 3055 patients of different ages, sex and religions with nodular swelling in different parts of their body were attending in different OPD of our hospital. From all the patients, a total of 3055 specimens were received in our department for histopathological evaluation.

After detailed clinical history data regarding, routine investigation of blood like complete blood count (CBC), BT, CT, PT, APPT, Blood sugar (Fasting and Post Prandial),

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creatinine, SGPT, viral markers, R/E of urine, X-Ray, Ultrasound as CT Scan findings were noted. The material was first examined and recorded about its nature, gross appearance and appearance on cutting. Tissue fixation, tissue processing, staining of the cut sample, mounting of section were carried as follows:-

The tissue was placed in 10% Formalin Solution for 24 hours for fixation. Then the tissue was put for 2 hours in each of the ascending grades of alcohol 50%, 70%, 90% and two separate jars of absolute alcohol. The tissue was kept overnight lastly in absolute alcohol. On next day the tissue was transferred to xylene I and xylene II for cleaning for 1 and 1/2 hours in each jar. After clearing in xylene I & xylene II, the tissue was transferred to a bath of molten paraffin in an paraffin wax oven. During this process the clearing agent is eliminated from the tissue by diffusion into the surrounding melted wax and the wax diffuses into the tissue replacing the clearing agent. This is carried out in paraffin wax oven at 60-62° c for 3-4 hours. After that the impregnated tissue was embedded in liquid paraffin wax with the help of two L-moulds (Leuckhart's Pieces) adjusting accordingly with various sizes of tissue. After the wax was solidified, the L-moulds are removed and the blocks of paraffin wax having tissue were kept in freezer part of freeze for hardening. After hardening of the block, the sections of the tissue in block were cut with the help of rotatory microtome having 2-4 µm thickness. Ribbon of sections was put in a bowl of slightly warm water.

The section was transferred on clean slides with tissue adhesives (Mayor's glycerol albumin). Deparaffinization of sections was done on hot plate regulated at melting point of wax. Delicate tissue section after deparaffinization was dried at 45.0 degree Celsius for several hours. Deparaffinized and dried thin sections were put in xylene I xylene II for 10-15 and minutes in each. Deparaffinized sections after treating with xylene, were hydrated in descending grades of alcohol from 95% to 70% to 50% for 5 minutes in each then kept in tap water for 5 minutes. Staining of slides was done with haematoxylin and Eosin stain. Hot plate regulated at melting point of wax. Delicate tissue section after deparaffinization were dried

Haematoxylin component stain the cell nuclei and Eosin component stain the cytoplasmic components of tissue sections. After staining and clearing the slides with the help of xylene, the slides were mounted with DPX and cover slip and seen under oil immersion field of microscope.

RESULTS

Out of 3055 specimen received for biopsy, 8 (0.26%) cases were diagnosed as cysticercosis. Out of which 50% cases (4 cases) were of less than 20 years age group and 62.5% cases were female patients (Table-2). The disease was found in both religions Hindus and Muslims (87.5% in Hindus) (Table-3).

Out of the 8 diagnosed patients of cysticercosis 37.5% were male and 62.5% were female. (Table-2)

Case no.	Age in years	Sex	Religion	State	Organ involve	Size of tissue (in cms)	Relevant findings
1.	50	F	H	B	Rt. breast	3x2x2 cms in all	On USG, cystic swelling.
2	10	F	H	B	Hand	0.8x0.6x0.6 cms in all	On grossing cystic lesion
3	15	M	H	B	Left eye conjunctival swelling	0.6x0.5x0.4cms in all	On grossing cystic lesion
4	20	F	H	B	Gluteal region	3x3x2 cms in all	On grossing cystic lesion
5	20	M	M	B	Index finger	0.8x0.6x0.6cms in all	On grossing cystic lesion
6	22	F	H	B	Rt. conjunctival swelling	0.8x0.6x0.4 cms in all	On grossing cystic lesion
7	28	M	H	B	Swelling in tongue margin	0.6x0.6x0.5 cms in all	A small nodular cystic lesion
8	36	F	H	B	Swelling in abdominal wall	1.5x1x1 cms cms in all	Nodular cystic lesion

H= Hindu, M=Muslim, B=Bihar

Table-1: Shows Details of patients diagnosed as cysticercosis on basis of Histopathology (total n=8)

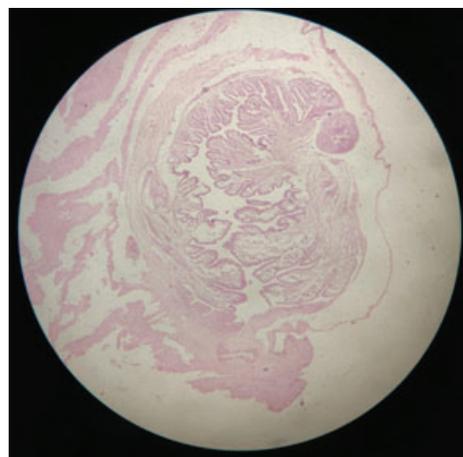


Figure-1: Shows cystic cavity containing larval form of cysticercus cellulose (H&E stain)

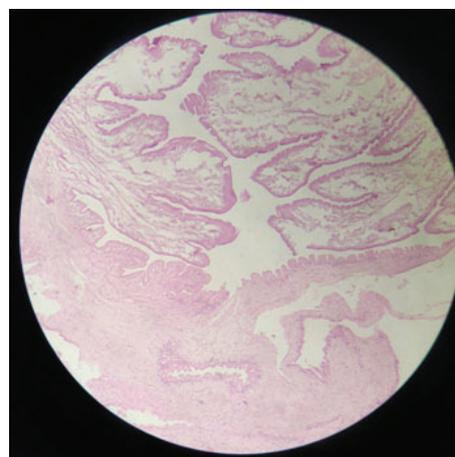


Figure-2: Shows duct like invaginations lined by eosinophilic membrane (H&E stain)

Sex	No.of cases	% of cases
Male	3	37.5%
Female	5	62.5%
Total	8	100%

Table-2: Shows sex distribution of cysticercosis (n:8)

Age in years	No.of cases	% of cases
<20years	4	50%
21-30years	2	25%
>30years	2	25%
Total	8	100%

Table-3: shows age distribution of cases of cysticercosis (n:8)

Religion	No. of cases	%of cases
Hindu	7	87.5%
Muslims	1	12.5%
Total	8	100%

Table-4: shows incidence of cysticercosis in different religion (n: 8)

This study shows maximum incidence was in age group of <20years (Table-3). Youngest patient in the present series was a female patient of 10 years old and the oldest patient was a female of 50 years age. (Table 1)

The disease was found in both religions Hindus (87.5%) and in Muslims (12.5%) (Table-4).

Histopathological Study: Gross study Case no. 1, 4, 7, and 8- Circumscribed greyish white cystic nodule filled with clear fluid like material, Case no. 2 and 5-Small greyish white nodular cystic lesion, Case no. 3 and 6- A small greyish brown nodular cystic lesion.

Microscopic study: The section showed a cystic cavity containing the larval form of *Taenia solium*. The scolex seen at the cephalic region as well as duct like invagination noted within the cystic lumen. The invagination showed lined by eosinophilic membrane and ovoid basophilic calcified corpuscles seen adjacent to duct like invaginations (fig-1,2).

DISCUSSION

Cysticercosis is a systemic manifestation caused by dissemination of larval form of *Taenia solium*, occurs mainly in pork eating nations due to consumption of undercooked pork. High prevalence has been reported from the developing countries because of co-existence of poor sanitary conditions and domestic pigs without proper veterinary control or surveillance as well as vegetables contaminated by *Taenia solium* eggs.

Children and younger patients are commonly affected because of increased chances of fomite infections. In this present study 50% cases were found less than 20 years of age.

The presentation of cysticercosis primarily depends upon the anatomic locations as well as number of cysts and the extent of associated inflammatory responses. The most frequently reported locations are skin, skeletal muscles, heart, eye and most importantly central nervous system. In developing

countries, it is one of the important contributors to neurologic morbidity and a major cause of acquired epilepsy in the world.¹²

The present study of histological evaluation of cysticercosis shows its involvement in all age groups, all the religions and in both sex males as well as females.

On the basis of serological evaluation by ELISA method, Samir H Vora et al found 22.4% sero-prevalence of cysticercosis in Goa, one of the highest levels worldwide.

In present study there were seven Hindu patients and one was Muslim which favours the fact that no relation of religion with cysticercosis.

Schantz et al¹³ (1992) found in their study (Jewish community in New York, strict non pork consumers) that no association between pork consumption and sero-positivity was found and stated this paradoxical finding indicates generalized exposure to *Taenia solium* eggs through contaminated vegetables or fruits grown and consumed in the study area.

In our present study, we found two cases of conjunctival cysticercosis in both sex's one male and one female

Orbital or ocular cysticercosis is one of the preventable causes of blindness or this may lead to a number of complications according to its location such as retinal detachment, retinal haemorrhages, proliferative vitreoretinopathy, secondary glaucoma, proptosis, lid swelling and ophthalmoplegia.

Imaging studies computed tomography, magnetic resonance imaging, are most helpful in providing a definitive diagnosis as well as ultrasonographic findings are valuable in recognising a well defined cyst in the orbit with a hyperechoic scolex and also used in monitoring the treatment.

Kruger -Leite et al¹⁷ (1985), reported that 35% of cysts were found in the subretinal space, 22% in the vitreous, 22% in the subconjunctival space, 5% in the anterior segment and only 1% in the orbit.

Rath S et al¹⁸ (2010) reported that when the extra ocular muscles are involved, the superior rectus is the most common. If the cyst is found in the subconjunctival space, it is thought to be spread from the adjacent muscles.

In present study one case of cysticercosis found in 50 years old female in right breast which was clinically presented as painless lump of more than 3 months duration mimicking as carcinoma of breast and on ultrasound it was reported as cystic lesion in right breast, histologically diagnosed as cysticercosis of right breast.

In Nepal, Amatya and Kimula¹⁹ (1999) reported 62 cases of histologically diagnosed cysticercosis, five of which were found in breast substances.

In India, Sahai K et al (2002) a review study of 8364 breast aspirates over 15 years demonstrated only 8 cases of cysticercosis.²⁰

In present study, we found four cases of cysticercosis within the intramuscular region of hand, index finger, lateral aspect of tongue and gluteal region. Clinically three cases presented as nodular swelling, only in gluteal swelling. the patient complained of dull ache pain especially on sitting.

Reddi et al. (2001) and Mittal et al. (2008) reported similar cases of intramuscular cysticercosis in the masseter

muscle, both of which were diagnosed by USG and treated conservatively. The most commonly involved intraoral sites include tongue (42.15%), lips (26.15%) and buccal mucosa (18.9%).

CONCLUSION

Cysticercosis is a global public health problem because neurocysticercosis has been identified as the most important cause of the acquired active epilepsy and ocular orbital cysticercosis as one of the preventable cause of blindness. It is considered as a biological marker of social and economic development which is potentially eradicable through surveillance and human interventions. Healthy food habits and sanitary improvements are essential to control this public health problem. There is an urgent need for effective health education campaign aimed at preventing and treating both *Taenia solium* infection and cysticercosis in the community through medical institutions and medical agencies as well as mass awareness.

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