

Original Research Article**Role of Fine Needle Aspiration Cytology in Diagnosis of Subcutaneous Cysticercosis: An Analysis on Clinico-Pathological Profile in A Tertiary Care Hospital****Anandraj Vaithy K.^a, Shanmugasamy^b, Dhananjay S. Kotasthane^c**^aAssistant Professor ^bAssociate Professor ^cProfessor & HOD, Department of Pathology, Mahatma Gandhi Medical College and Research Institute, SBV University, Puducherry-607402, India.**Abstract**

Background: Parasitic infestation remains a leading serious health problem with worldwide distribution especially in developing like India with wide range of morbidities. The fact that cysticercosis infestation caused by *Taeniasolium* remains a major health hazard with variable clinical manifestation. However, presentation of Cysticercosis infestation as lymphadenopathy with subcutaneous manifestation is a rare entity as observed in our present study which often mis-interpreted formsenchymal soft tissue tumour. The effective pick up of the infestation on routine cytology screening showers limelight on the diagnostic modalities.

Materials and Methods: All patients with lymphadenopathy and subcutaneous masses with various clinical differentials were subjected for routine Fine needle aspiration Cytology procedure with standard cytological stains. All relevant clinical information including socio economic status and procedural data were documented with ethical clearance. Demonstration of parasitic infestations and its association was based on personal knowledge on previously published articles on the disease.

Results: Among 153 cases examined, 15 cases demonstrated features of Cysticercosis infestation, 5 of which showed classical larval stages of proglottids on cytology smears. 4 cases demonstrated cellulose acetate material and 2 cases with cystic fragments in reactive lymphoid background which was confirmed on subsequent histopathology. Rest 4 cases shows fragmented parasites. All the cases were started on prompt appropriate treatment and well recovered.

Conclusion: Cysticercosis infestation should be included in priority as one of the differential diagnosis by Pathologists in patients presenting with lymphadenopathy & painless subcutaneous masses especially in endemic tropical regions. The study emphasizes the judicious and early diagnostic utility of cytology in detection of Cysticercosis infestation in initiating prompt treatment.

Keywords: Cysticercosis; FNAC; Histopathology; Subcutaneous Swelling; Lymphadenitis.

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Introduction

Parasitic infestation remains one of the very serious endemic health problem in developing countries like India especially in endemic regions and among low

socioeconomic groups with poor hygienic habits [1]. Majority of the parasitic infestations are symptomatic presenting with classical clinical manifestations. However, in few exceptional instances presentation with superficial palpable nodules and subcutaneous manifestations are

encountered [2,3] often leading to clinical misdiagnosis of mesenchymal soft tissue tumour.

Human Cysticercosis is a common parasitic infestation caused larval stage of Cestode *Taenia Solium* [Cysticercus cellulose] usually affecting brain, muscles, ocular region, heart, liver and occasionally subcutaneous tissue. Hence the condition is rightly termed as 'Biological Marker' of the social and economic development of a community [4]. Humans are the only definitive host [reservoirs] of *T. Solium* harboring larvae of adult taeniasis and pigs acting as an intermediate host with an incubation period ranging from months to several years. Cysticercosis is an acquired disease in humans as a sequelae of incidental ingestion of eggs excreted in feces by human carrier [5]. The incidence is more prevalent in endemic areas like pig husbandry and poor hygienic pork consumption practices [6]. The transmission and life cycle of *T. Solium* is of several stages and few cases with retrograde infections. Interestingly, subcutaneous swelling or lymphadenitis is an uncommon mode of presentation of Cysticercosis infestation in India, which often goes misdiagnosed as tuberculous lymphadenitis or soft tissue tumour including Lipoma clinically [6]. The differential diagnosis of subcutaneous presentation includes wide spectrum of diseases with varied implication on management. However, Cysticercosis with subcutaneous manifestation did not receive much attention in the past decades and only few epidemiological data and published articles are available on paper [7,8].

The diagnosis of Cysticercosis is largely based on excision biopsy of mass in conjunction with radiological imaging like MRI and CT scans showing classical 'ring enhancing lesion'. Serology studies like ELISA, Immunoblast assay and cytology are applied as ancillary diagnostic methods only with varied specificity.

The diagnostic role of Fine needle aspiration cytology in identifying Cysticercus infestation presenting as lymphadenopathy and subcutaneous masses was first emphasized by Kung et al., in 1989 [9]. Fine Needle Aspiration Cytology (FNAC) provides a good platform for assessment of any sub-cutaneous lesions. The spectrum of Cyto-morphological picture of Cysticercus lymphadenitis covers a wide range from viable cysts, larval forms of necrosis and calcified lesions with many differentials. The morphological identification of larvae on cytology smears by many eminent researchers had improved the diagnostic utility of FNAC in superficial nodular manifestation of the disease [10]. In the present prospective study, we report a series of 15 cases of Cysticercus infestation presented as subcutaneous mass/ lymphadenitis manifestation emphasizing the role of FNAC as simple interpretative and definite diagnostic aspect carrying a significant practical value especially in endemic regions and areas with limited diagnostic resources.

Materials and Methodology

Cytology being a simple day-care procedure in our hospital, more than 800 FNAC procedures of all foci are performed annually. The present Cross-sectional research study included, cases presented with subcutaneous swelling and lymphadenitis with various clinical differentials during a period of 3 years 2014-2016 in our tertiary care hospital.

All Palpable nodules are screened at different sites majority being cervical region which were clinically interpreted as tuberculous and reactive lymphadenitis, lymphoma, soft tissue mesenchymal tumour. Swelling from intraoral and thyroid was excluded from the study. All the clinical details were entered in the proforma sheet and the data acquisition and presentation were obtained based on the criteria of the published articles on the disease [1,2]. The aspirations were performed in patients using 22 Gauge needle attached to 5 and 10 cc syringe as per proper protocol in reference to standard textbooks [1]. Aspirates ranging from 0.5 ml to 2 ml in volume and appearance (clear, purulent, necrotic) was noted. The aspirates were smeared on a glass slide fixed in 95% alcohol and stained with cytological stain as per guidelines of Standard operating procedure in reference to standard textbooks [1].

Totally six smears were made, 3 for dry Giemsa stain and 3 for special stains including Zeihl-Neelsen, Papanicolau and Grams stain. In cases with purulent aspirates, under sterile precaution the part of the aspirate was transferred for culture sensitivity study test. Excision biopsy for histopathological evaluation was suggested in conditions where no definite could be arrived on cytology or with poor treatment outcomes. All the observed data are entered and parameters are correlated with previous research studies.

Results and Observations

The present prospective study included patients of varying age group from 20 to 50 years of age with an average being 35 years with male preponderance was observed compared to females with a ratio of 4:1 as tabulated in Table 1.

Site Distribution

Cervical region was the predominant site [10 cases] followed by trunk region including supra-sternal region as given in Table 2.

Nature of Aspirate

The nature of aspirate was clear fluid on 12 cases with grey white chalky appearance indicating parasitic infection and 3 showed frank purulent aspirate indicating underlying infective etiology.

Clinico-Pathological Profile

Clinical presentation varied with pathological findings with equal proportions. All the patients presented with painless, slow growing swelling with firm, mobile consistency especially Head & neck region, extremities, back (Figure 1 & 2) and were interpreted to be either one the diagnosis as tabulated in Table-3.

Cyto-Morphology

In 5 cases with clear aspirate, actual parasitic structures were demonstrated on the smears (4 suckers & hooklets)(Figure 3) with subsequent biopsy confirmation

in 3 cases. Two cases with clear aspirate showed cellulose acetate with fibrillary background. No actual parasites could be seen but the subsequent biopsy showed the parasites. In rest of the cases with purulent aspirates, only mixed inflammatory infiltrates comprising polymorphs, eosinophils, histiocytes are noted in varying proportions with cellulose acetate material (Figure 4). ZN stains were negative in all cases. Aspirates from lymphadenitis showed reactive lymphoid background which was confirmed on subsequent histopathology (Figure 5). Gram stain from purulent aspirates showed gram positive organisms in 10 cases indicating super-added infections.

Table 1: Age & gender distribution of cases

Age (years)	Gender	
	Male	Female
0-20	4	1
21-40	5	2
41-60	2	-
>60	1	-

Table 2: Site Distribution of cases

Site	Number of Cases
Head & Neck/ cervical	9
Extremities[upper limb] Truncal region[Suprascapular&suprasternal]	4
Abdominal region	1
Thigh	1

Table 3: Correlation of Clinico- Pathological profile with Nature of aspirate

Clinical profile	Nature of aspirate & volume	Pathological Findings [Cysticercosis infection]	Inflammatory cell component
Tuberculous Lymphadenitis (n=20)	Clear granular material- <0.5ml	Fragmented larval forms in suppurative background (n=2)	Polymorphs, lymphocytes, plasma cells, histiocytes
Soft tissue tumour [Mesenchymal] (n=10)	Blood stained clear material- <0.5 ml	Hooklets& proglottids -larval forms. (n=5)	Lymphocytes , macrophages, eosinophils
Suppurative lymphadenitis /abscess (n=15)	Purulent material - <1ml	Cellulose & fibrillary background (n=3)	Polymorphs, histiocytes, eosinophils
Reactive lymphadenitis (n=30)	Clear fluid -< 1.5ml	Cellulose acetate material (n=5)	Lymphocytes



Fig. 1: Cervical lymph node swelling with suppuration mimicking tuberculous lymphadenitis



Fig. 2: Sub-cutaneous swelling in extremities mimicking mesenchymal soft tissue tumour



Fig. 3: Cytomorphology showing classical Cysticercus forms with proglottids and hooklets. Inset: shows lymphoid population of background. Pap-40X

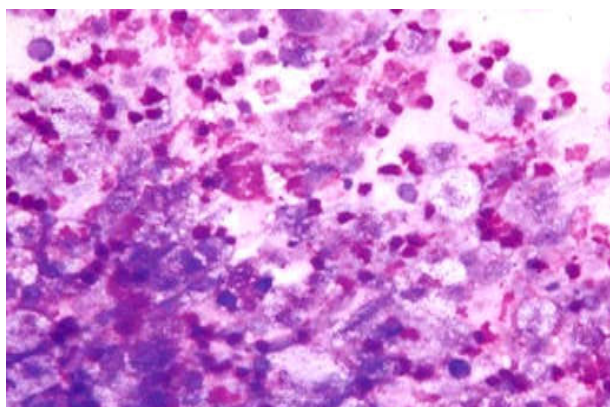


Fig. 4: Cytomorphology from purulent aspirate showing mixed inflammatory infiltration and bluish fibrillary appearance cellulose material. H&E-40X

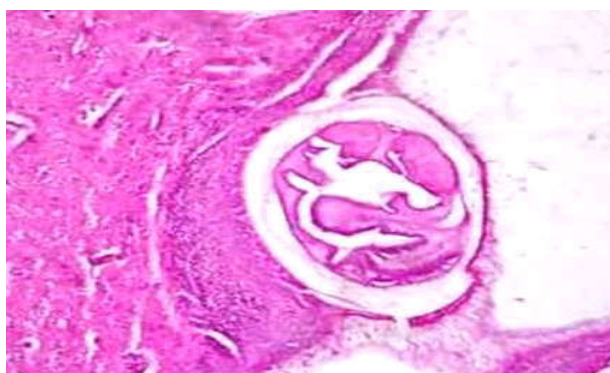


Fig. 5: Lymphnode biopsy showing cysticercus larvae with capsulation. H&E-40X

Discussion

Human Cysticercosis is an endemic disease in Tropical often termed as “Tods-Ready Disease” [2]. According to historical Literature and World Health Organization data, Cysticercosis in humans is an age old ancient disease well known from the Egyptian buried mummies by Paleo-Parasitologist [3]. Majority of the cases reported are due to consumption of uncooked food and unhygienic customs, poor socio-economic causes [2,3].

The term “Neurocysticercosis” being an usual entity, Lymphadenopathy and subcutaneous presentation of cysticercosis is relatively a less common prevalence in this entity without much Research works especially in the diagnosis modality [3]. However recent data from tropical areas reveal the fact that the incidence of cysticercosis is more commoner than previously assumed with high case reports of lymph node and sub-cutaneous nodular presentations [4,5].

With humans being the only definite hosts of *Taenia Solium* diagnostic modalities employed to detect cysticercosis includes radiology, serology and histopathological evaluation with excision biopsy being gold standard method [6]. Cysticercus nodules are challenging to distinguish from mesenchymal tumors and infectious lymphadenitis often warranting excision biopsy as observed in our present study [7]. FNAC is a simple minimally invasive procedure with varied sensitivity and specificity established in late 1990’s often obviating the need for excision biopsy. While Cytomorphology of Cysticercosis warrants demonstration of actual parasites which is rare to pick up on smears, presence of hooklets and fragments holds good for reporting Cysticercus even in absence of viable forms as proved in the present study with concordance to previous Researchers.

In the present study majority of case are reported with male preponderance in cervical region correlating with prior studies [7,8]. Four cases with purulent aspirate showed bluish fibrillary, granular background demonstrating cellulose acetate with eosinophils, plasma cells, lymphocytes histiocytes and subsequent excision biopsy also showed parasitic fragments. The inflammatory reaction is attributed to immune response due to super added infection. This alerts the Pathologists that granular dirty background with metachromasia on dry smears should raise the suspicion of parasites especially cysticercosis as observed in present previous studies as well [9,10].

It is proved from the present study that aspiration of clear fluid should be viewed with high index of suspicion for parasitic infestation even in the absence of straightforward parasitic fragment. Hence the clear fluid must be correlated and processed without discarding as non-specific. From the present study it is evident that presence viable forms doesn’t elicit any inflammatory reaction unless it is secondarily infected

Conclusion

Cysticercus infestation presenting as sub-cutaneous swelling and lymphadenitis manifestation is more common than usually assumed. In instances with clear fluid aspirates cysticercosis infection should be tabled as

priority differentials. FNAC is simple minimally invasive procedure and has high sensitivity and specificity in picking up subcutaneous cysticercosis often obviating the need for invasive surgical procedures.

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