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Original Research Article

Cytomorphological Study of Cysticercosis Causing Palpable Nodules: A Report of 29 Cases

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Abstract:

Cysticercosis is a serious health problem in developing countries like India. Fine needle aspiration cytology (FNAC) is a safe and rapid out-patient procedure for the diagnosis of cysticercosis.

Aim: To study the cytomorphological features of cysticercosis on fine needle aspirates.

Material and Methods: Retrospective data of 29 cases with palpable nodules during the time period from January 2015 to December 2022, which were already diagnosed as having or suspicious of cysticercosis on cytology, were collected and analyzed.

Results: In 15 cases, larval fragments were demonstrated in the aspirates. In the rest 14 cases, mixed inflammatory cells with or without granuloma were seen. Diagnosis was confirmed on follow-up histopathological examination in 8 cases.

Conclusion: FNAC in hands of a trained cytopathologist helps in prompt diagnosis and early medical management preventing fatal neurological complications.

Keywords: FNAC, Cysticercosis, Palpable nodule.

Introduction

Cysticercus is derived from Greek word 'kytis', meaning 'cysts' and 'kertos' another Greek word , meaning 'tail' because of its morphology.[1] Cysticercosis is an infection caused by larval stage of Taeniasolium. It is a serious health problem in developing countries, being endemic in Asia, Latin America and sub-Saharan Africa. [2] The most common area affected is CNS, followed by eyes, skeletal muscles and subcutaneous tissues. [3] Extracranial cysticercosis is more common in Asia and Africa than in other continents. [2] The diagnosis of cysticercosis can be made by radio imaging, serology and pathological examination. [3] FNAC has become a satisfactory diagnostic tool for cysticercosis. [3]

This study emphasizes role of FNAC in diagnosis of subcutaneous and muscular cysticercosis.

Material and Method

This study included retrospective data collected in Pathology department of Integral University, Lucknow from January 2015 to December 2022 in which 29 cases presenting with palpable nodule at different sites diagnosed as cysticercosis on FNAC were retrieved. FNAC was performed with a 23 gauge needle and a 10 ml disposable syringe. Smears were prepared from the aspirated material most of which were fixed immediately in 95% methanol and stained with Haematoxylin and Eosin stain. Air dried smears were stained with Giemsa stain and Ziehl- Neelson stain wherever required. Subsequent histopathology slides of excision biopsy were also evaluated.

Results

This study comprised of twenty-nine patients in the age group of 5 to 65 years. Peak incidence was noted in the second decade (27.59 %)[Table 1]. There was

no sex predominance in this study wherein fifteen patients in the study were males and 14 were females. Twenty one out of twenty-nine patients studied were strict vegetarians. The most common affected site for the lesions was head and neck involving lymph nodes, tongue (31.03 %), followed by abdomen (20.69 %) and upper extremity (17.24 %)[Table 2].

Majority of patients presented with single, painless and slow growing nodule. The size of nodule varied from 0.5 to 4 cm in the maximum dimension. They were soft to firm in consistency. The provisional diagnoses were tuberculous lymphadenitis, lipoma, neurofibroma and secondaries.

Table 1: Age of 29 patients with palpable swellings

Age (year)	Number of cases	%
0-10	2	6.90
11-20	8	27.59
21-30	7	24.14
31-40	4	13.79
41-50	4	13.79
51-60	3	10.34
61-70	1	3.45

Table 2: Site distribution of the lesions

Site	Number of cases	%
Head & Neck	9	31.03
Abdomen	6	20.69
Upper Extremity	5	17.24
Chest wall	3	10.34
Back	2	6.90
Lower extremity	2	6.90
Axilla	1	3.45
Multiple swelling	1	3.45

Aspiration yielded clear fluid in 22 cases (75.86 %), pus like material in 5 cases (17.24 %) and blood mixed material in 2 cases (6.90 %) [Table 3].No complications were encountered after the procedure.

The cytological features on FNAC have been shown in Table 4. In 15 cases (51.72 %), fragments of cysticercus bladder wall composed of fibrillar sheath with small blue pyknotic nuclei were observed on FNAC (Figure 1).None of them exhibited presence of hooklet or scolices. The definitive cytological diagnosis of cysticercosis was made in all these cases. 23 cases (79.31 %) showed presence of mixed inflammatory infiltrate in varying proportion comprising of eosinophils, neutrophils, lymphocytes, histiocytes and plasma cells. Epithelioid cell granuloma was seen in 4 cases (13.79 %) and multinucleated giant cell in 3 cases (10.34 %).These cases were reported as suspicious of parasitic infection. Diagnosis was confirmed on follow-up histopathological examination in 8 cases (Figure 2).

Table 3: Nature of Aspirate on FNAC

Aspirate	Number of cases	%
Clear fluid	22	75.86
Pus like material	5	17.24
Blood mixed mareial	2	6.90

Table 4: Cytological features of 29 patients

Cytological feature	Number of cases
Bladder wall of cysticercus	15
Mixed inflammatory cell	23
Epithelioid cell granuloma	4
Multinucleated giant cell	3

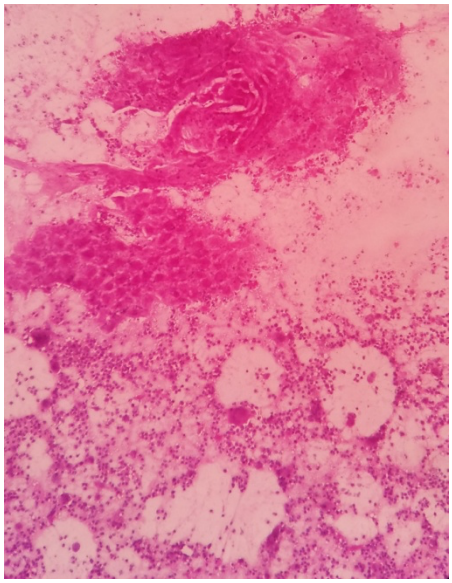

Figure 1: Cytological smear showing Cysticercuscellulosae with few multinucleated giant cells (H and E, x400)

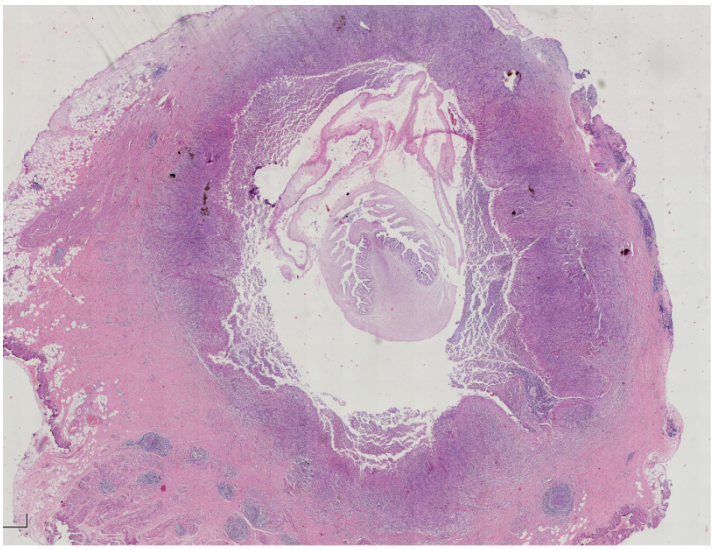

Figure 2: Tissue section showing cyst cavity containing larvae of Cysticercus (H&E ,x40)

Discussion

Though cysticercosis has been labelled as a biological marker of socioeconomic development, it remains a neglected parasitic disease.[4] WHO included it to the list of major neglected tropical disease in 2010.[5]In India the prevalence of taeniasis ranges between 2% and 38%.[6] The major contributing factors are poor hygiene, consumption of pork and raw vegetables and pig rearing. FNAC has emerged as a quick, cheap and minimally invasive tool for diagnosis of cysticercus in palpable nodules.[3,7] Its sensitivityranges from 46.4% to 94.2%.[3,8]The cytomorphological features like bladder wall fragments, tegument, hooklets, scolices and calcareous corpuscles helps in definitive diagnosis.[3]

In our study, most of cases were in age group of 11-20 years and without any sexual prediliction. Similar findings were reported by Srivastava et al.[9] Majority of patients were vegetarian. In India more than 95% cases of neurocysticercosis are vegetarian and less than 1to 2% are nonvegetarians.[10] They may be affected by consumption of contaminated water, fruits and uncooked vegetables.

Most of the cases presented with slow growing painless nodule. The differential diagnosis in cases of cervical region was of tubercular and reactive lymphadenitis while in case of trunk and extremities was of infectious swelling and benign soft tissue tumours like lipoma and neurofibroma.

In 22 cases, clear fluid was aspirated from the swellings. Aspiration of clear watery fluid from a subcutaneous or intramuscular swelling is highly suggestive of parasitic infection.[3] These aspirates on cytology may show bladder wall fragment on a clear acellular background. Viable cysts may not

cause any inflammatory response as it produce substances like taeniastatin and paramyosin which interfere with the cellular immune response.[11] Pus like material was yielded in 5 cases. ZN stain was performed in these smears and was found negative. Microscopically, these aspirates may contain fragments of bladder wall, calcareous corpuscles, hooklets, granuloma and mixed inflammatory cells chiefly eosinophils.[12] No calcareous corpuscle or hooklet was seen in any of our cases. Calcareous corpuscles and single detached hooklets may be the only findings in calcified cyst.[13] Out of 29 cases, in 15 cases (51.72%) fragments of parasite was identified and a definitive diagnosis of cysticercus was made. Rest 17 cases were reported as suggestive of parasitic cyst on the basis of presence of clear fluid aspirate, eosinophils, histiocytes, giant cells and dirty background. In 2 cases, the swelling subsided after FNAC. In another study by Pal et al 6 out of 16 cases showed resolution of nodule after procedure indicating possibility of therapeutic role.[7]

Other diagnostic tools like radiological imaging and serological tests may also be used. The sensitivity of serological methods ranges from 94% in cases with multiple cysts to 28% in cases with single or calcified cysts.[14] In endemic countries, false positive result may be due to past exposure of parasitic antigen or infection with other helminths limiting the role of serology.[15]CT and MRI are expensive modalities and more useful in neurocysticercosis.[16] Hence the identification of parasitic structure on FNAC or histopathology in superficial palpable nodules remains best diagnostic approach.

Conclusion

Cysticercosis is a neglected parasitic disease in tropical countries like India associated with significant morbidity and mortality. FNAC can be helpful in prompt diagnosis and early medical management preventing fatal neurological complications. Our study underscores the need to maintain suspicion of cysticercosis in palpable subcutaneous and soft tissue nodules in endemic areas.

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