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Case report Cytological diagnosis of cysticercosis: Role of FNAC with On-Site evaluation

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ABSTRACT

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Introduction

Fine needle aspiration cytology (FNAC) is a well-recognized diagnostic procedure for the evaluation of inflammatory nodules, including those caused by parasites. The diagnostic role of FNAC in cysticercosis was first emphasized by Kung et al. in 1989 [1]. Since then spectrum of cytological details of cysticercosis covering the entire range, from viable cysts through necrotic and calcified lesions has been described [2]. The possibility of cysticercosis should be kept in during assessment of all inflammatory and cystic swellings. We report a case of cysticercosis diagnosed by ROSE using toluidine blue emphasizing certain simple interpretive aspects with the role of ROSE and its practical value, especially for cyto-pathologist with limited exposure.

Case presentation

A 19-year-old hindu vegetarian male presented with complaints of swelling over lateral right chest wall for 4–5 months. He had history of on and off rise in size of swelling with itching (Fig. 1a). His socio-economic status was poor. Sonography chest wall (Fig. 1b) showed a space occupying lesion of 1.3 cm, with central nidus in right hypochondrium, suggestive of cysticercosis

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or an old hematoma. His complete blood count was within normal limits and he was then sent for FNAC

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Cysticercosis is a zoonotic disease, caused by the larval form of pork tapeworm Taenia solium. This disease

is a public health problem in a country such as India, but its incidence is likely underestimated. With the

advent of fine needle aspiration cytology (FNAC) with rapid on-site evaluation (ROSE), early detection of

this disease is possible, especially when the lesion is in anatomically approachable superficial locations. We report a case of cysticercosis confirmed by FNAC in the Department of Pathology where ROSE using

toluidine blue was done as a part of routine cytology procedure. FNAC diagnosis of cysticercosis can be

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easily made provided the reporting cytologist is aware of the morphological criteria.

On clinical examination he had a small cystic lesion measuring 1.5×1 cm, in right hypochondrium along the 7th rib border, well defined soft with restricted mobility. Aspirate revealed granular whitish fluidy material of 1mL. Smears were screened onsite using Toluidine blue followed by routine PAP and Giemsa stains. Cytology revealed pauci-cellularity showing polymorphs, histiocytes, occasional lymphoid cells and few histiocytes with ingested debris. Also seen were portion of cysticercus bladder wall with many small 'non-human parasite nuclei" and surrounding inflammation (Fig. 1c,d & Fig. 2a,b,c,d). It was thus reported as cysticercosis. Post FNAC the patient had erythematous reaction at local site.

Discussion

Human cysticercosis is the larval infestation of the cestode *T. solium*. Cysticercus can be found in any organ, but is especially common in skeletal muscle, subcutaneous tissue, eyes and the central nervous system. Fully developed cysticerci are opalescent, milky white cysts, elongated to oval and about 1 cm in diameter. The cyst contains fluid and a single invaginated scolex. The scolex has a rostellum, four suckers and 22–32 small hooklets. The cyst wall is multilayered, 100–200 mm thick and covered by microvilli. The outer, cuticular layer appears smooth and hyalinized and is frequently raised in projections [3]. Beneath the tegument is a row of tegumental cells. The inner layer or parenchyma is loose and reticular, containing mesenchymal cells and calcerous corpuscles [4]. The calcareous corpuscles are a unique feature of cestode tissue.

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Fig. 1. a,b: Swelling in right hypo-chrondrium, Ultrasonography showed a space occupying lesion of 1.3 cm diameter in right hypo-chrondium. c,d: Cytology revealed a fragment of parasite intestine (red arrow) and degenerated remnants of parasite with inflammatory background, few small pyknotic looking nuclei (yellow arrow) and giant cells (Toluidine blue, ×10 & ×400).



Fig. 2. a,b,c,d: Cytology revealed a fragment of parasite intestine (red arrow) and degenerated remnants of parasite with inflammatory background, few small pyknotic looking nuclei (yellow arrow) and giant cells (Tol. Blue, ×10; PAP, ×20 & ×40).

These spherical, noncellular masses occur in the parenchyma and are especially prominent in larval cestodes. The corpuscles take on a bluish-purple color in hematoxylin and eosin (H and E) [5].

The cysticercus secretes certain substances locally (e.g., paramyosin, taeniastatin), which alter the host immune response. Both cellular as well as humoral immunity are affected [6,7]. In older lesions, the host immune response can eventually lead to death of the parasite, granulomatous inflammation and calcification.

The prevalence of cysticercosis in India ranges somewhere between 7–26%. The clinical manifestations depend on location

and number of lesions at a site [7]. The most frequent sites affected are skeletal muscles, subcutaneous tissue, brain, ocular tissue, heart, liver, lungs, and peritoneum [8]. Majority of cases do not lead to clinical ill-health, except occasional abdominal discomfort, anorexia and chronic indigestion. The most serious risk of *T. solium* infection is neurocysticercosis, with symptoms related to space occupying lesions especially in the brain [9].

FNAC in cysticercosis is a low-cost outpatient procedure. It is one of the tools for preoperative diagnosis and may even obviate the need for open biopsy. Aspiration of granular fluid is a strong indicator of a parasitic infection in a palpable subcutaneous or intramuscular nodule [4].

The cytological diagnosis is quite straight forward in cases where an actual parasite structure is identified in the smears. Initially, the inflammation is comprised of macrophages and lymphocytes followed by the appearance of palisaded histiocytes, eosinophils and plasma cells. Subsequently, neutrophils surround and invade the parasite and lead to its degeneration However, in other cases, the presence of histiocytes which may be in palisaded clusters, a dirty, granular background etc., are features which should alert the pathologist to this possibility. Epithelioid cell granulomas can also be present in the later stages. Foreign body giant cells are invariably present in surrounding inflammatory zone. Nonetheless, in still some cases of cysticercosis, none of these features may be present, and the inflammatory infiltrate may also be variable. Demonstration of fragment of larval bladder wall, hooklets and calcareous corpuscles confirms the diagnosis of cysticercosis [2,3].

Control measures include: proper cleaning and cooking of vegetables, meat inspection, health education, adequate sewage treatment and disposal. Drug of choice is albendazole 10–15 mg/kg/day given twice daily with a fatty meal. Seven to 14 days may be sufficient for some patients, but a longer course (upto 28 days) is advisable at present. It can be repeated as necessary. It can be combined with corticosteroids for control of inflammation [10].

Conclusion

FNAC with ROSE helps in early diagnosis of cysticercosis along with helping in taking additional material for serological studies if required. We should note that cysticercosis is more common in our part of the world than usually thought. The cyto-pathologist need to have in mind that all cystic/inflammatory lesions, can have the possibility of the condition.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Ethics approval and consent to participate

Not applicable.

Availability of data and materials

All the data regarding the findings are available within the manuscript.

Competing interests

Nil.

Funding

Nil.

Authors' contributions

TS carried out concepts & design, literature search, participated in clinical study. KK carried out data acquisition, data analysis & manuscript preparation will stand as guarantor also. MA carried out concepts & design, literature search. All the authors have read & approved the final manuscript.

Presentation at a meeting

Nil.

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