

Cysticerci in Palpable Nodules Diagnosed on Fine Needle Aspiration Cytology

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ABSTRACT

Introduction: Cysticercosis is the larval manifestation of the cestode *T. solium*. It commonly presents as subcutaneous and intramuscular nodules which is often clinically misinterpreted as benign mesenchymal lesions and lymph nodes. Cysticerci in subcutaneous nodules can be diagnosed rapidly and with considerable accuracy by FNAC. This study highlights the cytomorphological features of subcutaneous cysticercosis diagnosed by FNAC.

Methods: Forty three patients with palpable nodules diagnosed as cysticercosis or suspected as cysticercosis by FNAC between August 2005 to July 2008 were included in the study. Excision biopsy was done in 12 cases where definitive evidence of parasite was not found

Results: Solitary nodules were present in 36 (83%) patients and multiple nodules were present in seven (17%). In 31 cases (72.09%) definite evidence of cysticercus was found. In 12 cases (27.9%) a suggestion of parasitic inflammation was made based on other cytomorphological features which was confirmed by biopsy in eight cases.

Conclusions: Human cysticercosis commonly presents as subcutaneous nodules which can be diagnosed with considerable accuracy by FNAC. Definite evidence and suggestion of parasitic inflammation on cytology obviates the need for subsequent histopathological examination.

Key Words: *cysticercosis, cytomorphology, FNAC, subcutaneous nodules*

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INTRODUCTION

Cysticercosis is a parasitic disease caused by the larva of *T. solium*. Human cysticercosis commonly presents as subcutaneous and intramuscular nodules which is misdiagnosed clinically as lymph nodes, neurofibroma, lipoma or other mesenchymal tumors. It can also be found in other organs like brain, eye, liver and lungs. Cysticercosis can be diagnosed by different methods. The gold standard for diagnosis is biopsy and histopathological examination. The fine needle aspiration cytology (FNAC) is also a well-accepted procedure for quick diagnosis of inflammatory nodules due to parasites. Different parasites causing disease such as filariasis, cysticercosis and hydatid disease have been detected by this technique.¹⁻⁴ This study highlights the cytomorphological features of subcutaneous cysticercosis diagnosed by FNAC.

METHODS

Forty three patients with palpable swellings diagnosed as cysticercosis or suspected as cysticercosis by FNAC between August 2005 to July 2008 were included in the study. FNA was performed using a 22-g needle and 10ml disposable syringe. Two smears were fixed in ethanol followed by Papanicolaou stain. Two smears were air-dried and stained by May- Grunwald-Giemsa stain. Excision biopsy was done in 12 cases where definite evidence of parasite was not found but the cytomorphological features were suggestive of cysticercosis on FNAC (discussed later). The sections were stained by Hematoxylin and Eosin and the findings correlated with cytology.

RESULTS

FNAC was done in 43 patients with solitary or multiple nodules. Solitary nodules were present in 36 patients (83%) and seven had multiple nodules (17%). The nodules ranged in size from 0.5-2cm and were painless. Age ranged from three years to 41 years. Majority of the patients were in the second and third decades of life. There was no sex predilection with a male to female ratio of 1:1. The most common site was upper arm followed by cervical region (Table 1).

Table 1. Site wise distribution of subcutaneous nodules.

Site	Number
Arm	21
Cervical region	9
Tongue	4
Abdominal wall	4
Breast	3
Cheek	2

Clear fluid without particles was aspirated in 23 cases (53%). Clear fluid with small greyish-white particles were seen in 11 cases (25%). Purulent material was aspirated in nine cases (22%). In 31 cases (72.09%) definite evidence of cysticercus infection was found in the form of fragments of parasite bladder wall, hooklets or intact larva. In 12 cases (27.90%) parasite fragment was not found but a diagnosis of parasitic inflammation was suggested and excision biopsy was advised. Eight out of these 12 cases biopsied showed parasite on histopathological examination (HPE). The remaining four cases failed to reveal parasite but serological test was positive. Most of the aspirations were uneventful. Five patients complained of pain and increase in size of swelling following aspiration.

The smears showed a mixed inflammatory cell infiltrate composed of eosinophils, plasma cells, lymphocytes, neutrophils and histiocytes in varying proportions. In the cases which yielded clear fluid, with or without particles, the background was more or less clear with a few inflammatory cells comprising predominantly of eosinophils and plasma cells. Aspirates which yielded purulent material showed on cytology numerous neutrophils, eosinophils, plasma cells, lymphocytes, histiocytes and foreign body giant cells. Epithelioid cell granulomas were seen in seven cases.

Larval fragments of cysticercus were seen in majority of the patients, 31 cases (72.09%). The larva comprised of a parenchymal layer of loose fibrillary stroma with numerous round to oval nuclei (Figure 1). Three cases showed hooklets of cysticercus having a characteristic sickle shape with a refractile curved portion with one end pointed and the other end bifurcated (Figure 2). In one case an entire fragment of the larva comprising of scolex with attached hooklets along with bladder wall was aspirated (Figure 3). Blue calcareous spherules along with parenchymal layer was seen in three cases. A definitive diagnosis of cysticercosis was made in all these cases. In 12 cases (27.90%) definitive evidence (parasite fragments) could not be identified, but a suggestion of parasitic lesion was made based on clinical, radiological and cytomorphological features which included clear fluid (4 cases) and inflammatory infiltrate comprising predominantly of eosinophils, histiocytes and giant cells (8 cases). Excision biopsy and HPE was done in the suspected cases, eight of which showed cysticercus. The excised cyst showed flat ribbon like worm with surrounding inflammation (Figure 4). The remaining four cases showed a cyst lined by palisaded histiocytes and inflammatory infiltrate rich in eosinophils. Parasite could not be identified. Serological test was positive in these cases.

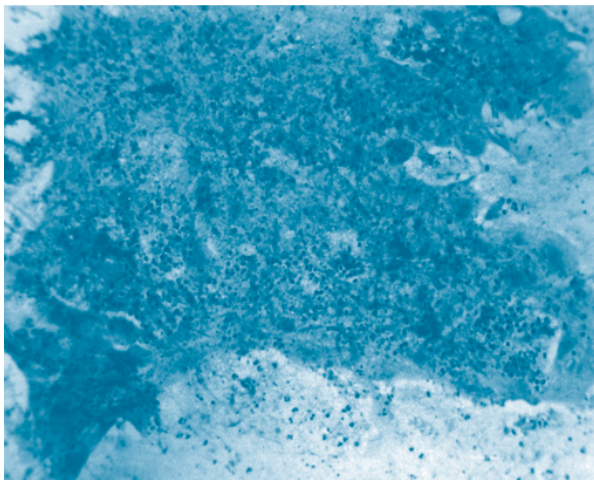


Figure 1. Parenchymal layer of loose fibrillary stroma with numerous oval nuclei (PAP x100)

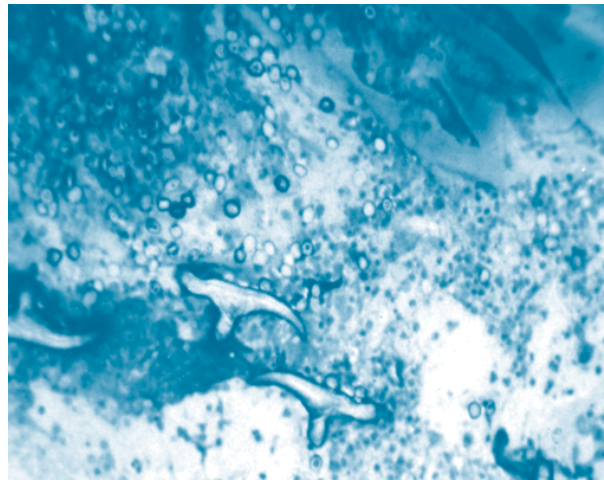


Figure 2. Sickle shaped hooklets of cysticercus (MGGx400)

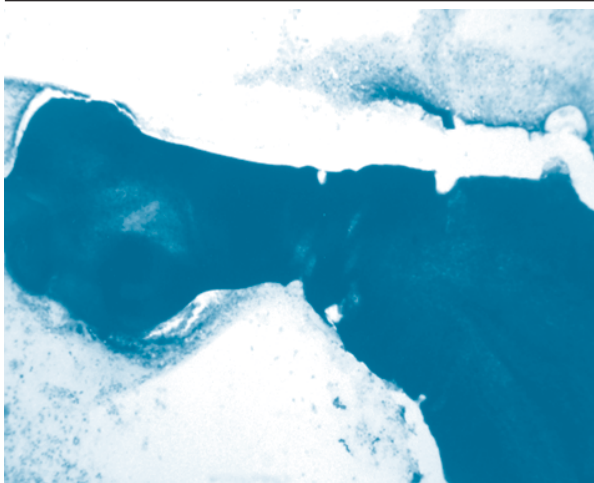


Figure 3. Intact larva showing sucker with attached bladder wall (MGGx100)



Figure 4. Cysticercus larva enclosed in cyst wall (H&Ex100)

DISCUSSION

Cysticercosis is a common health problem in developing countries like Nepal. It is the larval infestation of the cestode *T. solium*, with man occasionally serving as the larval host. It is acquired in humans by drinking contaminated water or by eating uncooked vegetables infected with eggs. Besides this, a man harbouring the adult worm may auto infect himself either due to unhygienic personal habits or by reversal of peristaltic movement.⁵ The high incidence of cysticercosis in Nepal is due to improper sanitation conditions and low literacy rate. Humans are the only definitive hosts of *T. solium*, although cats, dogs and sheep may harbor the larval forms. The common sites for cysticercosis are subcutaneous tissue, skeletal muscle, central nervous system although it can occur in many other organs. When it occurs in the subcutaneous tissue and skeletal

muscle it is misinterpreted clinically as mesenchymal tumours and lymphadenopathy.

A mature cyst is an opalescent ellipsoidal body and measures 8 to 10mm in width by 5mm in length. There is a dense milk- white spot at the side where the scolex with its hooks and suckers remain invaginated. The diagnosis of cysticercosis can be made by different diagnostic modalities which include radiology, pathological examination and serology. Imaging techniques are sensitive but these are expensive.⁶ Serological tests may be useful but are less specific. False positive serology can result from past infection with *T. solium* or cross reactivity with other helminthes.⁷⁻⁹ Negative test results do not rule out the disease.

FNAC is a useful modality in diagnosing subcutaneous and intramuscular cysticercosis. Aspiration of clear fluid with or without particles is highly suggestive. A definitive diagnosis can be made by identifying the larval cuticle, parenchyma and hooklets. Even if the parasite fragments cannot be identified, a high degree of suspicion is aroused if the inflammatory infiltrate comprises predominantly of eosinophils accompanied by plasma cells, histiocytes, giant cells and neutrophils.¹⁰ In these cases a repeat aspiration can be tried under ultrasound guidance which helps in localizing the milk-white spot. In our study definite evidence of parasite was identified in 31 cases. Suspicion of parasitic infection was made in 12 cases. A biopsy was done in these cases, 8 of which showed parasite pointing to the fact that the parasite fragments can be missed on aspiration. Not being able to demonstrate parasite on biopsy could be explained by cyst rupture and loss of parasite fragments on surgery or grossing in the pathology laboratory.

FNAC is a safe procedure. Five patients developed pain and increase in size of the swelling after aspiration probably due to secondary infection which subsided with antibiotics and analgesics.

CONCLUSIONS

Human cysticercosis commonly presents as subcutaneous and intramuscular nodules which can be diagnosed with considerable accuracy on FNAC. It eliminates the need for biopsy which is considered the only definitive diagnostic tool. Apart from clinical diagnosis it also alerts the clinicians to search for parasites in other vital organs where it can prove more fatal.

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