

Diagnosis of subcutaneous cysticercosis in fine needle aspirates: a study of 10 cases

RC Adhikari,¹ G Aryal,² A Jha,³ AD Pant⁴ and G Sayami⁵

^{1,3,4,5}Department of Pathology, Tribhuvan University Teaching Hospital, Kathmandu, Nepal.

²Department of Pathology, Nepal Medical College, Kathmandu, Nepal

Corresponding author: Dr. Gopi Aryal, MD, PhD. Department of Pathology, Nepal Medical College, Jorpati-7 P.O.Box: 13344, Kathmandu, Nepal. e-mail: gopiaryal@hotmail.com

ABSTRACT

The objective of this study is to document the value of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of subcutaneous cysticercosis. Aspirates smears of 10 cases of subcutaneous swellings were studied over a period of 1 year between January 2004 and January 2005. The subcutaneous swellings were presented at different sites like cheek, neck, forearm, arm, chest wall and abdominal wall. In none of these cases was cysticercosis considered as diagnostic possibility. The characteristic cytomorphological features of parasitic tegument, parenchymatous portion, presence of epithelioid cells, giant cells and inflammatory cells in cytological smears help diagnose the cases of subcutaneous cysticercosis. Biopsy confirmation was possible in 5 cases, of which, two cases showed parenchymatous portion of the parasite. FNAC provides safe and rapid tool for diagnosis of subcutaneous cysticercosis. In endemic areas, cysticercosis should be considered one of the differential diagnosis of the subcutaneous swellings.

Keywords: Cysticercosis, FNAC, subcutaneous nodule.

INTRODUCTION

Human cysticercosis is a parasitic infestation caused by larval stage of taenia solium. It is a serious health problem in developing countries like South America, Africa and South Asia.¹ It is endemic in Nepal.² The tissues affected by cysticercosis are subcutaneous layers, brain, muscle, heart, liver, lungs, peritoneum, lymph node and tongue.³⁻⁵ The pre-operative diagnosis of cysticercosis can be made by radio imaging (CT scan and MRI) and serological tests like complement fixation test, hemagglutination, radioimmunoassay, and enzyme-linked immunosorbent assay (ELISA).

Fine needle aspiration cytology (FNAC) is now available as pre-operative tool for the diagnosis of subcutaneous cysticercosis. It can be performed even in oral cavity cysticercosis.⁶ The diagnosis is confirmed by histopathological examination of the excised specimen. As subcutaneous lump is the common presentation of cysticercosis and FNAC provides rapid, safe, cheaper and reliable tool for diagnosis, we describe here cytologic features of cysticercosis.

MATERIALS AND METHODS

Ten cases of subcutaneous swellings presented at different sites at the Department of Pathology, Tribhuvan University Teaching Hospital between January 2004 and January 2005 were studied. Aspirates for cytology were obtained by suction with a 21-gauge needle attached to a 10 ml disposable syringe. Five smears were prepared from each case. Of the five smears, three were submitted for Giemsa stain and two for Papnicolaou stain. We also received the specimen of excisional biopsy from five patients. The specimens were processed in automated histokinette and stained by routine Hematoxylin and Eosin method.

RESULTS

We received a total of 1334 cases of FNAC smears between January 2004 and January 2005, at the department of pathology, Tribhuvan University Teaching Hospital. Diagnosis of cysticercosis was made in 10 (0.7%) cases. Out of 10 cases of cysticercosis, the lesion were located in cheek in 3 (30.0%) cases, neck in 2 (20.0%) cases, forearm in 2 (20.0%) cases, chest wall in 1 (10.0%) case, right arm in 1 (10.0%) case and abdominal wall in 1 (10.0%) case.

The clinical features of these 10 cases are summarized in Table-1. Eight patients in this study were female and 2 were male. The mean age at diagnosis was 26.4 years with a range of 8 to 48 years. All patients presented with painless slow growing nodule. On examination, all the swellings were well-defined, firm, non-tender and nodular. The overlying skin was intact. The size of the swellings ranged from 1 to 4 cm in diameter.

The aspirated material consisted of a few drops of clear fluid and white membranous pieces in 2 cases (case #3 and 4); while in others, blood-mixed material was aspirated. No allergic reaction was noted in 8 cases after the procedure; while in 2 cases (case #1 and 9) the overlying skin showed slight redness.

Pathological findings

The microscopic examination of aspirate smears revealed tegument layer of the bladder wall (Fig. 1) in 9 cases. Fine hair-like processes were also discernible (Fig. 2). Subcuticular cells with small pyknotic nuclei were evident (Fig. 3). In these cases, parenchymatous portion was not found. While in one case (case # 10), parenchymatous portion (Fig. 4) with identifiable spiral canal was identified. None of these cases showed hooklets or scolex. In 3 cases, the cytology smears showed epithelioid cells, multinucleated giant cells (Fig. 5) and mixed inflammatory cell infiltrates (Fig. 6).

Excisional biopsy was done in 5 cases. Three cases showed a cyst wall (Fig. 7), composed of fibrous tissue and lined by epithelioid cells, giant cells, lymphocytes and eosinophils (Fig. 8). Parasitic fragments were not seen. In 2 cases (case # 2 and 9), parenchymatous portion of the parasite was found (Fig. 9). The pathological features are summarized in Table-2.

DISCUSSION

Taenia solium infestation is rampant in many parts of the world, including Russia, China, India, Mexico, Philippines, Pakistan and Nepal.² Humans are the only definitive host and harbour the adult tapeworm. Humans can also act as intermediate hosts by ingestion of food contaminated with *taenia solium* eggs. Airborne transmissions of *taenia solium* eggs and autoinfection by regurgitation of proglottides into the stomach of patients with taeniasis have not yet been demonstrated as routes of infection. Therefore, cysticercosis in humans is almost always caused by cysticercosis cellulose and results due to infection with eggs of *taenia solium*.⁷

The ingested eggs hatch in the stomach and duodenum liberating the larvae, which penetrate the stomach wall and reach the brain, skeletal muscle, subcutis or any other sites via blood and lymphatics. The larvae become fluid-filled cysts known as cysticerci. These cysts are seen 2-4 months after ingestion of eggs.^{8,9} Within 3 weeks, the scolex is visible in the cyst and by 10 weeks, it is a fully infective larva. The parasite causes an inflammatory reaction in the surrounding tissue. Epithelioid cell reaction and foreign body giant cells reactions may also be evoked.^{2,10} In this study, epithelioid and giant cell reactions were found in 3 cases.

Cysticercosis is one of the differential diagnoses of palpable soft tissue nodules in endemic regions. Adding to the tumor and inflammation, cysticercosis may be considered in the differential diagnosis for subcutaneous nodules, even in non-endemic areas.¹¹ However, in this study none of the cases were clinically diagnosed as cysticercosis. Clinical diagnoses in this study were tuberculous lymphadenitis, reactive lymphadenitis, benign tumor, lipoma, and desmoid tumor. Diagnosis of cysticercosis should be kept in mind when examining the solitary well-defined subcutaneous nodules. The most frequently affected age range is 20 to 50 years. Two cases (case #5 and 8) in our study were under 10 years of age.

The fine needle aspiration cytology is one of the tools for pre-operative diagnosis and it may even obviate the need for open biopsy. The cytological features are the presence of parasitic tegument, parenchyma and polymorphous inflammatory reaction.^{6,12} The cytomorphological features, we noticed are presence of tegument layer of the bladder wall, subcuticular cells with pyknotic nucleus, presence of epithelioid cells, giant cells and inflammatory cells. Even parenchyma with spiral canal was detected in one case. Of the five biopsied cases, 3 cases showed a parasitic cystic structure without parasites. Possibly in these cases the FNAC procedure had removed all the parasitic tissue leaving a cyst wall only. Epithelioid cell and giant cell reactions are not common. We found these reactions in 3 cases,

So, cysticercosis is one of the important differential diagnoses of soft tissue nodule and FNAC is rapid, safe, cheaper and reliable diagnostic tool for soft tissue cysticercosis.

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Fig. 1. Photomicrograph of aspiration smear showing tegument layer of the bladder wall of cysticercosis. (Pap stain, x 40).



Fig. 2. Photomicrograph of aspiration smear showing fine hair like processes of tegument layer of the bladder wall of cysticercosis (Giemsa stain, x 200)

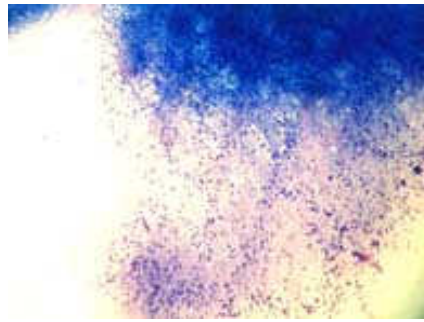


Fig. 3. Photomicrograph of aspiration smear showing subcuticular cells with pyknotic nuclei of cysticercosis (Giemsa stain, x 100).



Fig. 4. Photomicrograph of aspiration smear showing parenchymatous portion of cysticercosis with prominent spiral canals (Pap stain, x 200)

Table-1: Clinical features of 10 cases of cysticercosis

Case #	Age, Yrs/Sex	Site	Size, cm	Clinical diagnosis
1	28/F	Right arm	2.0 x 1.0	Lipoma
2	23/F	Right neck	2.5 x 1.5	Tuberculous lymphadenitis
3	40/F	Right cheek	1.5 x 1.0	Reactive lymphadenitis
4	32/F	Left cheek	1.0 x 0.8	Reactive lymphadenitis
5	8/M	Right cheek	1.0 x 0.7	Reactive lymphadenitis
6	48/F	Left forearm	1.5 x 1.0	Neurofibroma
7	21/F	Left neck	2.5 x 1.0	Tuberculous lymphadenitis
8	9/M	Left chest wall	2.5 x 1.5	Benign tumor
9	20/F	Right forearm	3.0 x 2.0	Benign tumor
10	35/F	Abdominal wall	4.0 x 3.0	Desmoid tumor

Table-2: Summary of pathological features of 10 cases of cysticercosis

Case no.	FNAC	Biopsy
1	Tegument layer of bladder wall, giant cells, epithelioid cells, lymphocytes, eosinophils	Cyst wall, lined by epithelioid cells, giant cells, and inflammatory cells
2	Tegument layer of bladder wall, lymphocytes	Parenchymatous portion of cysticercosis
3	Tegument layer of bladder wall, lymphocytes	Not available
4	Tegument layer of bladder wall, lymphocytes	Not available

5	Tegument layer of bladder wall, lymphocytes	Not available
6	Tegument layer of bladder wall, lymphocytes	Not available
7	Tegument layer of bladder wall, lymphocytes	Not available
8	Tegument layer of bladder wall, giant cells, epithelioid cells, lymphocytes, eosinophils	Cyst wall, lined by epithelioid cells, giant cells, and inflammatory cells
9	Tegument layer of bladder wall, giant cells, epithelioid cells, lymphocytes, eosinophils	Parenchymatous portion of cysticercosis, cyst wall lined by epithelioid cells
10	Parenchymatous portion	Cystic structure lined by epithelioid cells and inflammatory cells

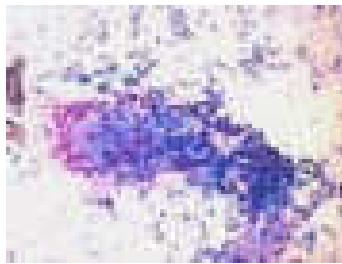


Fig. 5. Photomicrograph of aspiration smear showing multinucleated giant cells and epithelioid cells (Giemsa stain, x 200).



Fig. 6. Photomicrograph of aspiration smear showing inflammatory cells (left) and portion of tegument layer of bladder wall (right) (Giemsa stain, x 100).



Fig. 7. Photomicrograph of tissue section showing fibrous cyst wall devoid of cysticercosis (H and E stain, x 40).



Fig. 8. High power view of figure 7, showing fibrous cyst wall lined by epithelioid cells, giant cells and inflammatory cells (H and E stain, x 200).



Fig. 9. Photomicrograph of tissue section showing cyst with parenchymatous portion of cysticercosis (H and E stain, x 40).