Case Report

Fine-needle aspiration cytology of cysticercosis in submandibular gland

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Abstract

Fine-needle aspiration cytology (FNAC) has emerged as simple, minimally invasive, low-cost, outpatient diagnostic modality for the evaluation of nodules caused by parasites. Cysticercosis is caused by larval stage of *Taenia solium*, pork tapeworm. It is endemic in Southeast Asia, Latin America and South Africa. We report a case of cysticercosis in a 25-year-old male who presented with painless swelling of submandibular gland which was diagnosed on FNAC. The patient was recommended antihelminthic therapy which resulted in complete resolution of the swelling.

Keywords: Cysticercosis, cytology, submandibular gland

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INTRODUCTION

Fine-needle aspiration cytology (FNAC) has emerged as simple, minimally invasive, low-cost, outpatient diagnostic technique for the evaluation of nodules caused by parasites. Kung *et al.* in 1989 were the first to highlight the diagnostic role of FNAC in cysticercosis.[1] Human cysticercosis is the infection caused by Cysticercus cellulosae, larval stage of cestode *Taenia solium*, the pork tapeworm, and commonly manifest as subcutaneous and intramuscular nodules. It is endemic in Latin America, Africa and Southeast Asia.[2] The subcutaneous tissues, brain, muscles, heart, liver and lungs are more frequently affected; however, intraoral and salivary gland involvement is rare. We report a case of cysticercosis of submandibular gland diagnosed by FNAC emphasizing cytomorphological features which aid in diagnosis, thus obviates the need of open biopsy.

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CASE REPORT

A 25-year-old male presented with a swelling of the left submandibular gland for 2 weeks. The swelling was nontender, 1 cm × 1 cm and soft to firm in consistency [Figure 1]. The clinical differential diagnoses proposed were chronic sialadenitis, tuberculosis and salivary gland neoplasm. FNAC was done using 22-gauge needle and 20 mL syringe. Aspiration yielded fluid with granular particles. The smears were air dried as well as wet fixed in 95% ethanol and stained with May–Grunwald–Giemsa and hematoxylin and eosin, respectively. On cytology, fragments were seen as bluish fibrillary material corresponding to the parenchyma of the parasite with interspersed small nuclei [Figures 2-4]. A fair number of lymphocytes, eosinophils, neutrophils palisading histiocytes and degenerated cells in dirty necrotic granular background were noted [Figure 5]. A diagnosis of parasitic infection, cysticercosis of submandibular gland, was made.

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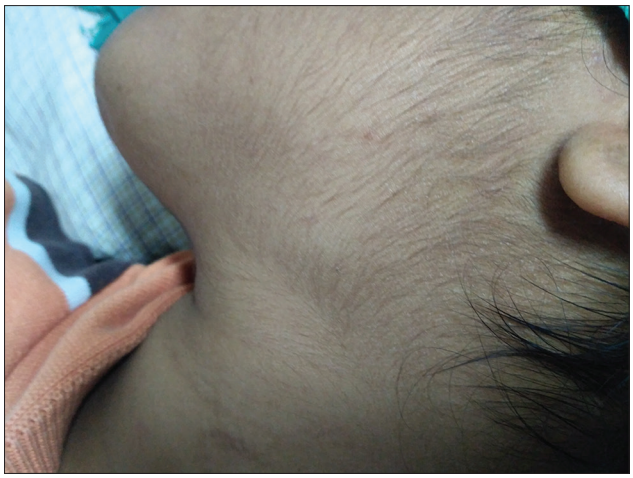

Figure 1: Submandibular swelling measuring 1 cm × 1 cm

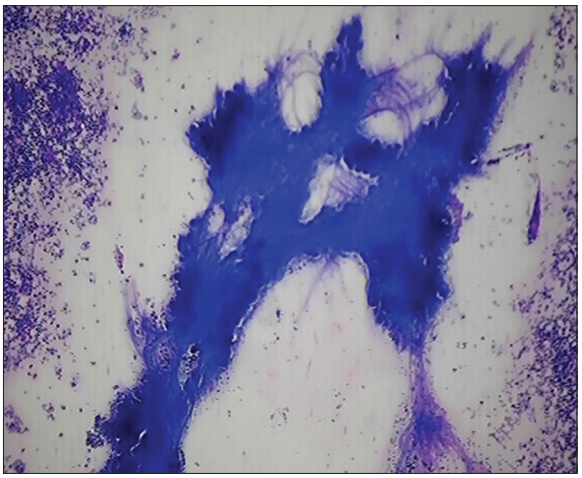

Figure 2: Cytological smears showing bluish bladder wall fragment of cysticercosis cellulosae surrounded with inflammatory infiltrate. MGG, ×10

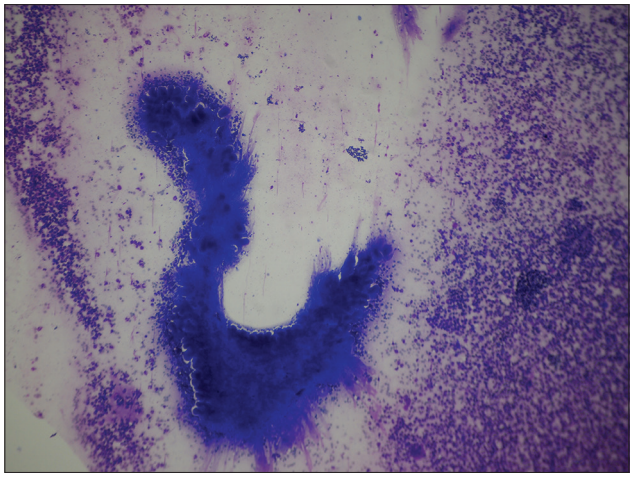

Figure 3: Low powerview show multiple blue bladder wall fragments of cysticercosis cellulosae MGG, ×10

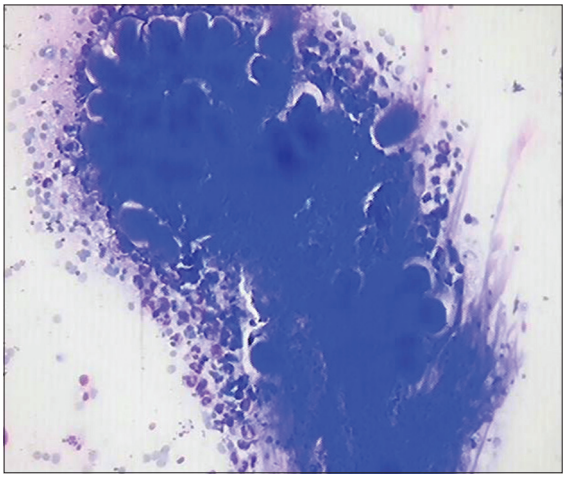

Figure 4: Giemsa-stained cytological smear at high power showing bluish bladder fragment of cysticercosis cellulosae. MGG, ×40

The patient was recommended antihelminthic therapy which resulted in complete resolution of the swelling.

DISCUSSION

Human cysticercosis is an eradicable parasitic tropical disease. It is acquired in humans by drinking contaminated water, by eating undercooked pork or by consuming raw vegetables such as cabbage which were infected by eggs of cestode *T. solium*. A human harboring the adult worm may autoinfect himself/herself either due to unhygienic personal habits or reversal of peristaltic movements.[3] The life cycle of the tapeworm is characterized by different stages of development, which require several species of hosts to appropriately harbor eggs, oncospheres, larvae and adult worms. The larvae develop in oncospheres that penetrate in the human intestinal wall and may disseminate through vascular or lymphatic circulation to develop into cystic larvae (Cysticercus cellulosae). The cycle is ended by development of an adult worm in the intestine of the host.[4,5] Once the individual becomes a host to Cysticercus cellulosae, cysticercosis may develop in various organs of which central nervous system (CNS) involvement leads to serious manifestation. The World Health Organization estimated that more than 50,000 deaths per year were caused by neurocysticercosis worldwide.[6] Various diagnostic modalities employed to detect cysticercosis preoperatively include radio imaging, serology and cytomorphological examination. Computed tomography scan and magnetic resonance imaging, though sensitive in diagnosing cysticercosis, especially when parasite involves CNS, are very expensive. Serological tests such as complement fixation test, hemagglutination, radioimmunoassay and enzyme-linked immunosorbent assay are useful if positive but cannot rule out the disease with negative results, further false positivity is expected with past parasitic infection or cross-reactivity with other helminthes. The FNAC has emerged as a widely accepted method for the diagnosis of cysticercosis.[7]

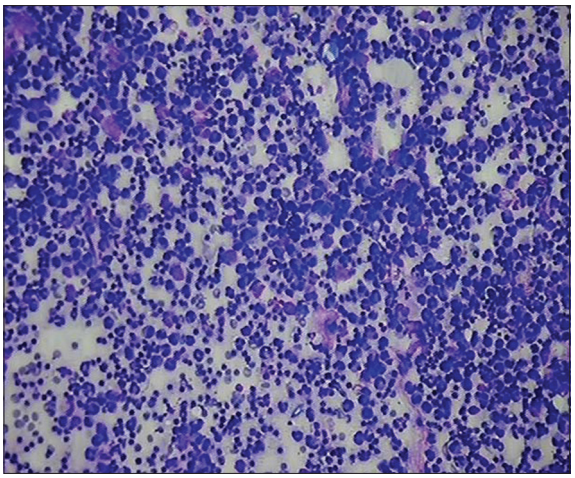

Figure 5: Cytological smears showing inflammatory infiltrate in the background comprising neutrophils, eosinophils, lymphocytes and necrotic debris. MGG, ×40

Saran *et al*.[8] analyzed 120 cases of cysticercosis with 4.2% cases were observed in mouth. The study conducted by Gill *et al*.[2] emphasized the role of FNAC in diagnosing cysticercosis in 22 patients who presented with painless subcutaneous and intramuscular nodules. Delgado-Azañero *et al*.[9] reported 16 cases of oral cysticercosis in their work. Although there is abundant of muscular tissue in the oral and maxillofacial region, still this is not a frequent site of occurrence for cysticercosis. So far, 64 cases have been reported in literature with most frequently involved sites as tongue, followed by the lips and buccal mucosa.[10]

The cytomorphology of cysticercosis varies from viable cysts to degenerated necrotic and calcified lesions. The viable cyst contains fluid and single invaginated scolex. The scolex has rostellum, four suckers and 22–32 small hooklets. On aspirating viable cyst, it yields clear fluid comprising fragments of bladder wall against acellular clear background. No inflammatory response is seen in case of viable cyst. The aspirates of degenerated and necrotic lesions may contain fragments of bladder wall, invaginated portions, including calcareous corpuscles and detached single hooklets, single detached hooklets and calcareous corpuscles may be the only recognizable remnants in calcified cysts.[11] When cysts degenerate, they elicit a inflammatory response comprising eosinophils, neutrophils, lymphocytes and histiocytes along with occasional granuloma formation. In our case, aspiration of fluid along with granular particles showed multiple nuclei in a blue fibrillary background with numerous inflammatory cells and necrotic debris which helped us in arriving at a diagnosis. No hooklets or scolex was seen in the present smears.

Cytomorphological details of different parasites help to differentiate them from each other. Cysticerci and coenuri have suckers and hooklets whereas spargna lacks. The coenures have multiple protoscolices which distinguishes them from cysticerci which have a single scolex. Further, bladder wall is thin and membranous in cysticerci; in contrast, it is thicker and lamellated in a hydatid cyst. Single scolex is observed in aspirate of cysticerci whereas multiple small scolices are obtained in hydatid cyst.[4]

CONCLUSION

Cysticercosis of the submandibular gland is rare. FNAC is a simple outpatient procedure which helps in the early diagnosis of nodules caused by parasites, thus preventing unnecessary surgical excision. Further, early intervention by antihelminthic drugs eliminates the risk of neurocysticercosis. The cytological spectrum varies from the presence of actual parasite in cytological smears in some cases; while in others, the mere presence of eosinophils, histiocytes and granular dirty background alerts a cytopathologist to this possibility.

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Conflicts of interest
There are no conflicts of interest.

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