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Case Report

Masseteric cysticercosis with abscess formation: A diagnostic dilemma

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ARTICLE INFO

Article history:

Received 10 June 2013

Accepted 25 September 2013

Available online 16 December 2013

Keywords:

Cysticercus

Cysticercosis

Masseter

Abscess

performed and the findings correlated with histopathological examination.

Case report

A 12-year-old male patient presented with painful, slow growing swelling in the right cheek over a period of 15 days. The patient was from a poor socio-economic background. On clinical examination, the swelling was tender and reddish. Systemic examination revealed no other significant abnormality.

Ultrasound examination was performed on SIEMENS XD300 machine using a linear transducer (13.5 MHz). A relatively well circumscribed fluid collection containing a well-defined cyst within along with surrounding inflammatory features was noted within the right masseter muscle. A tiny echogenic nodule was seen eccentrically placed within the inner cyst (Fig. 1). The appearance of the inner cyst was characteristic of a cysticercus. However, there was diagnostic dilemma regarding the surrounding fluid collection and associated inflammation of the muscle fibers.

Further imaging by CT scan on a 6-slice Siemens Somatom Emotion scanner revealed a relatively well circumscribed collection within the right masseter muscle showing mild peripheral enhancement on contrast injection, representing an abscess. Within it was a well circumscribed cyst showing no wall enhancement but a tiny hyperdense nodule within, representing the cysticercus. Inflammatory changes were noted in the surrounding fat but the muscle itself appeared normal (Fig. 2).

Introduction

Cysticercosis is a helminthic infection caused by cysticercosis cellulose. Although a common occurrence in third world countries, muscular cysticerci are often difficult to diagnose, masseteric cysticerci being rarely described. Also, the development of an abscess around the cysticercus can lead to confusion in both radiological and pathological diagnosis. The symptoms are often non-specific and imaging plays an important role in making a correct pre-operative diagnosis.

We report a case of masseteric cysticercosis with abscess formation which was diagnosed on high resolution ultrasound, CT and MRI following which surgical excision was

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<http://dx.doi.org/10.1016/j.mjafi.2013.09.008>

Fig. 1 – USG (13.5 MHz linear transducer) and CT (6 slice MDCT) images of a 12-year-old male child with masseteric cysticercosis and abscess formation. A – USG image revealing a hyoechoic abscess (*) with an anechoic cyst (arrow) within showing an echogenic focus representing the scolex. B & C – Post contrast CT axial & sagittal images showing an abscess (*) with mild peripheral enhancement showing a non-enhancing cyst (arrow) within which contains a tiny hyperdense nodule representing the scolex.

Pre-operative interval MR imaging on a Siemens Essenza 1.5T scanner was done to assess change in the size and appearance of the lesion, well depicted the abscess as a T2 hyperintense fluid collection with a hypointense rim and the cysticercus as a T2 hyperintense (hyperintense to abscess fluid too) cyst with a punctate hypointense nodule within, representing the scolex. On T1 weighted images, the abscess fluid was of intermediate intensity and the cysticercus content of low signal intensity.

The patient underwent surgical excision of the collection. 15 ml pus along with a small cystic lesion was acquired from within the abscess and histopathological examination confirmed the cyst to be a cysticercosis (with presence of a scolex) within a surrounding abscess. Microbiological culture of the pus did not grow any significant bacterial colonies.

Discussion

Cysticercosis is a helminthic disease caused by the tapeworm called '*Taenia solium*' and is endemic to many developing countries like Mexico, Central and South America, India, Sub-Saharan Africa and China. The symptoms of the helminthic diseases are usually non-specific, and when the imaging features are not definitive, the diagnosis mainly relies on clinical, epidemiological and pathological features.¹ Serological tests like the 'enzyme linked immunosorbent assay' may have sensitivity and specificity over 90%.²

Man is the definitive host and the pig is an intermediate host in the life cycle of *T. solium*. However, cysticercosis in man occurs when man becomes the intermediate host due to feco-oral transmission when man directly ingests the eggs of the worm in contaminated food. The eggs hatch within the small intestine and release oncospheres which penetrate the mucosal wall of the bowel and reaches various tissues via blood stream. Within the muscles and subcutaneous tissues, they undergo encystment and form cysticerci cellulosae. Other less common modes of infection are active penetration of the skin by larvae from the soil or via vector arthropods.^{3,4}

Clinical features depend on the location of the cysticercus, the number of cysticerci and the immune status of the host. In the order of frequency, the central nervous system is most often affected, followed by subcutaneous tissues and striated muscles.⁵ Subcutaneous cysticercosis usually presents as swellings or nodules, with or without pain whereas intramuscular cysticerci usually present with myalgia, as a pseudotumour or as pseudohypertrophy of the affected muscle.⁶ Cases of isolated muscle involvement have been reported in literature involving a wide variety of muscle groups ranging from muscles of the thigh to those of the anterior abdominal wall, forearm and so on.⁵ Although almost any muscle in the body may be involved, involvement of maxillofacial muscles has been rarely reported⁴ and that of the masseter is rarer still.³

Plain radiographs are usually featureless, unless calcification occurs in later stages after the death of the scolex. These soft tissue calcifications are aligned parallel to the long axis of the involved muscles resembling 'rice grains' which are characteristic of cysticercosis.^{7,8}

Ultrasonography is the investigation of choice for muscular cysticercosis. Various appearances on sonography have been described, the commonest being that of a cyst with a scolex and a surrounding inflammatory mass or an abscess. This was the appearance of the cysticercus in our patient. This may occur due to chronic leakage of cyst fluid or secondary bacterial infection.⁹ Culture did not grow any significant bacteria in our case. Another appearance is that of a large edematous fluid collection in the muscle with a scolex situated eccentrically. Sometimes, the scolex may escape and not be seen and the collection may be indistinguishable from any other cause. Finally, a rare appearance is that of a calcified cyst. Color Doppler usually does not show any internal vascularity.^{6,8}

CT is usually the commonest investigation demonstrating CNS cysticercosis, most often diagnosed in patients presenting with seizures. Several signs of neurocysticerci such as the "starry night sign" have been described. However, there were no neuroparenchymal lesions in our patient. On CT, muscular cysticerci appear as hypodense, non-enhancing lesions with or without calcification. Calcification of the cysticercus

Fig. 2 – MRI (1.5T, head matrix) images of a 12-year-old male child with masseteric cysticercosis and abscess formation. A – T2 axial, B – T2 sagittal, C – T1 axial and D – T2 coronal images showing an abscess (*) of high T2 signal intensity and intermediate T1 signal intensity with a T2 hypointense and T1 hyperintense rim (curved arrow) showing a cyst (arrow) within which itself shows a T2 hypointense focus representing the scolex.

usually implies death of the parasite. However, with formation of abscess, there may occur peripheral wall enhancement of the abscess cavity.⁸

MR imaging is particularly useful in disseminated cases in detecting cysticerci and their complications. Cysticerci appear as well-defined oval or rounded T2 hyperintense and T1 hypointense lesions, often aligned parallel to the long axis of the muscle fibers. On fat suppressed, post-gadolinium T1 images, mild perilesional enhancement of the cyst may be seen. Abscesses appear as heterogeneous T2 hyperintense and T1 hypointense lesions which often reveal a T2 hypointense rim due to presence of free radicals as seen in our patient. Also, abscess cavities usually show marked wall enhancement on gadolinium injection.¹⁰

Fine needle aspiration cytology and/or biopsy of the lesion confirm the diagnosis by demonstrating the scolex, hooklets or inflammatory cells when larval parts are absent.⁶

Cysticercosis of the muscles is usually treated conservatively with antihelminthics. Surgical intervention in the form of excision is attempted in cases with abscess formation as in our patient and sometimes in the form of simple cyst aspiration.⁴

Conflicts of interest

All authors have none to declare.

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