Primary Sonographic Diagnosis of Subcutaneous Cysticercosis

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ABSTRACT

We present the case of a 40-year-old woman with a small diffuse swelling on the left side of her face. She was diagnosed with intramuscular cysticercosis in the masseter muscle (case of disseminated cysticercosis involving the muscular system and subcutaneous tissues) with surrounding phlegmon on high-resolution ultrasound and managed conservatively. To our knowledge, the imaging findings of disseminated muscular cysticercosis have been reported before only a few numbers of times. In this case, the correct diagnosis was made on the basis of high-resolution sonography of the subcutaneous tissue and muscles. It showed multiple oval to circular, predominantly anechoic lesions, which were around 1 cm in diameter. Most of these cystic lesions showed a hyperechoic focus within suggestive of a scolex. There was no increased vascularity surrounding the lesions. Thus, sonography can primarily make the correct diagnosis of disseminated muscular cysticercosis if such lesions are seen. In endemic areas, cysticercosis should be considered one of the differential diagnosis of the subcutaneous swellings.

Keywords: Cysticercosis, Subcutaneous nodule, Ultrasonography.

INTRODUCTION

Human cysticercosis is an infection by larval form (cysticercus cellulose) of the pig/pork tapeworm Taenia solium. It is well known that, humans, the definitive hosts become infected with the parasite by eating uncooked pork containing the parasite in its larval form. In another manifestation of infection, humans can serve as an intermediate host, in which case, subcutaneous nodules called cysticercus cellulosae cutis forms. Cysts occur especially in striated muscles, subcutaneous tissues, nervous system, eyes and rarely other tissues. Subcutaneous cysticercus does not cause any symptoms, they present as nodules and can be felt as lumps/masses under the skin which tends to appear and disappear.

A case (uncommon) of disseminated cysticercosis involving subcutaneous tissue but lying above the masseter muscle is reported here. In this case the diagnosis was made on the basis of high resolution sonography of the subcutaneous tissue and muscles.

CASE REPORT

A 41-year-old Hindu female, a native of Anekal (southern Karnataka), agriculturist by profession, visited our Department of Oral Medicine and Radiology, Bangalore Institute of Dental Sciences, Karnataka (India), with a chief complaint of marble-like swelling over lower left one-third of her face (left angle of mandible), which was compromising her looks esthetically (Fig. 1).

She noticed a small peanut size swelling in the same region around 2 years back which started growing very slowly till the present size (well circumscribed of about an inch diameter). Although the swelling was asymptomatic without any sort of pain or any kind of associated discharge, its nodular appearance used to appear popping in and out of the surface on clenching her teeth, which made her more conscious about the esthetics.

Patient’s medical and family history yielded no significant data and this was her first dental visit. Systemic examination of the patient was normal and there was no other swelling present in her body. Patient had a mixed type of diet including pork and red meat since childhood. Patient had no oral deleterious habits nor used any tobacco related products or alcohol usage.

Fig. 1: Extraoral appearance
On local examination, there was a nodular well circumscribed swelling of approximately one inch diameter present on the left angle of mandible, without any associated symptoms. On palpation swelling was firm, nodular, nontender, nonfluctuant and not fixed to underlying tissues. Overlying skin appeared to be normal. There were no signs of localized lymphadenopathy. Intraoral examination of hard and soft tissues revealed no significant abnormalities. Salivary glands, including salivary flow and viscosity were normal. Provisional diagnosis of lipoma was made with differentials including tuberculous lymphadenitis, reactive lymphadenitis, benign tumor, and desmoid tumor.

On hematological investigations, there was mild eosinophilia. Other hematological findings and chest radiograph were normal. Two consecutive fine needle aspirations failed to yield the samples for diagnosis. Then the patient was sent for an ultrasound examination of the swelling to the department of radiodiagnosis (Ragav Diagnostics, Bengaluru).

Scan with high frequency probe showed a small cystic lesion (Fig. 2) measuring about 5.7 × 3.6 mm over the left masseter muscle. It was surrounded by edematous zone, measuring about 1.7 × 1.1 mm (Fig. 3). A small intramural nodule is noticed within the cyst. No significant vascular flare was seen within the mass. A diagnosis of cisticercosis (subcutaneous, nodular, overlying left masseter muscle) with surrounding inflammatory phlegmon was made.

Since the swelling was solitary, nodular, long standing and fibrosed, she was advised for an excisional biopsy of that nodule. Histopathology findings were consistent with cisticercosis with sections of excisional biopsy showed fragments of skeletal muscle tissue with mixed inflammatory cells including many eosinophils, center of the lesion showed scoliosis with the parasite (Fig. 4). Patient was advised on antihelminthics (albendazole, praziquental).

**DISCUSSION**

Cisticercosis is an infection caused by the pork tapeworm, *Taenia solium*. Infection occurs when the tapeworm larvae enter the body and form cisticerci (SIS-tuh-sir-KEY) cysts. Humans are the definitive *T* solium hosts and can carry an intestinal adult tapeworm (taeniasis), often without symptoms. Intermittent fecal shedding of egg-containing proglottids or free *T* solium eggs ensues, with the intention that the intermediate host (normally pigs) will ingest the excreted eggs in contaminated food or water. *T* solium embryos penetrate the GI mucosa of the pig and are hematogenously disseminated.

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**Fig. 2:** Ultrasonography with high frequency

**Fig. 3:** 17 × 10 mm cyst

**Fig. 4:** Section shows fragments of skeletal muscle tissue with mixed inflammatory cells including many eosinophils. Center of the lesion shows scoliosis with parasites
to peripheral tissues with resultant formation of larval cysts (cysticerci). When undercooked pork is consumed, an intestinal tapeworm will again be formed, completing the life cycle of the worm.

Human cysticercosis occurs when T solium eggs are ingested via fecal-oral transmission from a tapeworm host. The human then becomes an accidental intermediate host, with development of cysticerci within organs (Fig. 5). Cysticerci may be found in almost any tissue. The most frequently reported locations are skin, skeletal muscle, heart, eye, and most importantly, the CNS (NCC). Humans can occasionally be intermediate hosts, manifesting cysticercosis. The organism is transmitted to humans by ingestion of eggs from contaminated water or food, such as vegetables or by internal regurgitation of eggs into the stomach due to reverse peristalsis, when the intestine harbors a gravid worm. The eggs hatch in the small intestine, releasing oncospheres that penetrate the bowel mucosa and enter the bloodstream to reach various tissues, where they develop to form cysticercus cellulosae, which is the encysted larval form of T. solium. These can remain viable at this stage for as long as 10 years in humans. Living larvae evade immune recognition and do not elicit inflammation. When the larva dies, it induces a vigorous granulomatous inflammatory response that produces symptoms, depending on the anatomic location.

The clinical presentation of cysticercosis depends on the number and location of cysticerci as well as the extent of associated inflammatory response or scarring. Neurological manifestations, known as neurocysticercosis, are most common and may manifest as seizure, hydrocephalus and signs of raised intracranial tension. In the muscular form, three distinct types of clinical manifestations have been described: The myalgic type; the mass-like, pseudotumor or abscess-like type; and the rare pseudohypertrophic type. Degeneration of the cyst may result in intermittent leakage of fluid, eliciting a chronic inflammatory response, with collection of fluid around the cyst, resulting in the mass-like type, the pseudotumor type or the abscess-like type, as was seen in our case. Alternatively, the cyst retracts, its capsule thickens and the scolex calcifies.

![Fig. 5: Cysticercosis (Taenia solium)](image-url)
INVESTIGATIONS

- Laboratory studies are inferior to imaging in diagnosis of cysticercosis but may play an adjunctive role.
- Serology is the most useful of laboratory tests:7
  - Enzyme-linked immunosorbent assays (ELISAs) have reported 74% sensitivity and are highly specific for the appropriate antigens. Sensitivity may be increased in cases involving multiple cysts or if the assay is performed on cerebral spinal fluid (CSF) rather than serum.
  - The newer enzyme-linked immuno-electrotransfer blot (EITB)8,9 is preferred to ELISA. It carries a better than 95% sensitivity and nearly 100% specificity in patients carrying multiple cysts. However, its performance is poor in those with a single cyst or with only calcific lesions.
- Stool for ova and parasites.10

There are only a few reports of the ultrasound features of muscular cysticercosis.11 On ultrasound, cysticercosis can appear as the cysticercus cyst with an inflammatory mass around it, as a result of the death of the larva. In all types of appearances, the salient diagnostic feature is that of the cysticercus itself, which appears as an oval or round well-defined cystic lesion with an eccentric echogenic scolex in it. Calcified cysticercosis appears as multiple elliptical calcifications in soft tissue similar to the pathognomonic millet seed-shaped elliptical calcifications in soft tissues described on plain radiography.9 Ultrasound is not widely used in diagnosing muscular cysticercosis; however, with the advent of high-resolution ultrasound, it can be used liberally for diagnosing this condition.

Surgical removal is indicated for localized lesions that cause obvious symptoms. Medical treatment with praziquantel or albendazole has been recommended for neurocysticercosis and subcutaneous cysticercosis.12,13

CONCLUSION

High-resolution ultrasound, being noninvasive and non-ionizing, plays an important role in establishing the diagnosis in patients with muscular cysticercosis.14 If lesions with the morphological characteristics described above are encountered on ultrasound, the diagnosis of cysticercosis can be made with great confidence, and in muscular and subcutaneous cysticercosis no further investigation is required.

REFERENCES