**Case Report:**

**Skeletal Muscle Cysticercosis**

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**Abstract:**

Cysticercosis is a disease caused by cysticercus cellulosae, the larval form of tapeworm, Taenia solium. Cysticercosis is endemic with high prevalence in most of the developing countries because of the co-existence of poor sanitary conditions and domestic pig raising. Human cysticercosis occurs when eggs are ingested via faecal-oral transmission from an infected host. The infected human becomes an accidental intermediate host, with development of cysticercosis within various organs. The parasite has a strong predilection to involve central nervous system (CNS). Solitary muscular and soft tissue involvement without central nervous system involvement is rare and often presents a diagnostic challenge. Imaging and histopathological examination plays an important role in establishing the diagnosis by demonstrating a scolex on MRI and/or ultrasound. We report a rare case of an anterior abdominal wall cysticercosis diagnosed by ultrasonography and confirmed by histopathology.

**Keywords:** cysticercosis, skeletal muscle, taenia solium

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**INTRODUCTION**

Cysticercosis is a systemic manifestation caused by dissemination of the larval form of the pork tapeworm, Taenia solium. A high prevalence has been reported from the developing countries because of the co-existence of poor sanitary conditions and domestic pig raising without proper veterinary control or surveillance systems (1). It occurs mainly in pork eating nations due to consumption undercooked pork or measly pork. Humans are the definitive hosts and carry intestinal adult tapeworm. Intermittent faecal shedding of proglottids or free eggs occurs, and the intermediate host (normally pigs) ingests the excreted eggs in contaminated food or water. Embryos penetrate the gastrointestinal mucosa of the pig and are haematogenously disseminated to peripheral tissues with formation of larval cysts. When undercooked pork is consumed, an intestinal tapeworm is formed again, completing the life cycle of the worm. Human cysticercosis occurs when eggs are ingested via faecal-oral transmission from a tapeworm host. The human then becomes an accidental intermediate host, with development of cysticercosis within organs. Cysticercosis can affect various organs the brain, spinal cord, muscles, orbit, subcutaneous tissues and heart. The clinical manifestation of the patient varies depending upon the site of larval encystment, number of cyst and the extent of associated inflammatory responses. Isolated involvement of the soft tissues is very rare and can potentially mimic other soft tissue lesions including infective, inflammatory and neoplastic lesions.
CASE REPORT

A 16 year old male patient came to the surgical outpatient department with complaints of swelling the right side of the abdomen since one month. Initially no pain was experienced by the patient, but since one week moderate to severe pain was experienced. Patient also complained of fever, nausea and vomiting since 3 days which led to apprehension in the patient and made the patient report to the hospital. On general physical examination patient was conscious, coherent with temperature of 99.8 Fahrenheit. A swelling of size 2 x 2 cm is noted in the right anterior abdominal wall (lumbar region) in subcutaneous /muscular plane firm in consistency, tender, skin over the swelling appeared normal. Routine work up of patient was done – which was non contributory. Specific investigations requested were Ultrasound abdomen, Fine needle aspiration cytology (FNAC).

Ultrasonography – possible diagnoses given were Abscess/ infected cyst (? cysticercosis) within muscular plane of right external oblique. (Fig. 1)

![FIGURE 1](image1)

**FIGURE 1** – Showing Cystic lesion in the right external oblique muscle.

Fine Needle Aspiration Cytology (FNAC)

Cytosmears show few singly scattered cells (? endothelial cells/ histiocytes with round to oval and elongated nuclei with prominent nucleoli in a hemorrhagic background mixed with few lymphocytes.

Features were suggestive of benign soft tissue lesion /? Inflammatory lesion.

Patient was posted for excision and the excised specimen sent for histopathological examination.

Gross findings

We received gray brown to gray black soft tissue mass measuring 1.5 x 1.2 cm. At the periphery of the specimen a cystic area is noted measuring 0.4 cm diameter. Tissue was all embedded, processed and paraffin embedded tissue blocks were made. Tissue sections were cut and stained with hematoxylin and eosin.
Microscopy
Sections show skeletal muscle bundles, fibrocollagenous tissue and adipose tissue infiltrated by dense population of eosinophils, lymphocytes and plasma cells along with congested vessels. At one focus there is acellular hyaline material suggestive of cyst wall. (Fig 2, 3 & 4)
Features are suggestive of parasitic cyst – Cysticercosis.

DISCUSSION
Cysticercosis is a parasitic infection caused by Cysticercus cellulosae, the larval form of Taenia solium where as the infestation of human intestine with adult tapeworms is known as Taeniasis. Humans are the only definitive host while both humans and pigs can act as intermediate hosts. The mode of transmission is feco-oral, the most common being the consumption of raw or undercooked beef or pork, water, or vegetables contaminated with Taenia eggs (2). Children are commonly affected because of increased chances of fomite infection (3). Encystment of larvae can occur in almost any tissue. The most frequently reported locations are skin, skeletal muscle, heart, eye, and most importantly, the CNS (4). In the CNS, it can localize in the parenchyma (grey matter), ventricles (most commonly 4th ventricle), cisterns, subarachnoid space and the spinal cord (extra-medullary intra-dural). Involvement of the central nervous system (CNS), known as
neurocysticercosis (NCC), is the most clinically important manifestation of the disease. It may present with dramatic findings, and is an important contributor to neurologic morbidity in developing countries. It is also the major cause of acquired epilepsy in the world (5). A special form, termed cysticercosis racemosus is a conglomeration of cysts in the subarachnoid space, is frequently seen in Latin America (6).

Skeletal muscle encystment usually is asymptomatic but may cause muscular pseudohypertrophy with a heavy parasite burden. Cysts may cause spasms, weakness, and pain and may create subcutaneous nodules. Abdelwahab et al (6) reported a case of a 40-year-old man with cysticercosis presenting as a solitary tumor in the biceps brachii muscle. Magnetic resonance imaging suggested a cyst and histopathological diagnosis confirmed it as cysticercosis. Solitary presentation of muscular cysticercosis is extremely rare. Our case was also of intramuscular cysticercosis involving the right external oblique muscle. The intramuscular and subcutaneous cysticercosis is seen most commonly over the arms and chest and is characterized by multiple, mobile, firm, subcutaneous nodules with normal overlying skin. The nodules vary in size from 1 to 2 cm and are usually asymptomatic. It may be painful in about 20% of the patients and there are chances of abscess formation as well (7). The differential diagnosis includes lipomas, epidermoid cysts, neuroma, neurofibromas, pseudoganglia, sarcoma, myxoma or tuberculous lymphadenitis. Mani et al (8) presented a case of a solitary cysticercal cyst that involved the anterior abdominal wall musculature and was diagnosed with sonography. Sonograms revealed a well-defined cystic lesion with an eccentric hyperechoic area within it. An eccentric, echogenic, pedunculated structure was seen within the cystic area of the lesion without calcification. Inflammation and hypervascularity in the surrounding muscle was noted. Cysticercosis should be kept in mind if lesions with similar morphologic characteristics are encountered in the musculature or subcutaneous tissues during sonographic examination. Cardiac cysticercosis cases were also reported in the literature which may lead to conduction system abnormalities, abnormal rhythms or rarely heart failure. Oral mucosa is a rare site for cysticercosis. Mazhari et al (9) described eight cases of cysticercosis involving the oral cavity, all presenting with a solitary superficial mucosal nodule, of these four were in the buccal mucosa, two in the lips, one in the tongue and one in the gums. Involvement of the breast is a rare presentation. Agnihotri et al (10) reported the case of a 22 years young married woman who presented with a painless mobile swelling in the right breast. Histopathological examination revealed the presence of typical cysticercus larva. Cysticercosis of the breast is rare and it should be considered as a differential diagnosis for a lump in the breast.

Diagnostic tests include laboratory investigations showing eosinophilia in the blood and CSF. But in our case the peripheral blood smear showed eosinophils within normal range. Biopsy of the subcutaneous nodules, if any, will help in confirming the diagnosis of the lesion. Only Serological tests are nondiagnostic. These include, indirect haemagglutination test and enzyme linked immunosorbent assay (ELISA) which is about 80% sensitive in CSF. Lately, the enzyme linked immuno electro transfer blot (EITB) test has been introduced and reported to be 100% sensitive in patients with two or more viable lesions.
Praziquantel and albendazole have been used extensively in the treatment of cysticercosis and are the accepted therapies. Cysticercosis is a preventable faeco-oral transmitted infection. It is possible to prevent infection by avoiding undercooked food and pork, and water contamination with human faeces. Care should be taken in places with poor hygiene or meat inspection laws.

**CONCLUSION**

Cysticercosis of the abdominal wall is a rare entity and a clinical diagnosis is challenging as it can mimic other pathological entities which can be differentiated by histopathology.

**REFERENCES**