Case Report

# Isolated Intramuscular Cysticercosis of the Flexor Digitorum Profundus: A Rare Diagnostic Dilemma Resolved by Multimodal Imaging

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## Abstract

**Background:** Cysticercosis is a parasite that is caused by the larva of Taenia solium and it is normally found in the central nervous system and eyes. The case of isolated intramuscular cysticercosis without a systemic manifestation is a rare clinical phenomenon, whereas skeletal muscle manifestation is frequent in disseminated disease. It usually causes a diagnostic dilemma and can resemble a soft tissue tumor, abscess or myositis. Imaging modalities are central in the contemporary diagnosis and management which is non-invasive. **Presentation of the Case:** A 28-year-old male patient came with painful swelling on the flexor side of his left forearm after he experienced febrile condition. Radiographies were not significant. The transmission of high-resolution ultrasound (HRUSG) showed one individual cystic lesion in the flexor digitorum profundus (FDP) muscle, and the lesion consists of a pathogenic eccentric scolex with a vascularity around the cystic lesion. Magnetic Resonance Imaging (MRI) gave confirmation of a T1 hypointense, T2 hyperintense eccentrically located cystic lesion. Follow-up shots had signified rim improvement and perilesional edema, which is in agreement with active myositis. Systemic screening (MRI of the brain and abdomen) was negative. **Conclusion:** HRUSG and MRI non-invasive diagnosis can certainly be able to detect isolated intramuscular cysticercosis. The characteristic of the disease is the identification of the eccentric scolex in a cystic lesion. Radiologic diagnosis helps in the timely pharmacological treatment using anti-helminthics and steroids and avoids avoidable surgical procedures.

**Keywords:** Cysticercosis, Intramuscular, MRI, Ultrasound, Flexor digitorum profundus, Myositis, Taenia solium.

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## Introduction

Cysticercosis is an infestation of the tissue by a parasite, Cysticercuscellulosae, the larval stage of the pork tapeworm, Taenia solium. It is also a significant health issue in the developing world, especially in some of its regions in Asia, Africa, and Latin America that have coupled with poor sanitation and interaction with pigs makes it an easy target.[1] Humans are the ultimate hosts of the adult tapeworm (taeniasis) whereby it becomes the intermediate hosts to the larvae (cysticercosis) after inadvertently ingesting the eggs through fecal-oral pathway or contaminated food and water.[2]

Infection by the larvae is hematogenous and may occur in different tissues. Neurocysticercosis (NCC) is a condition of the central nervous system (CNS) variant, which is the most clinically severe one. Even though skeletal muscle is also reported, it typically occurs as a disseminated infection with NCC.[3] Isolated intramuscular cysticercosis (IMC)- referred to as soft tissue disease and no CNS or ocular lesions- has an estimated prevalence of a very low percentage.[4]

Clinically, it is difficult to diagnose IMC as it presents in a nonspecific way. The patients may exhibit both palpable nodules, vague pain or swelling such that they are mistakenly diagnosed with lipomas, neurofibromas, abscesses or pyomyositis.[5] Without high index of suspicion, there are chances of patients who have been subjected to unnecessary invasive procedures. The case report has demonstrated that High-Resolution Ultrasonography (HRUSG) and Magnetic Resonance Imaging (MRI) plays a very central role in the diagnosis of a rare isolated IMC in the forearm, as a way of promoting conservative managements.

## Case Presentation

**History:** The patient reports no cardiovascular or pulmonary issues, especially no shortness of breath or swelling of the lower limbs. <|human|>Examination: The patient also denies CVD or respiratory problems, and she does not experience shortness of breath or lower limb swellings.

A 28-year-old man presented to the surgical outpatient with the complaint of painful swelling on the flexor of his left forearm proximal part. The symptoms had been two weeks long. The patient did not note any history of low-grade fever prior to the

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appearance of the swelling or any trauma or weight loss or any neuromuscular symptoms (headaches or seizures). He was a normal-diet consumer who did not have any history of tuberculosis.

A local examination revealed that a single, soft, hard swelling was felt at the costal third of the left forearm about 2 x 2 cm. This was followed by an increase in pain and swelling when the extremities folded indicating deep intramuscular involvement. The skin in the overlay area was normal without any sinususes or discharge. [Figure 1]

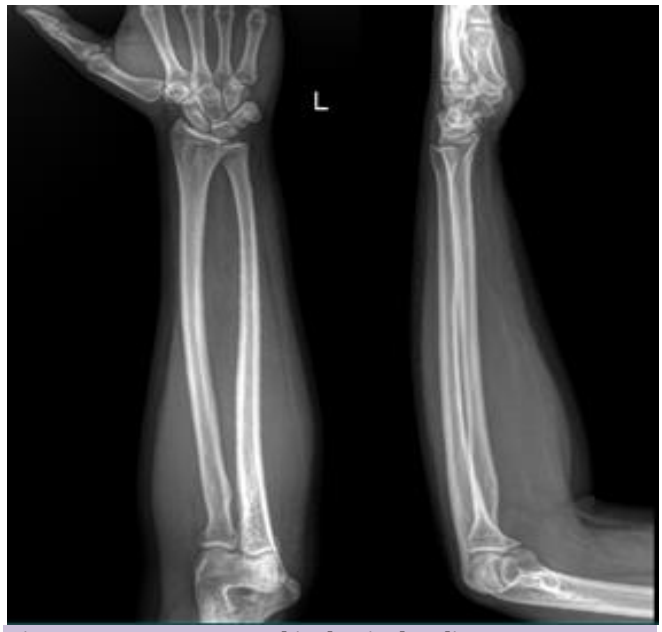


**Figure 1: Bones are normal in density baseline**

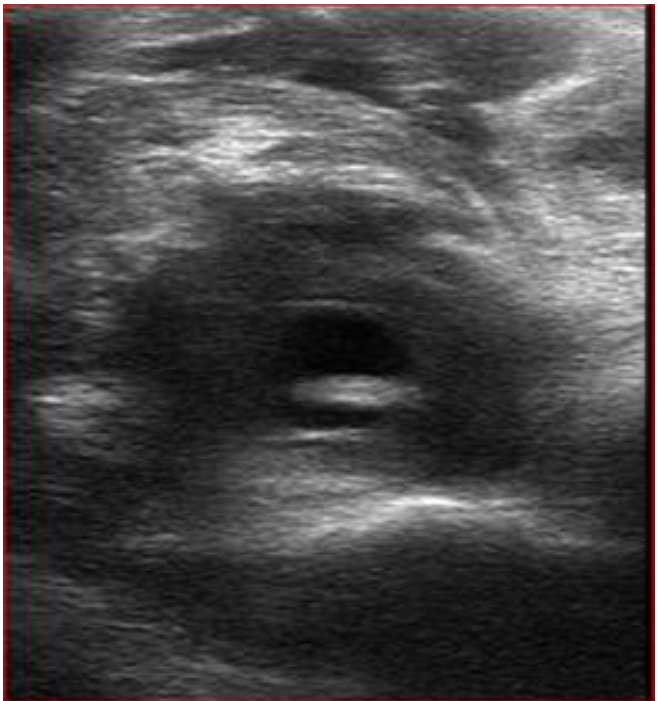

**Figure 2: Cystic lesion with a small eccentric echogenic lesion focus in the intramuscular area.**

**Diagnostic Imaging**

Preliminary plain radiographs (X-ray) of the forearm did not show any calcifications, bony erosions, or periosteal reactions.

To examine the soft tissue pathology, High-Resolution Ultrasonography (HRUSG) was used. This scan showed the presence of a solitary, thin-walled, and well-defined cystic lesion embedded in the muscle mass of flexor digitorum profundus (FDP) measuring 12 x 8 mm. A small, unique, and eccentric echogenic nidus was seen in the cyst. Color Doppler showed that there was an increase in peripheral vascularity of the muscle surrounding and the immediate perilesional muscle was found to be hypoechoic which may indicate inflammatory edema. [Figure 2]

**Anatomical mapping and confirmation by Magnetic Resonance Imaging (MRI) was ordered. The results of the MRI were as follows:**

T1-Weighted images A focal, non-infectious oval focus that follows the muscle fibres of the FDP.

T2-Weighted/STIR: There was hyperintense (fluid signal) with a well-delimited hypointense rim. There was a minute eccentric hypointense focus in the hyperintense fluid that corresponds to the scolex. There was diffuse muscle hyperintensity surrounding the cyst, and this is a sign of edema.

Post-Contrast Studies A major increase in rim enhancement of the cyst wall and heightened edematous tissue of the muscle surrounding it was noted, which indicated active myositis. [Figure 3,4]

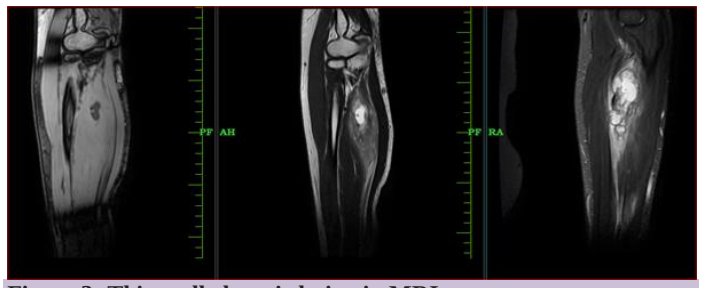

**Figure 3: Thin walled cystic lesion in MRI**

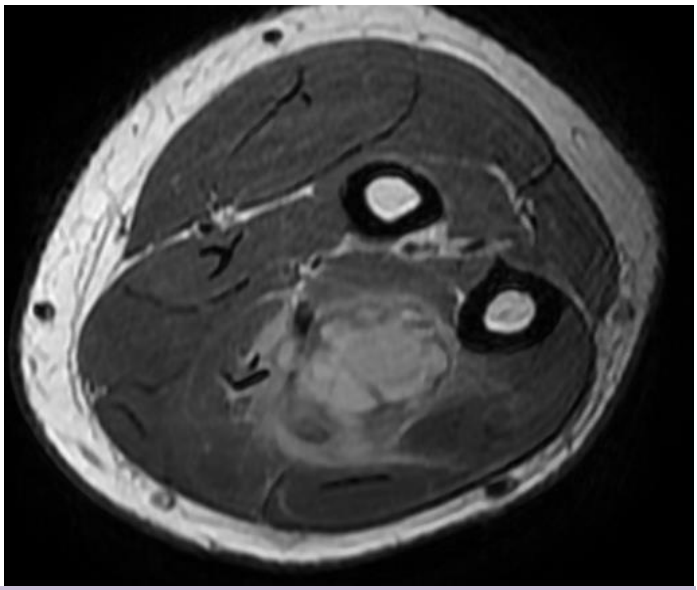

**Figure 4: The ulnar artery observed very close to the lesion.**

**General Workup and Diagnosis:**

In order to exclude diseased disseminated, MRI of the brain and ultrasound of the abdomen were carried out; both were within norms, which fail to rule out neurocysticercosis. This was finally diagnosed to be Isolated Intramuscular Cysticercosis and Perilesional Myositis.

**Management**

The patient was treated conservatively using oral Albendazole (400 mg twice daily) in the course of 21 days and a tapering course of oral corticosteroids to curb the inflammatory reaction due to parasite degeneration. The one-month follow-up revealed that the pain and swelling were gone, and follow-up ultrasound revealed that the lesion size had decreased significantly by this time.

## Discussion

The progress of intramuscular cysticercosis in the clinical course will determine the load of the organism and the immune reaction of the host. Live cysts usually are not inflammatory and viable. The larva normally produces some sort of toxic that causes the occurrence of symptoms when it dies, which is an inflammatory reaction resulting in pain, swelling, and local myositis, as it did with this case.[6]

**Diagnostic Dilemma and Differential Diagnosis.**

The differentials of a solitary intramuscular cystic lesion are pyogenic abscess, lipoma, neurofibroma, epidermoid cyst and soft tissue sarcoma.[7] In contrast to the clear fluid and thin wall seen with early cysticercosis, abscess normally have severe systemic evidence of infection and abnormal and thick walls with internal debris. Neurofibromas tend to be seen as a continuations of a nerve and lipomas are isointense to subcutaneous fat as seen in MRI. The presence of the distinctive imaging characteristics of cysticercosis makes it possible to exclude these pathologies.[8]

**Role of Ultrasonography**

The main modality of screening is HRUSG. The sonographic appearance of muscular cystscephalosus was categorized as four types by Vijayaraghavan et al.:

1. Cyst with a scolex that is eccentric: The pathological picture (in this case).
2. Cyst without scolex: The appearance of an abscess.
3. Multi cysts (rice grain pattern): Milliary type.
4. Calcified node: A hyperechoic lesion which is shadowed (chronic stage).[9,10]

The central diagnostic feature that was used to diagnose cysticercosis in our case identified the eccentric echogenic focus (scolex) in the cyst, and this has a high specificity towards cysticercosis.

**Role of MRI**

MRI is best to determine the anatomic extent and the extent of the disease. Depending on the stage; the cyst will look like:

- **Vesicular Stage:** Viable larva: fluid signal resembles CSF, paucifolumbar edema.
- **Colloidal Vesicular Stage:** T1 hyperintense compared to CSF, thick, degenerated larva, with much surrounding edema/myositis.[11]

Stage of nodular granules: Retraction and thickening of the cysts. also Calcified Stage: Signal void on all sequences.[1]2

The patient provided with the case of colloidal vesicular stage being supported by the heavy inflammatory response (myositis) and rim enchanted on contrast studies. The MRI is also able to distinguish between the scolex and debris; scolex is depicted as a mural nodule, and debris in an abscess is otherwise reliant.[13]

**Management**

Conservative is the primary approach of treatment of isolated IMC. The combination of such cysticidal drugs as albendazole or praziquantel is effective. Nonetheless, anti-helminthic treatment may further inflame through the release of antigens in large amount by the dying host. Accordingly, modern therapy is concomitant corticosteroid therapy to reduce myositis.[14,15] The surgical excision is usually only utilized in cases of doubtful diagnosis, or, in cases where the cyst generates the effect of nerve compression, or, abscess.[16,17]

## Conclusion

Isolated forearm intramuscular cysticercosis is a very obscure condition that must be taken into consideration in the differential diagnosis of soft tissue swellings, particularly in the endemic areas. Combination of HRUSG and MRI provides unambiguous diagnosis due to the visualization of the pathogenic scolex and typical inflammation characteristic patterns. The identification of such radiological features will save unwarranted biopsies and surgeries and can be cured using pharmacological methods.

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## Conflicts of interest

There are no conflicts of interest.

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