

## Extensive disseminated cysticercosis with involvement of all possible rare sites in a single patient – MRI and USG diagnosis

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### Abstract

Cysticercosis due to its extensive study is known to be one of the common tropical diseases. The spectrum of the disease extension and involvement has been updated continuously and every time case reports have come with new conclusions as the disease is seen worldwide. Disseminated cysticercosis by itself is a rare complication of cysticercosis with involvement of skeletal, ocular and tongue muscles. Pulmonary and cardiac involvements are rare and there are hardly few cases worldwide. Surprisingly we could identify such tiny cysticerci in the lung parenchyma, cardia and thyroid apart from other known dissemination sites. Isolated pulmonary cysticercosis have been reported but simultaneous involvement of other unusual sites is a rarity. Most of diagnosis in our case is by MRI and some by USG. Hence we report MR and USG imaging of such a case of disseminated cysticercosis involving all the possible rare sites in a single young Indian male patient who presented with history of seizures. This documentation and reporting will add up to the few cases reported previously, some of which are in isolation.

**Key words:** Pork tapeworm, Neglected disease, Attention pork eaters, Cysticerci studded body

### Introduction

Cysticercosis is included among Neglected tropical diseases (NTD). By definition these are a set of infectious communicable diseases arising from a diverse group of microorganisms which may be parasites, bacteria, or vector-borne protozoa [1].

Cysticercosis is a tissue infection caused by the larval form of the taenia solium also known as pork tapeworm. Cysticercosis is usually acquired by eating undercooked food or contaminated drinking water that has tapeworm eggs in it. Uncooked vegetables are the major source of infection in human beings. The history of pork consumption is not present in many of the

patients infected with the disease [2]. Disseminated cysticercosis is an uncommon complication of a common disease which was first reported by Krishnaswami in 1912 [3]. Commonly the larval stage of the pig tapeworm invades brain, skeletal muscle, subcutaneous tissue, liver, pancreas and sometimes heart [4]. Spinal cord, Pulmonary, thyroid, orbit and tongue muscles involvement can also be seen in some rare instances [5]. The reason behind presenting this case report is extensive disseminated cysticercosis involving all the rare sites like lung, cardia, thyroid along with ocular, tongue and skeletal muscles etc in a single patient.

### Case Report

A 28 year old male patient Hindu by religion presented with history of generalized seizures since 3 years with asymptomatic intervals in between and with a provisional clinical diagnosis of Neurocysticercosis. He was non

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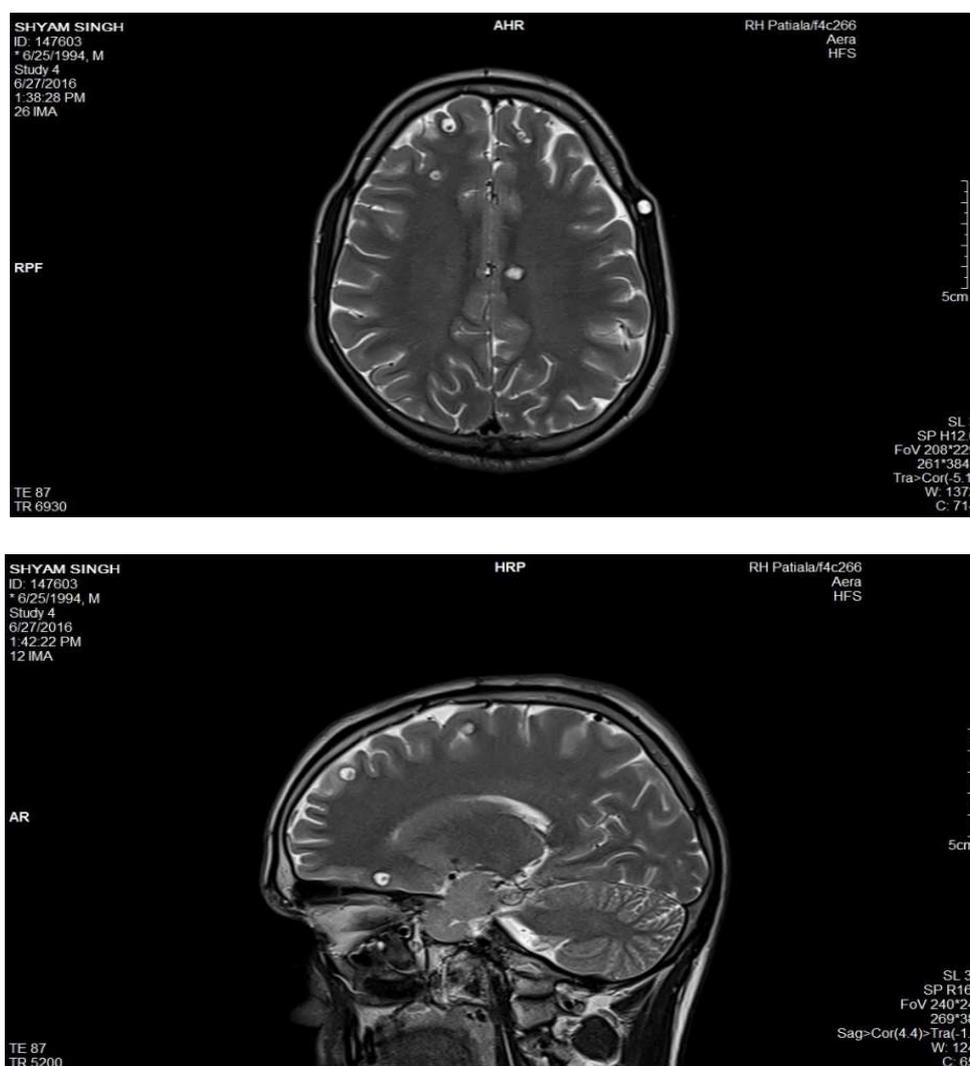
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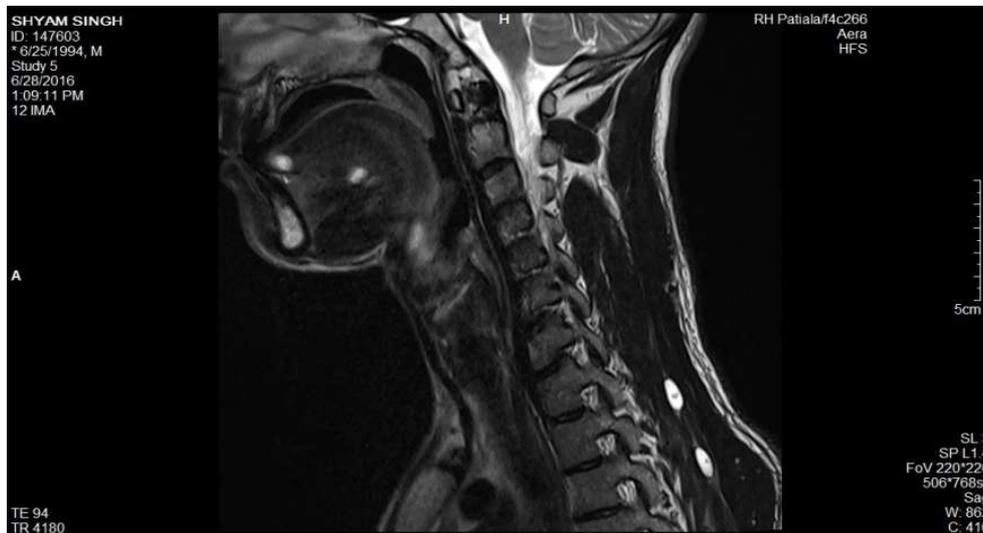
vegetarian with occasional pork eating habits and a farmer by occupation. The patient had no history of fever or previous hospitalizations and had got NCCT brain imaging in the past which revealed few tiny calcified granulomas in bilateral cerebral hemispheres at places. This patient was then referred to the department of radiology for further brain imaging. MRI brain was performed on 1.5T Siemens magnetom aera and it revealed multiple small round well defined hyperintense cystic nodular lesions with central hypointense focus without any perilesional edema scattered in bilateral cerebral hemispheres. On Contrast administration many of these lesions showed peripheral ring enhancement.

Additionally we could localize similar such lesions in the extraocular muscles, masticator, muscles of the neck and tongue. This led us to the suspicion of disseminated form of cysticercosis and we planned for further imaging to identify other organ involvement. Whole body MRI was carried out which demonstrated multiorgan involvement of the disease. The lesions were found distributed extensively in the skeletal muscles of the back, limbs, chestwall, abdominal wall etc. Involved sites in the descending order of rarity in our case were cardiac, lung, thyroid, orbit and tongue. In spite of such widely disseminated disease our patient had no symptoms with respect to the other involved sites except seizures. At this stage imaging diagnosis of Extensive disseminated cysticercosis along with granular nodular stage of Neurocysticercosis was made as the patient had primary complaints of seizures. Patient was advised biopsy for further confirmation. Biopsy was taken from a small cystic lesion in the back which confirmed the diagnosis of cysticercous cellulosa.

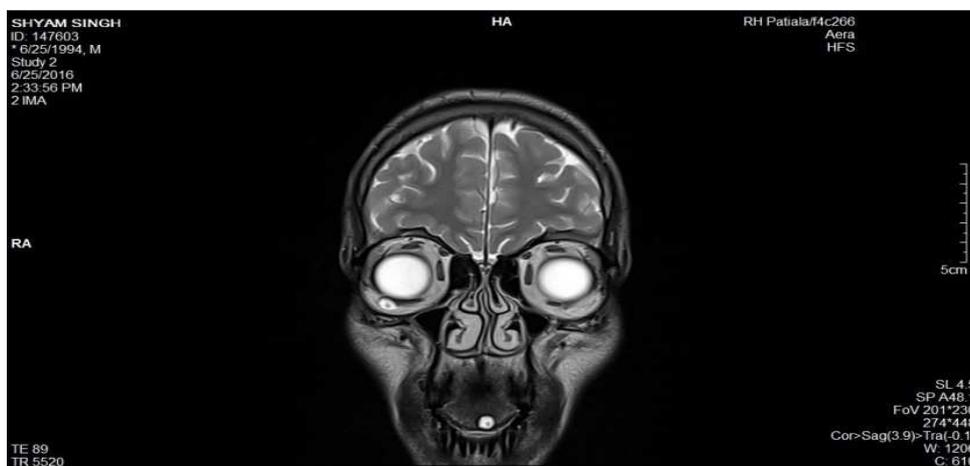
### Imaging gallery



**Figure 1 & 2:** Axial and sagittal T2W brain MR image showing multiple well defined round to oval shaped hyperintense cystic lesions seen scattered at places. Lesions were also noted in the scalp. Hypointense scolex is also seen.



**Figure 3 & 4:** Coronal and sagittal T2WI showing multiple cysticerci lesions in the skeletal muscles of the back and tongue muscles.



**Figure 5 :** T2WI in coronal and saggital scans reveal lesions in ocular and tongue muscles.



Figure 6: T2WI in coronal and saggital scans reveal lesions in ocular and tongue muscles.

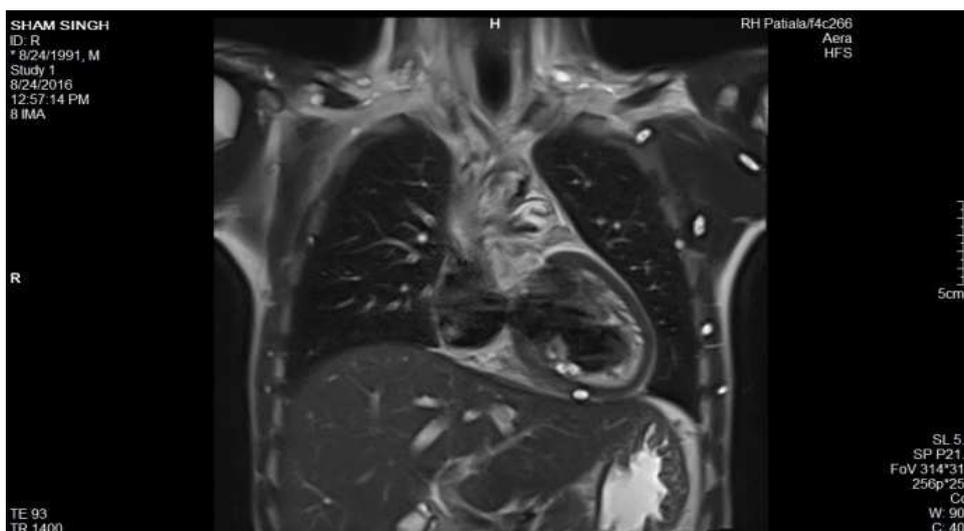
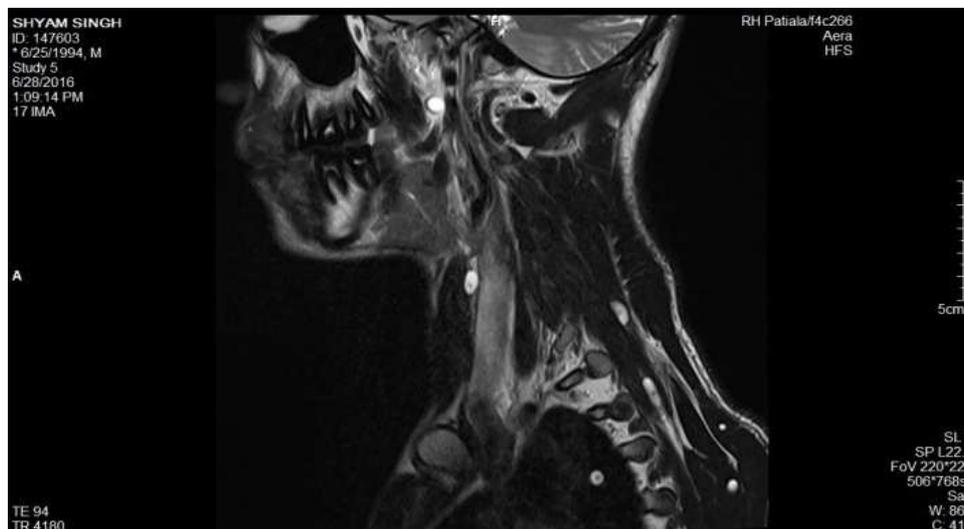
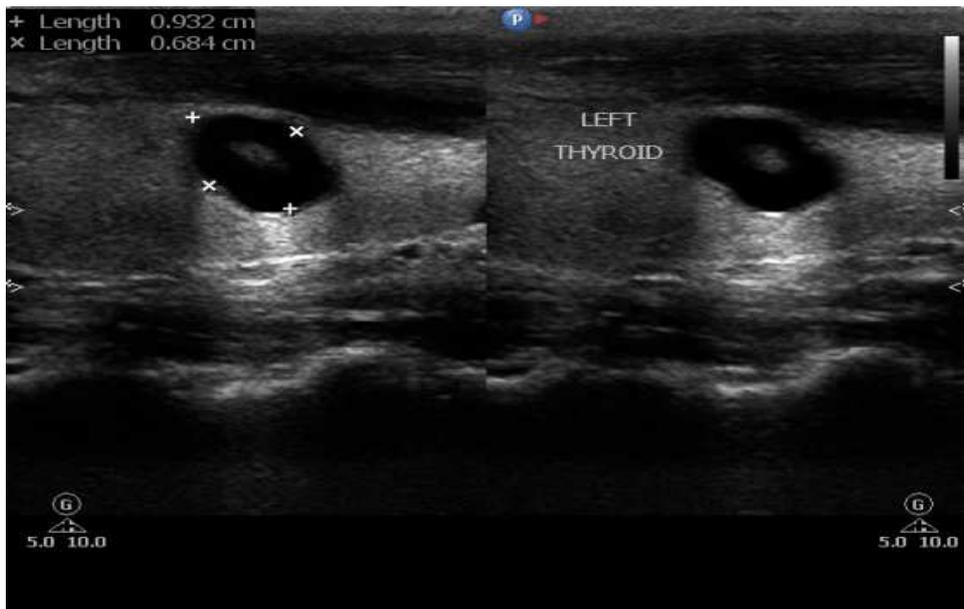


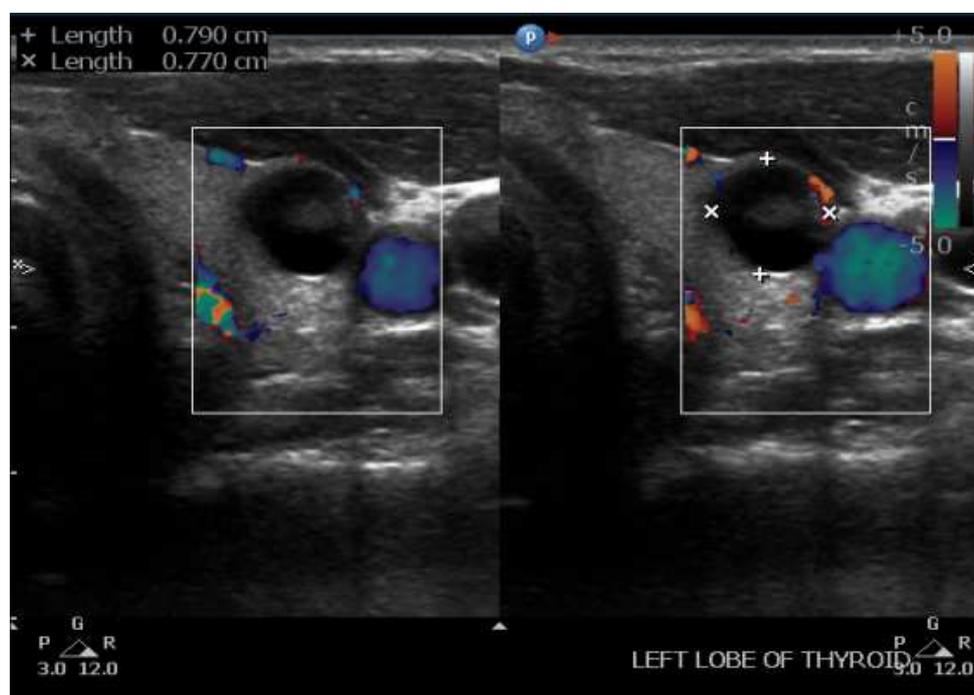
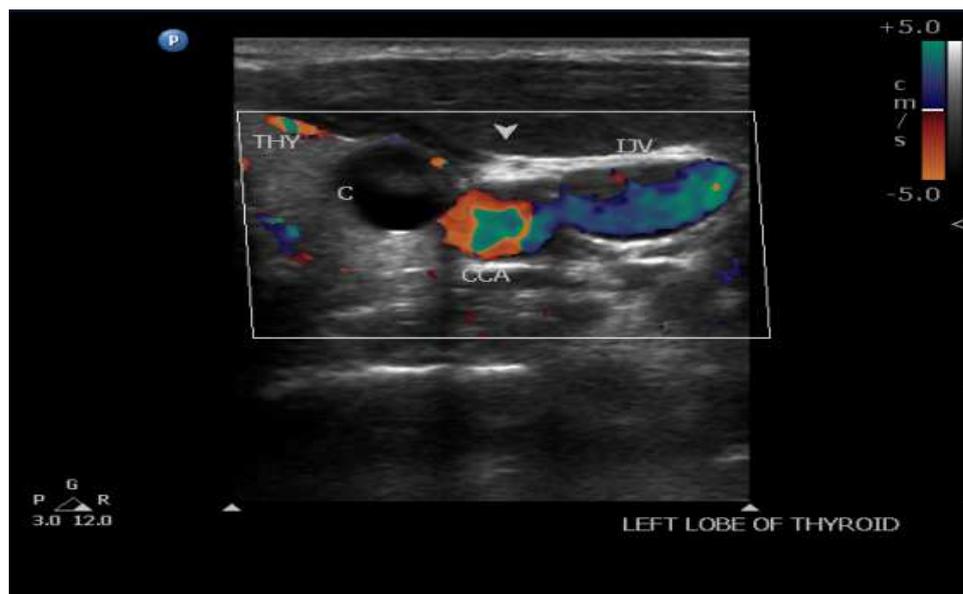
Figure 7 & 8: Sagittal and coronal scans at the level of cervical spine and chest display tiny cysticerci in the left lung upper lobe, pericardium and myocardium. Chest wall muscles are also involved.



Figure- 9 & 10: Cysticerci are seen studded in the muscles of the abdominal wall, gluteal region and in the thigh.

USG of Thyroid





\*Transverse and longitudinal scans of the thyroid gland show hypoechoic well defined lesion with hyperechoic eccentric nodule in the left lobe.

## Discussion

Cysticercosis is widely endemic in Eastern Europe, Russia, Manchuria, China, India, Pakistan, Madagascar, and parts of Africa, especially West Africa. *Taenia solium* has been recognized and written in the medical literature from the time of Hippocrates but was not differentiated from *T. saginata* which is the beef tapeworm, until the time of Goseze (1782) [6]. The eggs of *Taenia solium* are spherical or subspherical in shape and they measure approximately 31 to 43  $\mu\text{m}$  in

diameter and cannot be microscopically distinguished from those of *T. saginata*. Infection occurs by ingesting contaminated water, vegetables or undercooked pork containing *taenia solium* eggs. The eggs enter the stomach and intestine where they develop into larvae which penetrate the mucosa of the intestine. They then enter the bloodstream and invade host tissues, where they further develop into cysts called cysticerci over a period of 60-70 days [7, 8, 9]. Almost any organ in the

body can be involved in disseminated form of cysticercosis. Depending upon the location of cysts, cyst burden, and a host reaction, the patient can present with wide spectrum of symptomatology ranging from no clinical manifestation like in muscular cysticercosis to convulsions in neurocysticercosis [10, 11]. When pulmonary cysticercosis are noted on detailed evaluation of patient with cysticercosis, it should be taken into the consideration that the disease is widespread and other anatomical sites are already involved. Pulmonary involvement is considered a rare site and has been explained by the life cycle of taenia solium. Humans may be an intermediate host for the adult larvae and favourable sites being mostly the muscles and brain parenchyma to complete their life cycle. Another reason for pulmonary involvement being overlooked most of the times is because the respiratory symptoms are non-specific and patients usually present with neurological symptoms, which is their primary worrisome feature. Also it is difficult to differentiate overlapping imaging features from other parasitic infections [12].

USG, Computed tomography and magnetic resonance imaging (MRI) are useful in anatomical localization of the cysts. Four type of sonographic appearances have been described in literature. Cystic lesion with eccentric echogenic scolex within it, surrounded by inflammatory mass / fluid collection. Also it can appear as irregular cyst with minimal surrounding fluid. Multiple soft tissue calcified foci can also be seen [13]. MRI is more sensitive than a CT, as it can identify scolex and live cysts and helps in follow up response to treatment [8][10]. The radiological findings of cysticercosis are almost similar in all affected organs. On MRI, cysticercosis lesions appear hyperintense, with well-defined edges, which show a hypointense eccentric nodule within, representing the dead parasite's head and is called the scolex. The presence of a scolex in a cystic lesion usually suggests the diagnosis of cysticercosis [14].

## Conclusion

Cysticercosis with widespread involvement of the subcutaneous tissue all over the body, skeletal muscles, heart, lungs and brain, is one of a kind and very rarely seen. Fewer than 50 cases have been reported so far, the majority being from India. It is important to recognize and appropriately investigate by imaging and biopsy, as this condition needs planned therapy.

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