

Case report

Disseminated cysticercosis: role of whole body Magnetic Resonance Imaging

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ABSTRACT. Cysticercosis is a parasitic infection that is commonly seen in developing countries. Treatment of cysticercosis can precipitate an intense inflammatory response which may further worsen the symptoms. Whole body MRI is an upcoming tool for screening of diseases. It can be acquired in the same setting as a brain MRI in reasonable time without any additional hardware. We present a case wherein whole body MRI was used to evaluate disseminated cysticercosis. It can prove as useful screening tool to gauge the disease load and modify the treatment plan accordingly, especially in endemic areas.

Key words: disseminated cysticercosis, whole body MRI

Introduction

Cysticercosis is an infection caused by the larvae of the tapeworm *Taenia solium* found in uncooked pork meat. It's incidence is highest in developing countries, poor hygiene and close contact with swine population being the major contributing factors [1]. The central nervous system is most commonly involved with patients usually presenting with convulsions [2]. It is an important cause of epilepsy, accounting for approximately 30% epilepsy cases in endemic areas [3]. However, this disease is no longer limited to the developing countries owing to the migratory trend of populations [4].

Case report

A 45-year-old man recently diagnosed with squamous carcinoma of the upper alveolus was brought to the emergency department following a single episode of generalized tonic clonic convulsions. The patient had a history of chronic headache for the past two months. On examination, he was afebrile and well oriented in time and space. He had stable vitals and no focal neurological deficit was observed.

A plain and contrast enhanced CT scan of the brain was performed, which revealed multiple tiny

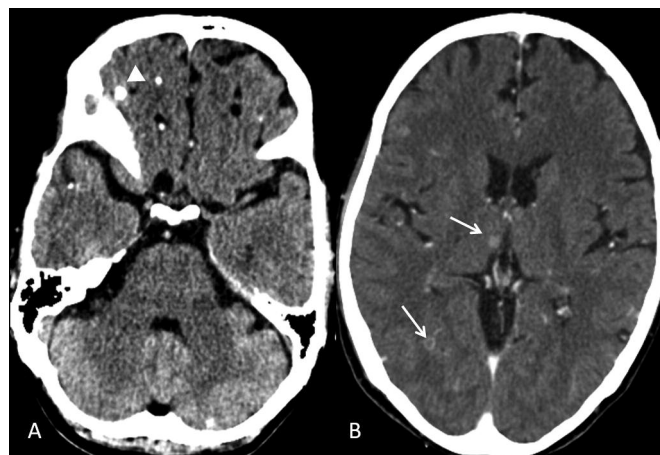


Fig. 1. A. Plain CT shows few calcified subcentimetre sized lesions (arrowhead) in the bi-frontal and right temporal lobe. B. Contrast enhanced CT shows few ring enhancing lesions (arrow).

well defined cystic lesions involving the entire brain parenchyma. Most of the lesions showed calcifications within while the rest showed iso to hyperdense foci and peripheral ring enhancement (Fig. 1A,B). Similar lesions were also identified in the subcutaneous tissue of the neck and on further enquiry the patient revealed that he had developed multiple nodular lesions all over the body in the past two months. A prior chest radiograph revealed multiple well-defined slender ovoid calcific lesions in the soft tissues (Fig. 2A). Ultrasound showed

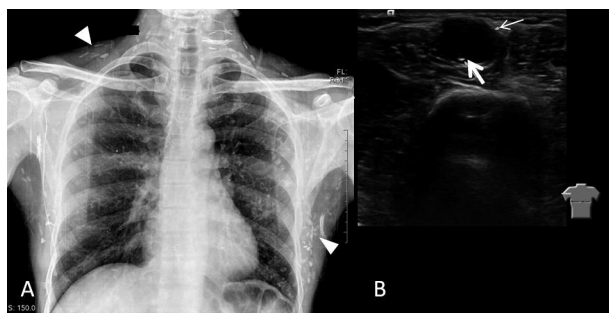


Fig. 2. A. Frontal radiograph of the chest shows multiple ovoid calcified lesions (arrowheads) in the soft tissues of the chest wall and neck. B. Ultrasound reveals a cystic lesion (thin arrow) with hyperechoic scolex (thick arrow) in the right upper arm.



Fig. 3. Post Contrast T1W sagittal section confirms multiple well-defined ring-enhancing lesions in the brain (arrows). A few cystic lesions are seen in the subcutaneous tissues of the neck (arrowheads).

hyperechoic scolices within these cystic lesions located in the subcutaneous tissues and muscles (Fig. 2B). MRI brain was also performed for further evaluation (Fig. 3). Additionally, a whole body STIR (Short Tau Inversion Recovery) sequence was performed in the same setting to map the disease extent. It revealed innumerable hyperintense lesions all over the body (Fig. 4).

The characteristic CT and MRI appearances in the brain conclusively ruled out the possibility of metastases. The multiple tiny cystic intra-muscular and soft tissue lesions with small isoattenuating or hyperattenuating rounded structures (hole with dot appearance) represented the cysticercus larvae in the vesicular and calcified nodular stage,

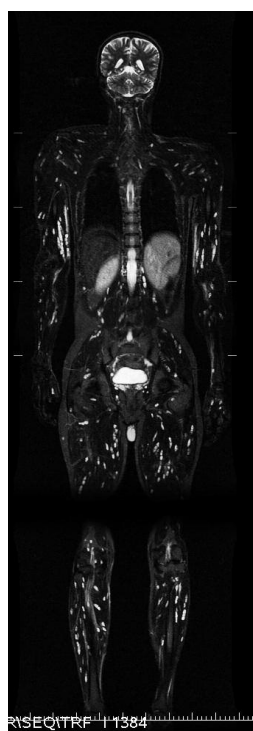


Fig. 4. Whole Body STIR image shows innumerable intramuscular and few subcutaneous hyperintense foci throughout the body suggestive of disseminated cysticercosis

respectively. Whole Body STIR image showed disseminated cysticercosis. Although the diagnosis of neurocysticercosis was made on the CT scan, whole body MR helped map the entire extent of the disease. The patient was started on steroids for his acute neurological symptoms and albendazole for the disseminated cysticercosis. His symptoms subsided over the next few weeks.

Discussion

A systemic form of cysticercosis with widespread affection of organs by the *Taenia solium* larva is a common presentation in developing countries, however imaging features of such disease have not been frequently reported with only a few cases reported so far [2]. Its presentation depends on the organs involved, the parasitic load, the stage in which the larva exist and the immunity of the host, common symptoms being intractable epilepsy, dementia, muscular hypertrophy, subcutaneous and lingual nodules and a relative paucity of focal neurological signs [1,2]. It is interesting to note that the symptoms are not due to the mere presence of the parasite in the brain, but due to inflammation around the degenerating cysticerci causing focal encephalitis, vasculitis and edema [5].

MRI is the modality of choice for diagnosis of CNS disease which depicts the five stages of the larval development: non-cystic, vesicular, colloidal vesicular, granular nodular and calcified nodular

[6]. Of these the calcified nodular stage represents the non-active form of the disease [6]. Whole body MRI using STIR is an upcoming tool for screening of diseases with potential to spread in the entire body, for example, in metastatic work up for cancers. A typical coronal fast Spin Echo (SE) STIR sequence is performed using a body coil. Overlapping sections can be acquired and pasted together to get whole-body pictures. As compared to the existing whole body studies like PET; this has the advantage of avoiding hazards of radiation and intravenous contrast. It can also be safely repeated for response evaluation. This sequence is can be performed immediately after brain MRI at the same setting within a reasonable time as no additional hardware is required.

The anti-parasitic drugs praziquantel and albendazole are the first line of management for cysticercosis [5]. However, treatment of cysticercosis can precipitate an intense inflammatory response causing local tissue swelling and generalized anaphylactic reaction which may further worsen the symptoms [5,7]. This is especially important in cases with widespread disease as a large number of larvae can be in the active phase of the disease. Premedication with corticosteroids has shown to decrease the incidence of these complications [7,8]; however no consensus has been laid down in such scenarios. Park et al. [1] have tried using a lower dose of albendazole (12 mg/kg, while the routine dose is 15mg/kg) along with steroids. In our case the whole body MRI displayed the true extent of disseminated cysticercosis and helped modifying the treatment protocol.

Conclusions

To conclude, in endemic areas where disseminated cysticercosis is a common clinical presentation whole body MRI can prove to be a

valuable tool to assess the entire disease burden more accurately and tailor the medical management accordingly.

References

- [1] Park S.Y., Kong M.H., Kim J.H., Song K.Y. 2011. Disseminated cysticercosis. *Journal of Korean Neurosurgical Society* 49:190-193.
- [2] Akhtar M.N., Agarwal S. 2012. Disseminated cysticercosis incidentally diagnosed in a patient of low backache: a case report and concise review of literature. *Asian Pacific Journal of Tropical Medicine* 5:582-586.
- [3] Ndimubanzi P.C., Carabin H., Budke C.M., Nguyen H., Qian Y.J., et al. 2010. A systematic review of the frequency of neurocysticercosis with a focus on people with epilepsy. *PLoS Neglected Tropical Diseases* 4: e870.doi:10.1371/journal.pntd.0000870.
- [4] Schantz P.M., Wilkins P.P., Tsang V.C.W. 1998. Immigrants, imaging and immunoblots: the emergence of neurocysticercosis as a significant public health problem. In: *Emerging infections 2*. (Eds. W.M. Scheld, W.A. Craig, J.M. Hughes). ASM Press, Washington, D.C.: 213-241.
- [5] Carpio A. 2002. Neurocysticercosis: an update. *Lancet Infectious Diseases* 2:751-762.
- [6] Kimura-Hayama E., Higuera J.A., Corona-Cedillo R., Chávez-Macías L., Perochena A., Quiroz-Rojas L.Y., Rodríguez-Carbajal J., Ciales J.L. 2010. Neurocysticercosis: radiologic-pathologic correlation. *Radiographics* 30:1705-1719.
- [7] Baily G.G. 2003. Cysticercosis. In: *Manson's Tropical Disease*. (Eds. G.C. Cook, A. Zumla). 21st ed. London/Philadelphia, Saunders/Elsevier Science Ltd:1584-1595.
- [8] Wadia N., Desai S., Bhatt M. 1988. Disseminated cysticercosis. New observations, including CT scan findings and experience with treatment by praziquantel. *Brain* 111:597-614.

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