

# Isolated cysticercosis of the cauda equina

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### ABSTRACT

Cysticercosis is the most common parasitic infection of the central nervous system. It is an endemic condition in developing countries, but the incidence rate is increasing in developed countries as well because of rising immigration. Spinal involvement is quite rare and it is usually associated with concomitant intracranial infective lesions. We present an unusual case of a 44-year-old woman who experienced a cauda equina syndrome. Magnetic resonance imaging disclosed two intradural cystic lesions at L4-L5 level. Only after histological examination the diagnosis of cysticercosis was definitively determined. The entire neuraxis evaluation confirmed that it was a rare form of isolated intradural racemosus type cysticercosis of the cauda equina. Steroids and albendazole were administered and post-operative course was uneventful. In this paper we discuss clinical, pathogenic and therapeutic aspects of this infective pathology.

**Key words:** Cauda equina syndrome, isolated spinal cysticercosis, neurocysticercosis, parasitic infection, racemosus type, taenia solium

### Introduction

Cysticercosis is the most common parasitic disease affecting the human central nervous system and is caused by the tapeworm of *Taenia solium*.<sup>[1]</sup> In all patients with neurocysticercosis (NCC) the spinal involvement is uncommon (1-3% of all cases).<sup>[1]</sup> This condition is endemic in Central and South America, sub-Saharan Africa and east and south Asia.<sup>[2]</sup> Raising migration from these endemic areas has consequently caused an increasing incidence of NCC in developed countries as well, where this infection is considered rare.<sup>[2]</sup> We report a case of isolated intradural NCC of the cauda equina.

### Case Report

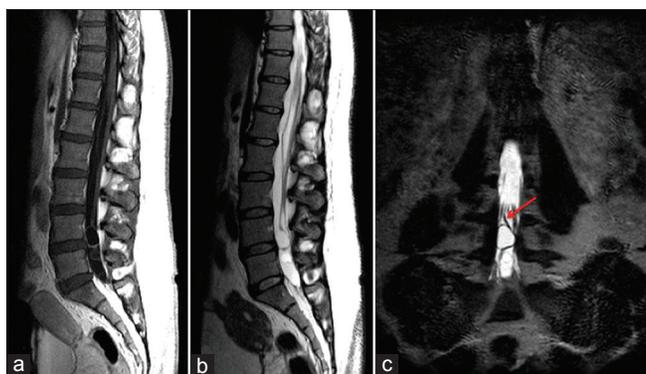
A 44-year-old housewife, born in Ecuador and otherwise healthy, was referred to us with a two years history of

low back pain and left L5 radiculopathy complicated with more recent complaints of urinary incontinence and progressive paraparesis. Neurological examination disclosed muscle strength as grade — in both lower extremities with consensual diminished reflexes. Moreover, the patient presented hypoesthesia in the left L5 dermatome and saddle anesthesia. Magnetic resonance imaging (MRI) of the lumbar spine revealed two well-defined intradural cystic lesions, without contrast-enhancement, at L4-L5 level [Figure 1]. Our presumptive diagnosis was an intradural tumor of the cauda equina. This is why we did not perform any specific serologic or cerebrospinal fluid (CSF) tests. Therefore, the patient was subjected to L4-L5 laminectomy, but when the osteotomy was completed we had a surprise. The underlying dura appeared tough and tense with a spontaneous laceration in one point, through it a small cyst came out. After opening the dura the roots appeared tied up in bundle around two other lesions, not having been disclosed by preoperative MRI. By careful microsurgical dissection, the cystic masses were removed in toto, thanks to a clear cleavage plane [Figure 2]. The wound was irrigated with saline solution. The specimens were sent for histopathological analysis. Gross examination showed three transparent cysts and each one presented a small yellowish nodular area [Figure 3]. Histological examination demonstrated the cystic wall consisted

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**Figure 1:** Preoperative MRI of the lumbar spine documenting two cystic lesions. The upper cyst had a diameter greater than 5 mm. (a) T1 sagittal section. (b) T2 sagittal section. (c) T2 coronal section with evidence of root dislocation (red arrow)

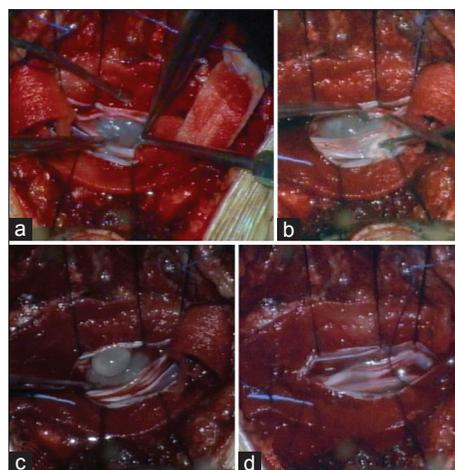


**Figure 3:** Macroscopic appearance of the cystic lesions

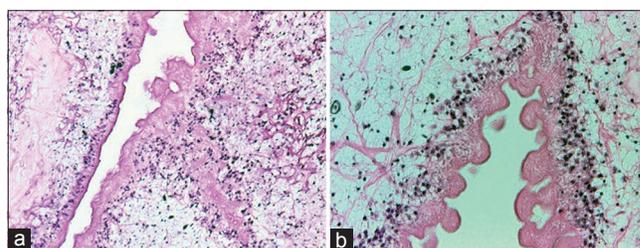
of an outer cuticular layer with brush-like border, an epithelial-like intermediate layer, and an inner reticular layer made up of a canaliculi network. The scolex was not been identified [Figure 4]. Racemosus type of NCC was the final diagnosis. Post-operatively, the patient was treated with albendazole (15 mg/kg per day) for 4 weeks along with dexamethasone (4 mg \ twice \ daily for 1 week, then 4 mg per day for 10 days and every other day for 6 days). Clinically, the woman showed marked improvement in pain and motor strength, and a complete cranio-spinal MRI evaluation excluded any other cysticercosis lesions. The neuroradiologic follow-up studies, performed at 3, 6 months and 1-year after the operation [Figure 5], demonstrated a complete resolution of the parasitic disease. The patient returned to her normal daily activities three months after the surgical procedure.

## Discussion

Despite the high incidence of NCC in endemic areas, the spinal involvement is uncommon when compared with the cerebral one. Even rarer is a spinal parasitic infection without evidence of concomitant cranial disease.<sup>[2,3]</sup> The low incidence of spinal lesions is

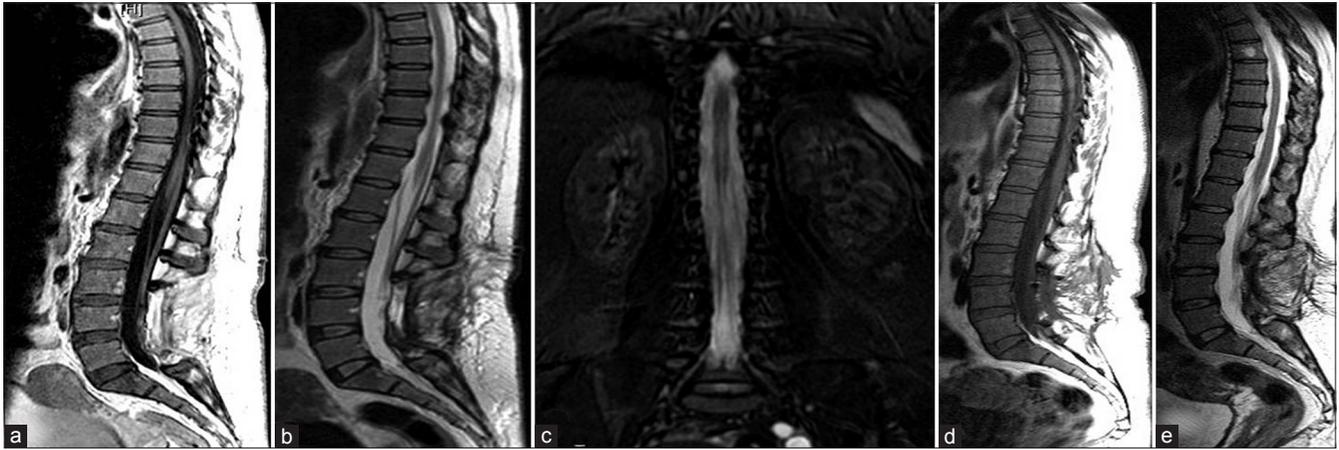


**Figure 2:** Intraoperative images. (a-c) Exposure of the lesions. (d) Complete removal of the lesions



**Figure 4:** Photomicrographs of the histopathological specimen, H and E. (a) Original magnification  $\times 200$ . (b) Original magnification  $\times 400$

believed to be proportional to the regional blood flow, in fact the brain bloodstream is 100-fold greater than that of in the spine. This would help to explain the most frequent distribution in the thoracic region, which is the spinal segment with the highest blood flow, followed by cervical, lumbar, and sacral tracts.<sup>[2]</sup> The most common is the subarachnoid type (80% of the cases) and is thought to be a result of direct CSF dissemination from cerebrum.<sup>[3,4]</sup> Instead, we presented a case of subarachnoid NCC of the cauda equina without evidence of brain involvement, suggesting that hematogenous dissemination is also possible.<sup>[1,3,4]</sup> To our knowledge, in the literature were reported only about 10 similar cases.<sup>[1-9]</sup> Clinical symptoms are not specific and can mimic other lesions.<sup>[1]</sup> Symptomatology can be caused by direct compression of the spinal cord/roots by cysticerci and by local or at distance inflammatory reactions (arahnoiditis). Another mechanism of lesion is degeneration of the spinal cord due to pachymeningitis or circulatory insufficiency (CSF congestion). The diagnosis is almost always definitive only after surgery. Before operation it is of paramount importance to have recent neuroradiologic studies due to the possibility of cystic migration.<sup>[10]</sup> Treatment of spinal cysticercosis is still controversial. However,



**Figure 5:** MRI of the lumbar spine confirmed the absence of local recurrence. (a-c) 3 months follow-up. (d-e) 1 year follow-up

in our opinion and according to the American Society for Microbiology Current Guidelines for treatment of NCC, the management is primarily surgical, especially in the presence of progressive neurological dysfunction and when the diagnosis is doubtful.<sup>[5]</sup> Even if we were able to remove all the three cysts without breaking the capsule, it is a common practice that the anticysticercal therapy should be always administered because NCC is considered to be a systemic disease with focal manifestations. The two mostly used cysticidal drugs are albendazole and praziquantel, but it seems that the former could be more effective in destroying subarachnoid cyst due to its higher CSF concentration.<sup>[3]</sup> Furthermore, when antiparasitic therapy kills the larvae, an inflammatory process usually occurs with worsening neurologic symptoms. For this reason, it is advisable to combine with steroid therapy. We used dexamethasone because it also increases albendazole blood level.<sup>[1,3,5]</sup> In conclusion, aggressive and individualized treatments are required for spinal NCC because of the limited available space inside the spinal canal. Morbidity associated with this potentially curable illness is still significant, even with an optimal management strategy.<sup>[3]</sup> Outcome may be related to many factors such as location, severity of inflammation and duration of symptoms at the time of treatment.<sup>[4]</sup> Subarachnoid NCC is considered to be less responsive to drug therapy than the intraparenchymal form.<sup>[2,4]</sup> This is the reason why we believe that the surgical option represents the mainstay in almost all patients. This is particularly true in the developing countries, which are endemic areas, due to the

inconvenient availability of immunologic tests and short period of medical observation.<sup>[1]</sup> However, we must not scotomize the crucial role of chemotherapy and follow-up to ensure the best chance of cure in spinal neurocysticercosis over time.

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