

MRI Findings of a Rare Case of Gradual Spinal Cord Compression Caused by a Thoracic Spinal Arachnoid Cyst

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Abstract

Introduction: Extradural spinal arachnoid cyst is a rare, male-dominated condition. It is usually asymptomatic, and spinal cord compression is rarely described. MRI (magnetic resonance imaging) is the gold standard for diagnosis and neurosurgical treatment. We report a case in order to study the contribution of MRI in the diagnosis. **Observation:** Mrs. DB, 65 years old, with no medical or surgical history, was referred by the neurosurgery department for progressive paraplegia for 02 years. The MRI made for the circumstance revealed an intraductal, extradural and extramedullary cystic lesion, at the posterior thoracic level, extending from Th6 to Th8, well circumscribed, without a wall of its own. It is in French hyposignal T1, hyper signal T2 and unrestricted diffusion in ADC. It severely compresses the spinal cord in front. No signal abnormality of the spinal cord is in the regard. It is not modified after the injection of the gadolinite contrast medium. No stigma of intra-lesional bleeding is in T2*. It was associated with a protrusive degenerative lumbo-discarthrosis stepped from L2-L3 to L5-S1 leading to a disco-radicular impingement. She was operated on by the neurosurgery team and the post-operative effects were simple. There is a clear regression in his lower limb deficit after two months. **Conclusion:** Compressive arachnoid cyst is rare and chest topography is the most common. MRI is the reference examination for diagnosis. The treatment is surgical and has a good prognosis.

Keywords

Vertebral Spinal Arachnoid Cyst, MRI, Spinal Cord Compression, Kati

1. Introduction

Extradural spinal arachnoid cyst, described as a “meningeal” cyst or “arachnoid” pouch, is a rare condition with the most common thoracic location with a male predominance [1] [2]. It was first described by Magendie in 1843 [3]. It is usually asymptomatic, and the spinal cord compression picture is rarely described [4]. The diagnosis is radiological, and MRI remains the reference radiological examination given its high sensitivity and specificity for lesions containing cerebrospinal fluid (CSF) [5]. The chronic nature of neurological lesions progresses progressively. The MRI characteristics of an arachnoid cyst are identical to those of cerebrospinal fluid (T1 hyposignal, T2 hyposignal, without pathological gadolinated contrast), its dorsal extradural location. The MRI diagnosis was corroborated intraoperatively by the neurosurgeon and confirmed by pathological anatomy examination. Treatment is neurosurgical [1]-[5].

2. Observation

Mrs. DB, 65 years old, resident of Kati, with no known medical and surgical history, was referred by the neurosurgery department for progressive paraplegia for 02 years. His symptoms date back to the end of 2022, marked by chest and lumbar pain that prompted multiple consultations. Initially, she underwent a thoracolumbar x-ray which concluded that she had degenerative low back disc disease, and treatment based on anti-inflammatory drugs and muscle relaxants was initiated, resulting in a slight improvement. Given the persistence of the pain, she consulted the doctor again, and a thoracolumbar CT scan ordered concluded that the X-ray diagnosis was the same. He was referred to the neurosurgery department of the Kati University Hospital. He is in the department, on 06/01/2025, the patient's anamnesis revealed for two years, the appearance of a spinal syndrome and a lesional syndrome with a sensory level at the T6-T8 level by the examination of the dermatome (from the mid-thoracic region to the tip of the sternum), there is flaccid paraplegia (muscle strength rated at 0/5) and stress urinary incontinence.

The MRI examination is done for the occasion with weighted sequences: in sagittals T1 without, in Fatsat after injection of gadolinium chelate, T2, T2 STIR, T2* and Diffusion. It had demonstrated a cystic formation of density comparable to that of cerebrospinal fluid (CSF), intracanalal, extra medullary and extradural. It was located at the posterior thoracic level, extending from the Th6 to Th8 vertebrae, well circumscribed, without its own wall, in frank hyposignal T1, hypersignal T2 and diffusion, without restriction in ADC. The cystic lesion measured 58 mm cranio-caudal diameter, 19 mm anterior-posterior diameter (sagittal section) and 28 mm transverse diameter (axial section). It severely compressed the spinal

cord in front of it without any signal anomaly and was not enhanced after injection of the gadolinated contrast medium. There was no stigma of intra-lesional bleeding in T2* (**Figure 1** and **Figure 2**). It was associated with degenerative lumbo-discarthrosis with disc dehydration and circumferential disc overhangs stepped from L2-L3 to L5-S1 with bi-foraminal filling, leading to a slight discoradicular impingement. However, the reason for the MRI was clearly indicated at the thoracic sensory level T6-T8 (a dorsal compression). The clinical signs of lumbar degenerative disc disease have a low clinical translation in the lower limbs.

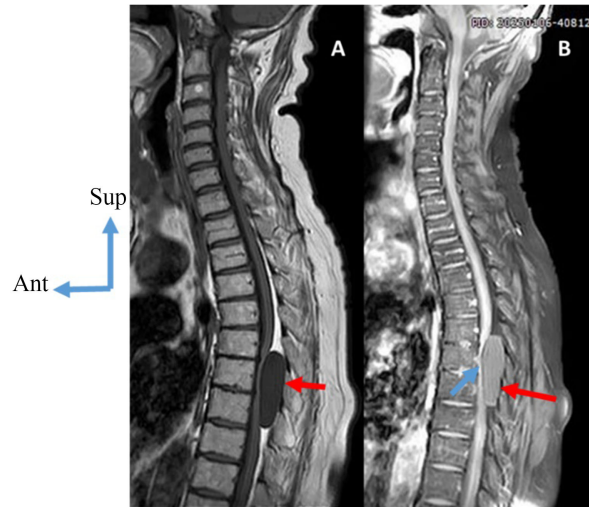


Figure 1. MRI sagittal section in sequence T1 (A) showing the cyst in franc hypo signal (arrow) without enhancement after injection of gadolinium chelate; (B) better visualizing the compressed marrow (blue arrow).

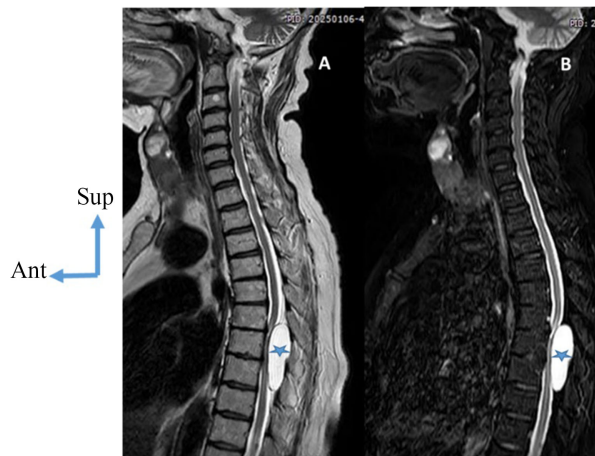


Figure 2. MRI sagittal section in sequence T2 TSE (A) and T2 Stir (B) showing the spinal arachnoid cyst in frank hyper signal (blue arrow).

She was operated on by the neurosurgery team by a posterior approach visualizing the cyst (**Figure 3**) which allowed the cyst to be enucleated with intrusion of the pocket. The operative report did not indicate a dural breach. The post-operative effects were simple. There was a clear regression in the limb deficit at

two months of postoperative follow-up, but stress urinary incontinence persisted.

Iconographies: we present these few images illustrating our observation.

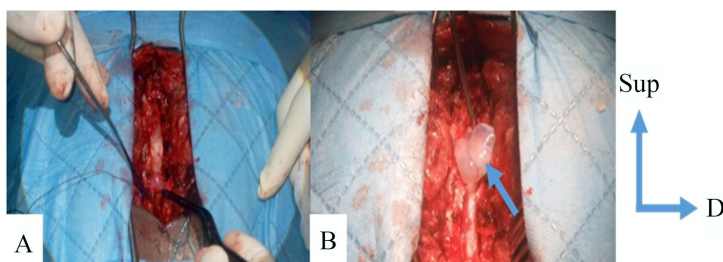


Figure 3. Intraoperative image visualizing the cyst (arrow).

3. Discussion

- KAER (Extradural Spinal Arachnoid Cyst) is a benign, relatively rare condition. Its spinal topography is essentially thoracic (65%), often extending over several vertebrae [6], as evidenced by our observation which extends over three vertebrae (Th6 to Th8), cervical and lumbosacral locations are very rare [7]. It is usually posterior or posterolateral, which corroborates our observation, however, an extension through a conjugation hole can sometimes be noted [8]. It can affect both sexes but a male predominance has been described in the series reporting several cases [6] [9], in our case this observation is made in a woman. Its diagnosis can be made at any age ranging from 4 to 80 years old [10], which corresponds to our case. Most arachnoid cysts (AK) are asymptomatic and incidentally discovered on MRI or myelography [11]. When they are expressed, they manifest as pain, paresthesias, intermittent claudication, and a varying degree of spasticity [8]. The neurological signs are related to the level of lesion and therefore the level of spinal cord compression. Clinical signs tend to worsen gradually. However, a spurt course with periods of remission and exacerbation has been reported [8]. In our context, the clinic was made up of paraplegia and progressive voiding disorders. MRI is the diagnostic tool of choice for detecting these AKs because of its high sensitivity and specificity for lesions containing cerebrospinal fluid (CSF). It has the advantage of non-invasively showing the exact location, extent and relationship of the injury to the spinal cord [12]. Generally, the extradural arachnoid cyst presents as a mass located behind the spinal cord and similarly signals the CSF on both the T1 and T2 sequences. Intravenous injection of gadolinium is useful to rule out other lesions that can be confusing, such as;
- Hydatid cyst: is a parasitic disease caused by the larvae of *Echinococcus granulosus*, and is endemic in breeding regions (Mediterranean basin, North Africa, Middle East). Their MRI aspects are those of fluid lesions made up of several daughter vesicles, separated by the septa. They are in T1 hyposignal and T2 hypersignal. There is a discreet wall enhancement after intravenous

injection of gadolinium.

- Aneurysmal bone cyst: intraosseous lesion with liquid-fluid level made up of bleeding of different ages. He is in hyposignal.
- The dermoid cyst is more common in the lumbar area, its aspects are heterogeneous containing fat and other cutaneous elements.
- Other cystic lesions: joint synovium, tumor such as spinal hemangioblastoma with different signals and dynamic behavior.
- MRI also makes it possible to:
 - to show any septa that partition the cyst;
 - specify its unique or multiple nature;
 - to assess the extent of bone marrow atrophy and the extent of myelomalacia lesions;
 - Assess the patient's neurological prognosis [12].

The treatment is surgical, the objective is to restore normal circulation of the CSF, remove the radiculo-medullary compression and avoid recurrences [13]. It should also allow samples to be taken for an anatomical and pathological examination to confirm an already suspected diagnosis or to make the diagnosis when it has not been mentioned preoperatively [13]. Several surgical methods can be proposed, but it seems that block excision of the cyst whenever possible, associated especially with neck ligation and closure of the dural defect, are the only guarantees of adequate decompression and the absence of recurrence [14] [15]. The prognosis for KAER is good, especially if diagnosed and treated early. Nevertheless, even if surgery ensures good functional results, some authors have some reservations about the prognosis in the presence of certain preoperative factors such as advanced age, long-term neurological deficit or myelomalacia on MRI. This may be due to spinal cord vascular failure caused by chronic compression of the spinal cord [9]. Our patient underwent excision surgery, the pouch could not be enucleated in a single piece but with fragmentation of the cystic membrane. The operative report does not indicate any communicating dural breach.

We had not performed a postoperative MRI, the evaluation was rather clinical.

Two months after the postoperative period, the patient has gradually recovered motor (3/5) and sensory (touch) functions. Walking was possible with a walker after a paraplegia. However, stress incontinence persisted, even if the patient attests to a slight improvement.

Motor physiotherapy is being underway to help improve motor skills and urinary incontinence.

4. Conclusion

Compressive arachnoid cyst is rare, and chest topography is the most common. MRI is the reference examination for diagnosis. The treatment is neurosurgical and consists of the removal of the cyst. The prognosis is generally good if treatment is early and adequate.

Consent

For this study, we received consent from the patient, the head of department and the director of the KATI University Hospital.

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Author Contributions

Mody Abdoulaye CAMARA: choice of topic, drafting of the protocol and drafting of the final article.

Ilias Guindo: supervision, definition of the methodology, and critical review of the research protocol.

Amadou Doumbia: conducting the medical imaging examinations, formatting the manuscript in accordance with the recommendations, and critical review of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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