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Case Study

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A CASE REPORT ON SPINAL EXTRADURAL ARACHNOID CYST INTHE THORACO-LUMBAR REGION

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ABSTRACT

Arachnoid cysts are fluid-filled sacs of the arachnoid layer which are composed of substances similar to but not equal to the cerebrospinal fluid (CSF).[1] Spinal arachnoid cysts are one group of rare spinal expansions that have both baffled and intrigued the curiosityof neurologists and neurosurgeons for years.[2] They are considered as rare causes of spinal cord compression.[3] The exact causes of these cysts still remains unclear, but the most accepted explanation is the existence of certain areas of weakness in the spinal dura. The symptoms depend on the location of these cysts. Magnetic resonance imaging (MRI) is mainly used for its diagnosis. Therapeutic management of these cysts depends on the clinicalpresentation. Surgical removal is usually indicated for patients who are having neurological impairment.[4]

KEYWORDS: Spinal Arachnoid cyst, Extradural lesion, Laminectomy.

INTRODUCTION

Arachnoid cysts are fluid-filled spaces within the brain that are lined with arachnoid membranes and are not cancerous. They represent around 1% of all brain lesions that occupy space. In adults, they occur in about 1.4% of the population, with more cases seen in females,while in children, the prevalence is around 2.6%.[5] These cysts do not constitute neurodegenerative disorders and are probably congenital in nature.

A spinal arachnoid cyst is an uncommon anomaly in the spine, representing about 1% to 3% of spinal tumors.[1] They are mostly asymptomatic, but in some cases, they can exert pressure on the surrounding areas, resulting in neurological symptoms. These cysts can arise from congenital factors or develop secondary to various causes.[6] A spinal extradural arachnoid cyst develops when a small defect in the dura mater causes the accumulation of cerebrospinal fluid (CSF) and herniation of the arachnoid membrane. The exact cause of this herniation is still a matter of debate and could be either congenital or acquired. These cystsare typically located from the mid-thoracic spine to the thoracolumbar junction, often in a posterior or posterolateral position. Localised pain and myelopathy are typically seen in children and young adults.[7]

Even though SEACs are rare, they are considered as important in neurosurgical view because they are surgically curable disease.[8] Various surgical techniques have been developed for the treatment of spinal extradural arachnoid cysts (SEACs); however, there is no consensus on the most appropriate treatment approach. While many researchers advocate for repairing the dural defect, the complete removal of a SEAC remains a subject of debate.[9]

Here we report a case of Spinal Extradural Arachnoid cyst in the Thoracolumbar region.

CASE REPORT

A 60 year old female came to the Neurology department with complaints of insidious onset, gradually progressive, symmetrical proximal weakness of bilateral lower limbs since the last2 years. She has difficulty in getting up from the squatting position and lower limb pain on walking. She also experiences sudden onset weakness in both knees while walking & standing followed by falls with no bladder and bowel complaints. Based on these symptoms, She was advised to do an MRI of the spine to rule out any neurological or structural abnormalities. The MRI showed a large lobulated extradural lesion extending from the upper border of T11 to mid L1 vertebral body level. The lesion appears markedly hyperintense on T2 weighted images and hypointense on T1- following almost CSF signal

intensity. A few thin hypointense septations are noted within reaching upto 1.3 mm. It measures 3.8 x 2.1 x 7 cm and displaces the thoracolumbar spinal cord and conus anteriorly markedly compressing them with reduction of anteroposterior dimension. It extends through the neural canal on either side at T11- T12 level. It extends to right neural foramen at T12-L1 level. There is associated marked widening of the above mentioned neural foramina. There is scalloping and widening of the involved bony spinal canal with thinning of adjacent vertebral elements (fig.1)

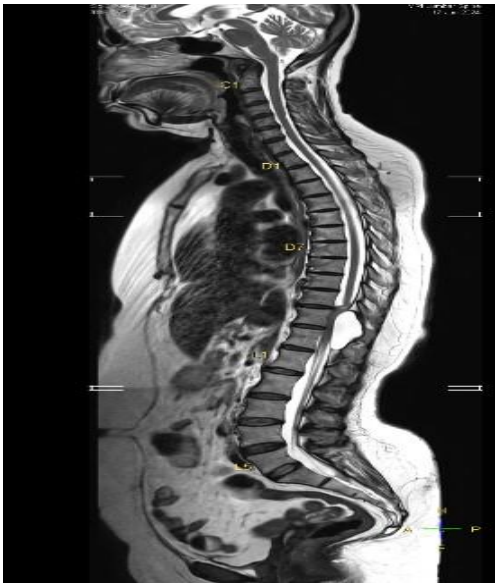

Fig. 1: Preoperative MRI of the case.

She was admitted for surgery and she underwent D11 Laminectomy with D10, D12 bilateral pedicile screw fixation and gross total excision of cyst (fig 2).

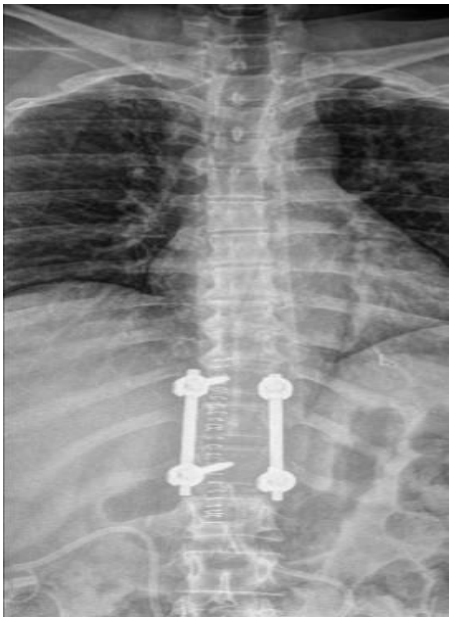

Fig. 2: Postoperative X Ray of the case.

Post surgery was uneventful and her condition improved gradually.

DISCUSSION

Arachnoid cysts are fluid-filled sacs or extensions of the arachnoid layer which contains substances whose composition is similar but not equal to the cerebrospinal fluid. It is not actually a neurodegenerative disorder, rather caused by underlying defect present in the arachnoid layer and is usually congenital in nature. These cysts may manifest either sporadically or in conjunction with other anomalies or medical conditions. They might emerge during early childhood but can also originate later, exhibiting growth or reduction in size over time. Detection can occur through prenatal ultrasound screenings or may occur during various stages of life, including childhood or adulthood. It is to be noted that numerous arachnoid cysts show no symptoms.[1]

Arachnoid cysts can be categorised into two types: primary developmental cysts and secondary cysts based on their development. Primary cysts form due to the division of the arachnoid membranes during foetal development, leading to the formation of abnormal accumulations of cerebrospinal fluid (CSF). Secondary cysts, which are less frequent, typically emerge following trauma, surgery, infection, or intracranial hemorrhage.[5]

Spinal arachnoid cysts are uncommon cystic masses found in the spinal canal, with varying characteristics and typically benign nature, categorised as either intra- or extradural (intradural being less common) based on their location. They are not frequently encountered, often identified incidentally via MRI before or after the onset of symptoms such as pain or nerve dysfunction due to spinal root or cord compression. Many cases go unnoticed in asymptomatic individuals for extended periods and are only addressed when symptoms like radiculalgia, limb spasms, weakness, upper-limb pain, or urinary and bowel dysfunction arise.

The causes of these cysts are multifaceted, involving congenital factors, idiopathic origins, and acquired instances linked to factors like bleeding, inflammation, infections, or trauma from punctures.[10,11]

Ji Qi, Jun Yang, and Guihuai Wang proposed a new five-category stratification system for selecting treatment for spinal arachnoid cysts, based on evaluating the location and abnormalities observed in MRI scans. This system is outlined in Table 1. It utilises a multimodal approach combining T1-weighted and T2-weighted magnetic resonance imaging techniques.

Table 1: The novel five category classification of spinal arachnoid cysts.[11]

TYPES	DESCRIPTION
Type 1	Intra medullary cyst
Type 2	Subdural Extramedullary cysts
Type 3	Subdural Epidural cysts
Type 4	Intraspinal Epidural cysts
Type 5	Intraspinal Extraspinal cysts

There is another classification of spinal cysts which was proposed by Nabors *et al.* It is depicted in **Table 2**.

Table 2: Showing the classification proposed by Nabors *et al.*[12]

TYPE	PATHOLOGY
Type I	Extradural Meningeal cyst without spinalnerve root fibers
Type IA	Extradural Meningeal or Arachnoid cysts
Type IB	Sacral Meningocele
Type II	Extradural Meningeal cyst with spinal nerveroot fibers (Tarlov perineural cysts)
Type III	Spinal Intradural Arachnoid cysts

MRI is the preferred diagnostic method due to its ability to precisely depict the localization, size, and proximity of the arachnoid cyst to the spinal cord. It can also reveal cord atrophy resulting from compression, aiding in predicting neurological outcomes. While myelography and CT-myelography (CTM) remain diagnostically relevant, they can illustrate communication between the subarachnoid space and the cyst, which is crucial for surgical preparation.[13]

The majority of spinal arachnoid cysts are situated behind the spinal cord in the thoracic regions. The preferred treatment involves procedures like laminectomy or laminoplasty coupled with puncture, marsupialization, or excision. It is theorised that these cysts may enlarge due to fluctuations in cerebrospinal fluid (CSF) pressure during activities like exercise or Valsalva manoeuvres. This enlargement is facilitated by small channels enabling communication between the cysts and the subarachnoid space.[8,14] The primary goal of surgical intervention is neural decompression and the prevention of cyst refilling. This objective is most effectively achieved through the complete removal of the cyst and the closure of the communication between the cyst and the subarachnoid space.[13]

Despite being uncommon, spinal arachnoid cysts hold significance in neurosurgical practice as they are considered as surgically treatable conditions. Our patient had a spinal arachnoid cyst in the thoracolumbar epidural region for which she had undergone D11 Laminectomy with D10, D12 bilateral pedicle screw fixation and gross total excision of cyst. Post surgery, her condition had gradually improved.

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Conflict of interest

The authors declare that the case report was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Abbreviations

CSF: CerebroSpinal Fluid.
MRI: Magnetic Resonance Imaging
SEAC: Spinal Extradural Arachnoid Cyst.

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