Case report

Dorsal cervical spinal arachnoid cyst (Type III) presenting with dorsal column dysfunction: A case report

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Context: Spinal arachnoid cysts are usually asymptomatic and discovered incidentally. Expansion of the cyst, whether acute, subacute or chronic, leads to neural compression resulting in radiculopathy and/or myelopathy.

Findings: This case report is of a patient who presented primarily with posterior column dysfunction, subacute in onset and rapidly progressing. Images of the cervical spine showed a dorsal arachnoid cyst, causing significant cord compression and signal changes in the cord, with no scalloping of the vertebrae.

Conclusion: The author explains the mechanism of rapid expansion of an asymptomatic spinal arachnoid cyst, causing neural compression leading to fast progression of neurological deficits. The dorsal location of the cyst, explain the absence of radiculopathy, which is a common presenting feature of ventrally located intradural arachnoid cyst.

Keywords: Posterior column dysfunction, Intradural, Arachnoid cyst, Fenestration, Laminotomy

Introduction

Spinal arachnoid cysts (SAC) occur in the cervical, thoracic, lumbar and sacral regions in descending order of frequency.¹ These can be either ventral or dorsal to the cord in the cervical and thoracic regions. The commonest location is mid/lower dorsal thoracic region. There are 26 cases of ventral cervical arachnoid cyst reported so far.² According to another recent literature review, only 17 cases of anterior intradural arachnoid cyst causing cord compression were reported so far.³ I report a unique case of dorsal cervical arachnoid cyst presenting with predominant dorsal column dysfunction and myelopathy.

Case report

A twenty-nine-year-old female with no known morbidities, presented, with episodic electric shock like sensation down the back and rapidly progressing imbalance while walking with frequent falls, for three weeks. Clinically she had features of dorsal column dysfunction (impaired fine touch, vibration and position sense from fifth cervical cord segment (C5) level downwards, ataxia and positive Romberg's sign) and myelopathy (exaggerated

biceps, brachioradialis, triceps, patellar and ankle reflexes associated with bilateral extensor plantar reflex). Neck flexion elicited Lhermitte's sign. Magnetic resonance imaging (MRI) of the cervical spine showed a dorsal intradural cyst extending from the lower border of fourth cervical vertebra (C4) to upper border of first thoracic vertebra (D1), causing maximum cord compression and anterior displacement of the cord at C5–7 levels (Fig. 1). There were signal changes within the compressed cord. There was no scalloping of the vertebrae, usually seen with intraspinal cysts, due to chronic compression. Patient underwent C5–6 laminotomy and fenestration of the cyst. Intra operatively there was bluish discoloration of the thinned out and bulging dura, suggestive of underlying arachnoid cyst. The cyst was evident on opening the dura. The histopathology report was arachnoid cyst wall. Post operatively there was total resolution of the posterior column dysfunction in one week. Post operative MRI after one month showed a fully expanded spinal cord with signal changes and near complete resolution of the cyst with a small dorsal residual CSF collection, at C5,6 levels (Fig. 2).

Discussion

SAC are traditionally classified into Type I (extradural without spinal nerve root fibers), Type II (extradural

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Figure 1. a,b & c – Pre operative magnetic resonance imaging (MRI) of cervical spine, T2 W sagittal sequences, showing dorsal cyst extending from lower C4 to upper D1 vertebrae (arrows); d – axial section showing the cyst (arrow 1) compressing the spinal cord (arrow 2)

with spinal nerve root fibers) and Type III (intradural).⁴ The addition of “interdural” was proposed by Sajjad *et al.* in 2016. SAC can be idiopathic, traumatic,

Figure 2. a & b – Post operative MRI cervical spine, T1W & T2W sagittal sequences, showing fully expanded spinal cord and small residual cyst (arrows); c & d –axial sections showing the same (arrows)

iatrogenic or congenital.⁵ Congenital arachnoid cysts are mostly associated with neural tube defects and lacks inflammatory changes in histopathology specimen examination.⁶ Intradural cyst can be associated with syringomyelia secondary to deranged cerebrospinal fluid (CSF) flow dynamics.^{7–10} SAC can present with myelopathy, radiculopathy or both, corresponding to the level of neural compression, and may be associated with waxing and waning of symptoms. The commonest reported mode of presentation of SAC, in the cervical and thoracic canal, is radiculopathy [lower motor neuron lesion (LMN) signs] at the level and compression and myelopathy [upper motor neuron lesion (UMN) signs] below the level of spinal cord compression. The cysts were ventral to the cord, in all the reported cases of cervical SAC and radiculopathy (LMN signs) was the prime mode of presentation, in the majority. The unique features in our case were relative rapid onset and progression of clinical features, absence of radiculopathy (LMN signs) and absence of scalloping of the vertebrae. Another unique feature was posterior column dysfunction as the dominant clinical finding, associated with myelopathy (UMN signs). We hypothesize that, rapid expansion of an existing asymptomatic cyst, which was freely communicating with the subarachnoid space, led to the fore mentioned clinical manifestations. This may be due the development of a ball valve mechanism resulting in unilateral egress of CSF into the cyst. The anterior displacement of the cord by the SAC was probably insufficient to stretch/compress the roots and cause radiculopathy, but was sufficient to compress the long tracts resulting in posterior column dysfunction and myelopathy. This view is supported by the fact that radiculopathy with/without myelopathy is the classic clinical presentation of cervical intervertebral disc prolapse and ventrally located SAC, which causes ventral compression and posterior displacement of the root/cord.

The advent of magnetic resonance imaging (MRI) has led to increase in number of asymptomatic incidental SAC. In MRI the SAC will show CSF density in T1W and T2W sequences, no enhancement or diffusion restriction and decreased CSF flow within the cyst. Flow-sensitive MRI sequences can detect communication of the SAC with the subarachnoid space.¹¹ Cine-mode MRI may be more sensitive in diagnosing intradural cysts.¹² Signal changes may not be seen within the cord, especially if the compression is chronic.¹³

Fenestration with/without excision of the cyst via a posterior or anterior approach is the treatment of choice for SAC. Posterior approach is the commonest

choice, for fenestration, though anterior approach may be opted for excision of the cyst. Posterior approach to excise, ventrally located cyst, is prone to complications, due to manipulation of the spinal cord and laminectomy.^{2,3,14,15} In the case presented, posterior approach was ideal, due to the dorsal location of the cyst in the spinal canal.

Conclusion

Dorsal SAC compressing the cord may present with dysfunction of the posterior column and myelopathy, without radiculopathy. Relatively rapid onset and progression of neurological symptoms/signs in patients with SAC may be due to acute expansion of the cyst, resulting in decompensate neural compression. Presence of signal changes within the cord and absence of scalloping of vertebrae may suggest rapid expansion of the cyst. Posterior approach is ideal for dorsally located SAC. Excision of the cyst may not be superior to fenestration because recurrence rate is comparable for both, and excision of cyst is more prone to complications.

Informed consent: The patient consented to submission of the case report to the journal.

Disclaimer: The author states that the views expressed in the submitted article are his own and not an official position of the institution.

Disclaimer statements

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