



Case Report

Cervical spine arachnoid cyst complicated by spontaneous intracystic hemorrhage: Case report and review of the literature

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ABSTRACT

Background: Spinal intradural extramedullary arachnoid cysts represent about 1–3% of all primary spinal space-occupying lesions often causing spinal cord and/or radicular nerve compression. Spontaneous intracystic hemorrhages are extremely rare and are typically found within intracranial arachnoid cysts. Here, a 55-year-old female presented with a spontaneous hemorrhage into a cervical spine arachnoid cyst warranting surgical intervention (i.e., fenestration/excision/occlusion).

Case Description: A 55-year-old female presented with 3 weeks of dull pain in the cervicothoracic region. She subsequently developed paresthesias and progressive lower extremity weakness with (urinary incontinence). The cervical magnetic resonance revealed a right anterolateral intradural extramedullary “cystic” lesion extending from C7 to T2; it contained a heterogeneous signal on T2W sequences, and a fluid-fluid level was documented on the T2-GRE and FLAIR sequences. At surgery, consisting of a laminectomy, two hemorrhagic cystic lesions were identified and removed. Histological findings were consistent with hemorrhage into an arachnoid cyst.

Conclusion: Only rarely hemorrhages develop in intraspinal intradural extramedullary spinal arachnoid cysts.

Keywords: Case report, Cavernomas, Cervical spine, Intracystic hemorrhage, Spine arachnoid cyst

INTRODUCTION

Spinal intradural extramedullary arachnoid cysts account for about 1–3% of all primary spinal space-occupying lesions, (i.e., sub-group III Nabors classification).^[7] Cyst formation can be due to congenital splitting and herniation of the arachnoid membrane (primary cysts) or acquired dural defects following trauma, neoplasms, arachnoiditis, lumbar puncture, or surgery (secondary cysts).^[2,5] Spontaneous intracystic hemorrhages are rare and are typically only reported intracranially. Herein, we report the case of 55-year-old female who presented with a paraparesis attributed to a hemorrhage occurring in a C7-T2 cervicothoracic intradural extramedullary arachnoid cyst, warranting surgical decompression and cyst excision.

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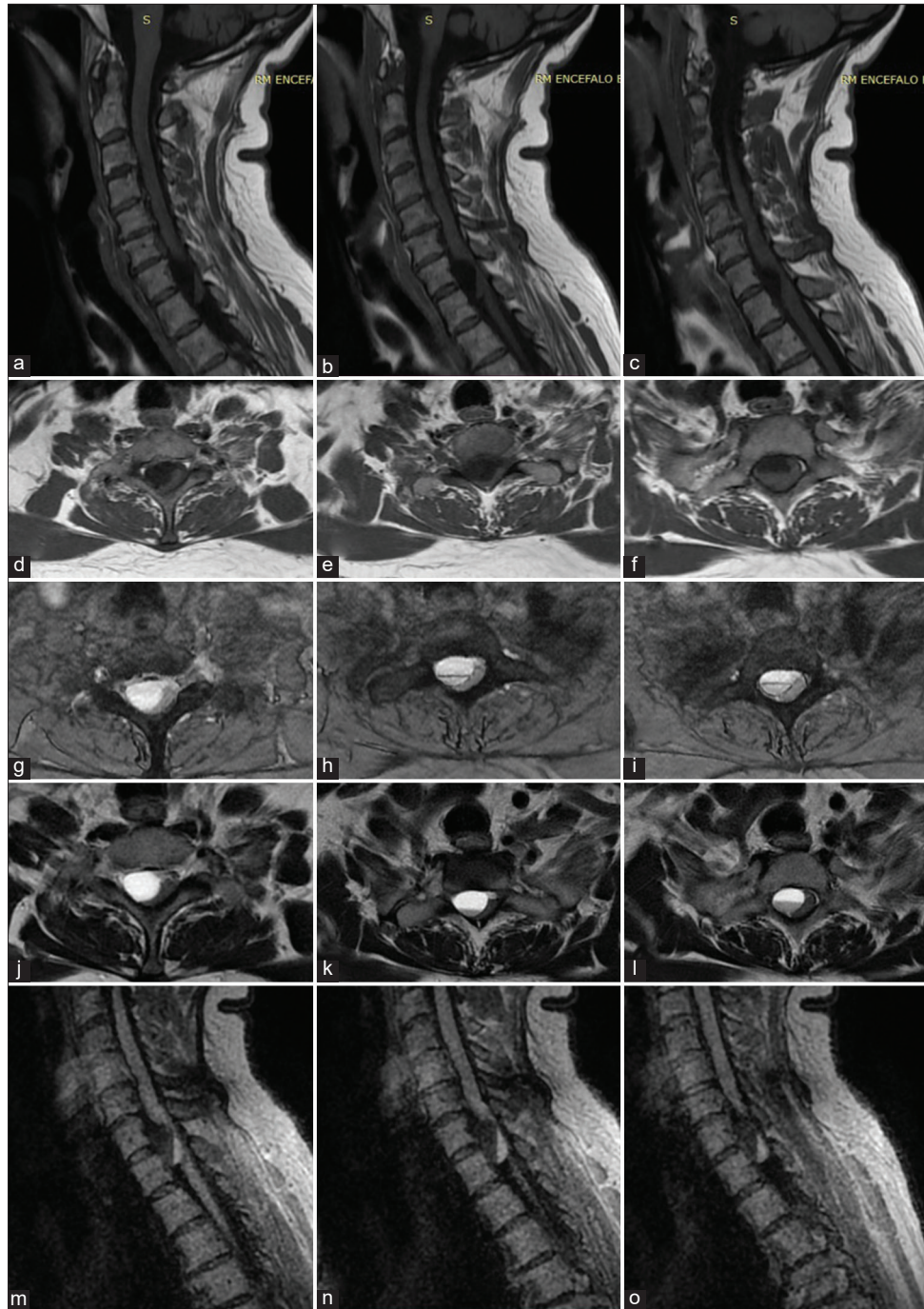


Figure 1: (a, b, c) Sagittal T1W MRI shows a lesion extending from C7 to T2 with an hyperintense anterior component and a posterior CSF-isointense area; d, e, f) axial T1W MRI shows the right anterolateral extra-axial cystic lesion determining left posterolateral shift of the spinal cord; g, h, i) axial GRE-T2W sequences detect fluid-fluid level: an hypointense line divides two components of different intensity; j, k, l) axial T2W sequences show fluid-fluid level with anterior hyperintense and posterior hypointense components ; m, n, o) in Sagittal T2W-Flair sequences the anterior component results CSF-isointense and the posterior one is hyperintense.

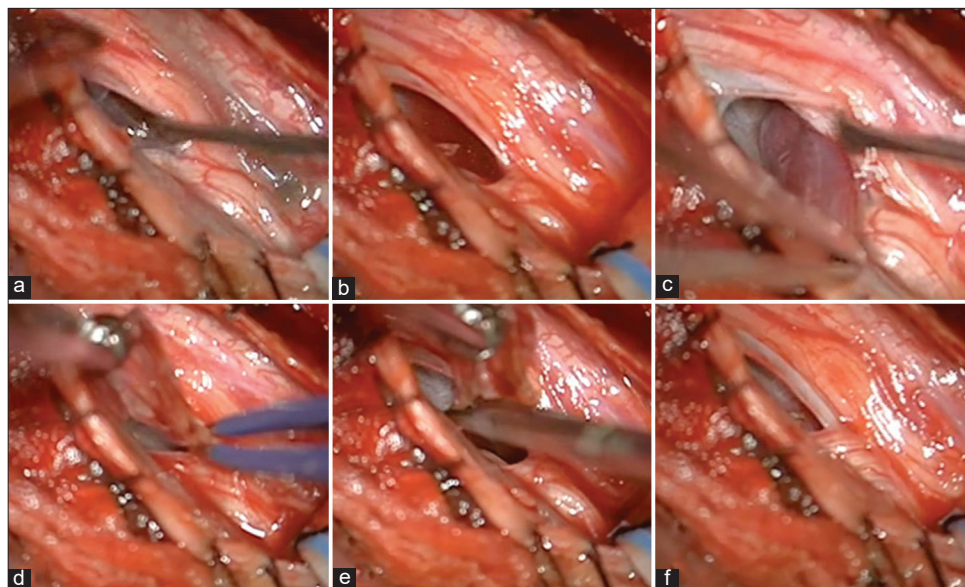


Figure 2: Spinal cord appeared dorsally displaced (a). On the right side, just below dentate ligament, a cystic formation was opened, revealing a citrine fluid (b) below, a second lesion was detected, showing signs of recent bleeding (c). The lesion was coagulated (d) and removed *en block* (e). (f) It shows the surgical field after lesions removal.

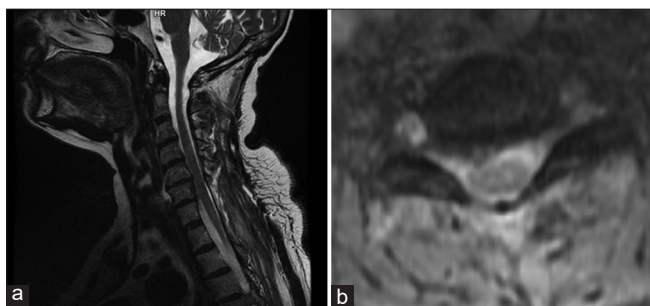


Figure 3: 3-month follow-up magnetic resonance imaging of cervical spine showed no residual lesion. a) sagittal plane; b) axial plane.

CASE DESCRIPTION

A 55-year-old female presented with 3 weeks of dull cervicothoracic pain, accompanied by lower extremity paresthesia (right >left), progressive weakness (right 0/5; left 1/5), and urinary incontinence. The cervicothoracic magnetic resonance imaging (MRI) studies showed an anteroateral intradural extramedullary cystic lesion extending from C7 to T2 resulting in the left posterolateral shift of the spinal cord. A hemorrhagic cystic lesion was strongly suspected when the T1W sequences showed an hyperintense anterior component and a posterior cerebrospinal fluid (CSF)-isointense area. Contrariwise, the anterior component was isointense to CSF and the posterior one was hyperintense T2W-Flair sequences. Further, the GRE-T2W sequences revealed a fluid-fluid level, namely, an hypointense line dividing the different components and

identifying the presence of hemosiderin, and the lesion did not enhance with contrast [Figure 1].

Surgery

The patient underwent a C7-T1 laminectomy. The spinal cord was dorsolaterally displaced toward the left. On the right side, just below dentate ligament, a cystic lesion was found and opened; a second contiguous lesion was detected showing signs of recent bleeding and was removed *en block* [Figure 2]. Intraoperative neurophysiological monitoring did not show any variation from baseline during the entire procedure.

Postoperative course

Three months after surgery, her lower extremity strength improved to 3/5 and hypoesthesias/sensory deficits resolved, along with normal sphincter functions. The follow-up cervical MR revealed no residual lesion [Figure 3].

Pathology

The pathology was consistent with a hemorrhagic arachnoid cyst [Figure 4].

DISCUSSION

Spinal arachnoid cysts are mostly located at thoracic level followed by lumbosacral and cervical spine segments. They are often placed dorsally to the spinal cord, excepted in the

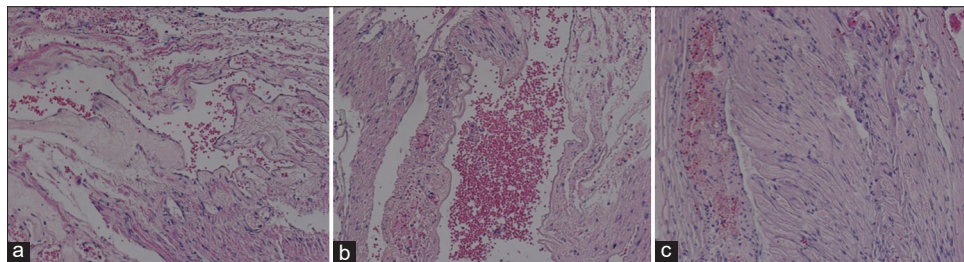


Figure 4: (a, b, c) Histopathological images of lesion specimens stained with hematoxylin and eosin ($\times 20$).

Table 1: Hypothesis on the potential mechanisms leading to hemorrhagic spine arachnoid cysts formation.

Etiology	Pathogenesis
Arachnoiditis after partial resorption of subdural hematoma	The cyst resulting from hematoma resorption can contain residual blood clots. The clots dissolve and thus widen the cyst prompting symptoms onset
Spinal aneurysm rupture	<ul style="list-style-type: none"> The rupture can occur inside a pre-existing arachnoid cyst determining its widening and symptoms onset The rupture itself can determine an arachnoiditis and subsequent hemorrhagic cyst formation
Spontaneous resolution of intradural extramedullary cavernous hemangioma	Cavernous hemangioma resolution can result in a capsulate hemorrhage larger than the original lesion. This mechanism can lead to spinal cord displacement and symptoms onset

cervical spine where they are more often ventral.^[1,8] Cyst widening can determine compression of the spinal cord and/or the spinal nerve roots prompting clinical symptoms as dull pain, sensory disturbances, gait ataxia, incontinence, or para or tetraparesis. Rarely, spontaneous hemorrhage of intracranial arachnoid cysts has been described, with few being reported in the spine.^[3,4,6] Hemorrhagic spinal arachnoid cysts may be warranted by several etiologies and may be associated with poor prognosis [Table 1].

MRI of spinal arachnoid cysts

On MRI, spinal arachnoid cysts have CSF intensity in T1W sequences but on T2W studies, they may have either CSF intensity or may be even brighter since there is no signal loss from pulsation/flow. They typically demonstrate no contrast-enhancement and on DWI studies, showing no evidence of restricted diffusion.^[8] Here, the diagnosis of intracystic hemorrhage was based on the documentation of a fluid-fluid level on the T2W-Flair and GRE sequences, along with hemosiderin detected by GRE-T2W sequences.

Treatment of symptomatic spinal arachnoid cysts

Select symptomatic spinal arachnoid cysts may warrant surgery, especially if an acute hemorrhage had results in rapid neurological impairment. Surgical techniques variously include decompressive procedures with cyst fenestration, resection, occlusion of communication with the subarachnoid space, and/or cyst-peritoneal shunts.^[1]

CONCLUSION

Herein, we report a spontaneous C7-T2 intra spinal hemorrhagic arachnoid cyst resulting in subacute cord compression that resolved following a decompressive laminectomy with cyst excision.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Fam MD, Woodroffe RW, Helland L, Noeller J, Dahdaleh NS, Menezes AH, *et al.* Spinal arachnoid cysts in adults: Diagnosis and management. A single-center experience. *J Neurosurg Spine* 2018;29:711-9.
- Fukumoto H, Samura K, Katsuta T, Miki K, Fukuda K, Inoue T. Extensive multilocular spinal extradural meningeal cyst that developed 16 years after traumatic brachial plexus injury: A case report. *World Neurosurg* 2016;86:510.e5-10.
- Golnari P, Ansari SA, Shaibani A, Hurley MC, Potts MB, Kohler ME, *et al.* Intradural extramedullary cavernous malformation with extensive superficial siderosis of the neuraxis: Case report and review of literature. *Surg Neurol Int* 2017;8:109.
- Hong JC, Kim MS, Chang CH, Kim SH. Arachnoid cyst with spontaneous intracystic hemorrhage and chronic subdural

- hematoma. J Korean Neurosurg Soc 2008;43:54-6.
5. Kadono Y, Yuguchi T, Ohnishi Y, Iwatsuki K, Yoshimine T. A symptomatic spinal extradural arachnoid cyst with lumbar disc herniation. *Case Rep Orthop* 2015;2015:250710.
 6. Kieu HD, Le TD, Tran TQ. Arachnoid cyst with spontaneous intracystic hemorrhage and associated chronic subdural hematoma: A case report. *Int J Surg Case Rep* 2021;81:105789.
 7. Paramore CG. Dorsal arachnoid web with spinal cord compression: Variant of an arachnoid cyst? Report of two cases. *J Neurosurg* 2020;93:287-90.
 8. Schmutzer M, Tonn JC, Zausinger S. Spinal intradural extramedullary arachnoid cysts in adults-operative therapy and clinical outcome. *Acta Neurochir (Wien)* 2020;162:691-702.

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