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Surgical Neurology International

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Editor
Nancy E. Epstein, MD
Clinical Professor of Neurological Surgery, School of Medicine, State U. of NY at Stony Brook.

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Case Report

Rare dorsal thoracic arachnoid web mimics spinal cord herniation on imaging

Zaid Aljuboori, Maxwell Boakye

Department of Neurosurgery, University of Louisville, Louisville, Kentucky, United States.

E-mail: *Zaid Aljuboori - zaid.aljuboori@yahoo.com; Maxwell Boakye - maxwell.boakye@ulp.org

***Corresponding author:**
Zaid Aljuboori,
Department of Neurosurgery,
University of Louisville,
220 Abraham Flexner Way
Ste. 1500, Louisville -40202,
Kentucky, United States.

Received : 13 March 2020
Accepted : 26 March 2020
Published : 11 April 2020

DOI
10.25259/SNI_98_2020

Quick Response Code:

ABSTRACT

Background: Dorsal arachnoid webs (DAWs) are rare clinical entities that can mimic other conditions on magnetic resonance imaging (MRI). Here, we present a case of DAW that was misdiagnosed on MR as a ventral cord herniation.

Case Description: A 35-year-old female presented with a 1-year history of lower extremity weakness and numbness. The MRI of the thoracic spine showed ventral cord displacement with syringomyelia. The computed tomography myelogram demonstrated ventral cord herniation. Intraoperatively, the patient had a dorsal thoracic web in the absence of cord herniation. Within 8 postoperative weeks, the patient had improved, and the follow-up MI showed a significant reduction in the syrinx size.

Conclusion: On MR scans, DAWs may look like ventral cord herniation. However, the positive "scalpel sign" and syrinx, the absence of an arachnoid cyst on myelography, and the findings on cine MR help differentiate DAWs from ventral cord herniation.

Keywords: Cerebrospinal fluid, Cyst, Dorsal arachnoid webs, Herniation, Magnetic resonance imaging, Spinal cord, Ventral

INTRODUCTION

Dorsal arachnoid webs (DAWs) are rare clinical entities, of unknown etiology, that usually affect the thoracic spine. In theory, they may represent the remnant lining of previously ruptured arachnoid cysts or their precursors.[4] DAWs usually lead to disturbed cerebrospinal fluid (CSF) flow, resulting in syrinx formation. Clinically, patients may present with progressive back pain, radiculopathy, or myelopathy.[1,4,8] Notably, on MR studies, DAWs often mimic other spinal lesions (e.g., spinal arachnoid cyst [SAC], spinal cord ventral herniation [VSCH], thoracic disc herniation, etc.) and can, therefore, be readily "misdiagnosed."[2-5] Here, we present a 35-year-old female with thoracic myelopathy that was originally misdiagnosed on MR as a ventral cord herniation. However, at surgery, it proved to be a dorsal arachnoid web.

Case summary

A 35-year-old female presented with a 1-year history of progressive upper back pain, bilateral lower extremity weakness, and numbness. The thoracic MRI images showed a focal area of ventral cord displacement (e.g. the "scalpel sign" at T4) and a T2-T4 syringomyelia. The CT

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myelogram documented a possible ventral dural defect supporting the diagnosis of ventral cord herniation [Figures 1 and 2]. Intraoperatively, the patient was found to have a dorsal thoracic web; there was no cord herniation [Figure 3].

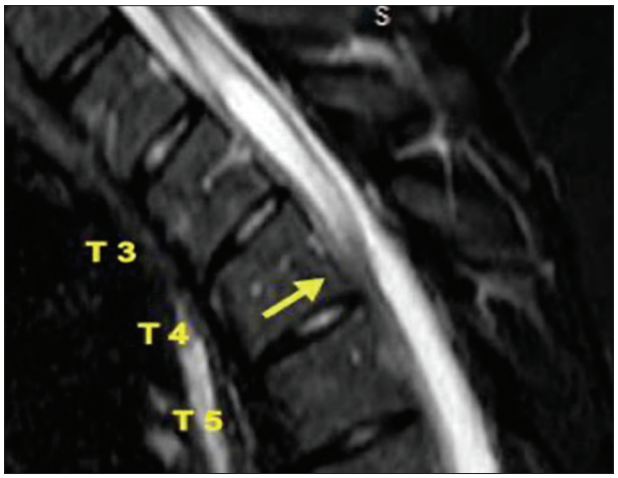

Figure 1: Magnetic resonance imaging of the thoracic spine (sagittal view) shows the syrinx with dorsal indentation of the cord (arrow).

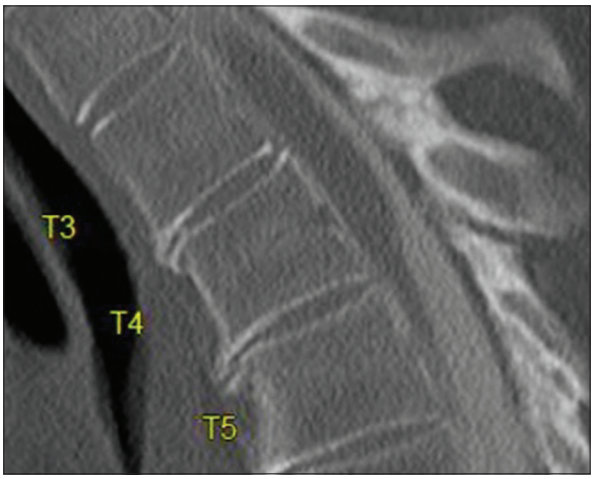

Figure 2: Computed tomography myelogram of the thoracic spine (sagittal view) shows the ventral displacement of the cord (arrow).

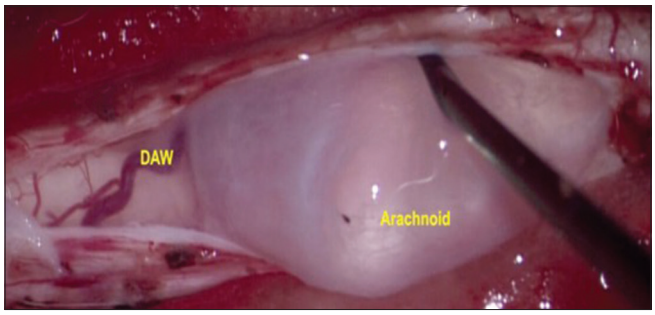

Figure 3: Intraoperative microscopic view (50×) shows dilation of the dorsal arachnoid with the dorsal arachnoid web.

Postoperatively, the patient remained neurologically stable and the MR scan 8 weeks later showed a significant reduction in the syrinx size.

DISCUSSION

DAWs of the spine are rare and typically contribute to progressive myelopathy.[4] MR and myelo-CT studies may fail to differentiate DAWs which may from SAC or VSCH.[1,4,5,8]

Magnetic resonance imaging

For DAW, SAC, and VSCH, thoracic MRI's usually shows an enlarged dorsal subarachnoid space with ventral shifting of the spinal cord. With DAWs, there may also be accompanying attenuation of the CSF signal dorsal to the cord on T2-weighted images (e.g. CSF flow artifact). Also, a dorsal indentation of cord (e.g., the "scalpel sign") and/or an abnormal lesion on T-2 axial images in the dorsal subarachnoid space.[1-3,6] Further supporting, the diagnosis of DAW is CSF flow quantitative study using a cardiac-gated phase-contrast cine-mode that can show a marked reduction in rostral CSF flow in the dorsal subarachnoid space.[1] Alternatively, the diagnosis of VSCH would be better confirmed by an MR or myelo-CT documenting a segment of cord parenchyma extending outside the dura mater, while for SAC, there would be no such pathognomonic MR signs.[1,5-7]

Computed tomography myelogram

For DAW, there are no pathognomonic signs on CT myelogram.[1-7] Alternatively, with VSCH, the CT myelogram shows herniation of the cord through a dural defect with no contrast seen anterior to the cord itself while for SAC; the flow of contrast on a myelo-CT study is interrupted by a space-occupying lesion in the dorsal subarachnoid space.[1,7]

Combined MR and Myelo-CT in the Diagnosis of DAW, SAC, and VSCH

Combined, MR and myelo-CT studies better help differentiate DAW from SAC and VSCH. Reardon *et al.* indicated that the presence of the positive "scalpel sign" on MRI was highly suggestive for DAWs, as was the accompanying documentation of a syrinx.[5] For VSCH, the preoperative MRI alone usually proved diagnostic in 30% of patients, while SAC, MRI, and CT myelography combined may be diagnostic in 68% of cases.[1-7]

Here, although the MRI showed a positive "scalpel sign" consistent with a DAW, the CT myelogram was interpreted as showing a VSCH. Notably, this "misdiagnosis" could have significantly impacted surgery, as DAWs are usually

approached posteriorly, while VSCH is more frequently approached anteriorly.

CONCLUSION

DAWs of the spine are rare and share similar clinical and radiographic features with SAC and VSCH. The presence of a positive "scalpel sign" and a syrinx on MRI in the absence of an arachnoid cyst on myelography is highly suggestive/confirmatory for DAWs.

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Aljuboori Z, Boakye M. Rare dorsal thoracic arachnoid web mimics spinal cord herniation on imaging. Surg Neurol Int 2020;11:66.