



Radio-Diagnosis

DORSAL ARACHNOID WEB IN THORACIC SPINE: A CASE REPORT

Dr. Suvanya Mahajan

3RD Year Radiodiagnosis Resident Government Medical College, Jammu

Dr. Shivani Katal*

3RD Year Radiodiagnosis Resident, Government Medical College, Jammu*Corresponding Author

Dr. Pamposh Pandita

3RD Year Radiodiagnosis Resident, Government Medical College, Jammu

Dr. Rajesh Sharma

Professor, Department Of Radiodiagnosis, Government Medical College, Jammu

ABSTRACT

Dorsal arachnoid web is a rare entity, which was first reported by Malleci et al in 1997. It represents intradural, extramedullary band of arachnoid tissue that extends to the pial surface of the spinal cord which blocks the cerebrospinal fluid flow in the longitudinal direction and widens the dorsal cerebrospinal fluid space associated with increased pressure of the cerebrospinal fluid & a local mass effect, resulting in the dorsal indentation and anterior displacement of the cord to cause myelopathy. Dorsal arachnoid web typically occurs in the upper thoracic spine

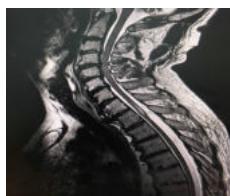
KEYWORDS : dorsal arachnoid web, upper thoracic spine, cerebrospinal fluid

Case report

A 65year old male patient presented in medicine department of our hospital with history of progressive back pain and lower limbs weakness since 2years. No history of bowel or bladder difficulty. He denied any history of prior trauma, spinal surgery or spinal inflammation. On physical examination, he was alert and fully oriented. Cranial nerve's functions appear intact. Lower limb weakness with spasticity was noted.

Imaging findings

MRI spine (with gadolinium) was performed using "Siemens Magnetom Symphony" 1.5 Tesla Helium cooled superconducting MR scanner, using dedicated protocol, sagittal images (Figure 1) show focal dorsal indentation on thoracic spinal cord with widening of posterior CSF space and spinal cord expansion below the level of dorsal indentation (SCALPEL SIGN) at D2 level with abnormal high intensity signals above the level of indentation extending to D1 level. No abnormal contrast enhancement was present. Axial T2WI (Figure 2) at the level of indentation (A) and (B) proximal spinal cord show mild flattening of cord at the level with T2 hyperintense signals. in proximal cord.

FIGURE 1

A



B

Figure 1 - (A) Sagittal T2WI and **(B)** post contrast T1WI show a focal dorsal indentation of thoracic spinal cord at the D2 level and abnormal high intensity signals above the level of indentation extending to D1 level (A). No abnormal contrast enhancement was seen (B).

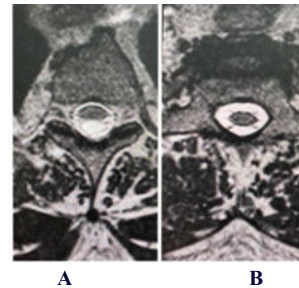
FIGURE 1

Figure 2 - axial T2 (A) at the level of indentation and (B) proximal spinal cord show mild flattening of cord at the level with T2 hyperintensity noted with in proximal cord

Discussion

Dorsal thoracic arachnoid web is extremely rare. Literature shows that there are only few case series and reports that have been published of patients having a diagnosis of dorsal thoracic arachnoid web. These webs are intradural extramedullary bands of arachnoid tissue that protrude into the pial surface of the spinal cord, creating an indentation dorsally in the cord. The web can block the components of cerebrospinal fluid (CSF) movement in the longitudinal direction. The exact mechanism of formation of arachnoid web remains largely unknown. Several theories proposed are forceful CSF flow resulting in arachnoid herniation into congenital dural defect, Post trauma, post infectious and post operative etiology. Still consideration is given to idiopathic etiology. Clinical presentation includes episodic weakness and sensory symptoms, spastic paraparesis, clonus hypertonia, pain and gait instability. Characteristics imaging finding includes scalpel sign resulting from focal mass effect on Dorsal cord. The cord above or below the band often exhibit a high T2 signal. Syrinx is common finding associated with arachnoid web. Greitz introduced the venturi effect as possible explanation Stating that web interrupt the transmission of Systolic pulse pressure to the distal CSF thereby altering intramedullary pulse pressure. This creates pressure gradient from center of the cord outwards resulting in cavitation with in spinal cord. For reasons unknown, these webs are statistically more common in the upper thoracic spine and can produce an image on MRI that is now coined 'scalpel' sign because of its resemblance to a surgical scalpel. The scalpel sign is an important secondary imaging sign that suggests the presence of an arachnoid web. The differential diagnosis of the 'scalpel' sign is a dorsal arachnoid web, dorsal arachnoid cyst and ventral spinal cord herniation. In spinal cord herniation, the cord tissue protrudes through a ventral dural defect causing a focal deformity along the ventral aspect of the cord. However, it should be noted that when the ventral spinal cord is closely opposed to the anterior dura, it

may be difficult to differentiate between a dorsal arachnoid web and anterior spinal cord herniation. Arachnoid cysts can be identified, particularly on thin-section volumetric MR by their marginated walls, and they produce a relatively smooth scalloping on the spinal cord surface. An intraspinal filling defect with delayed filling of the arachnoid cyst are also present on myelography. Spinal arachnoid webs can be definitively diagnosed with intraoperative ultrasound, where they resemble membrane-like structures in the dorsal. Radiologists should recognize and alert the neurosurgeon to this distinctive finding to avoid delayed treatment as well as unnecessary intervention (such as medical management) because neurosurgical lysis of the web is curative. Options for management of a symptomatic arachnoid web include marsupialization, fenestration, or laminectomy with exploration of the intradural space and subsequent resection of the arachnoid web. Postoperative MRI CSF flow study should demonstrate improved flow dynamics. Failure to consider arachnoid web as a diagnosis preoperatively increases the risk of future myelopathy, and diagnosis prior to development of spinal cord signal abnormality and syringomyelia reduces morbidity.

Conclusion

Spinal arachnoid web is rarely reported pathology with unknown etiology. It demonstrates typical imaging features and MRI is best imaging modality. Identification of these features facilitate early diagnosis and management.

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