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Case Illustration

Dorsal Arachnoid Web and Scalpel Sign: A Diagnostic Imaging Entity

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ABSTRACT

A case of 60-year-old woman with idiopathic syringomyelia and progressive myelopathy by dorsal arachnoid web is presented. One focal indentation along the dorsal surface of the spinal cord at the T3 vertebral body level revealed the scalpel sign, a radiological entity diagnostic of a dorsal thoracic arachnoid web. T2-T3 laminectomy for the resection of dorsal arachnoid band was performed. Careful sectioning of the web resulted in visual apparent relief of the compression and good functional recovery. In patients with presumed idiopathic syringomyelia, imaging studies should be closely inspected for the presence of transverse arachnoid web. This extramedullary transverse band of arachnoid tissue extends to the dorsal surface of the spinal cord, resulting in mass effect and dorsal indentation, known as the scalpel sign because of its apparent resemblance to a scalpel on sagittal imaging. Early diagnosis with early intervention may greatly benefit patients. Surgical resection of transverse arachnoid web is a minimally invasive procedure with low morbidity, and can result in resolution of syringomyelia and improvement in neurological function.

KEYWORDS: Syringomyelia, Arachnoid web, Magnetic resonance imaging, Myelopathy, Scalpel

■ CASE ILLUSTRATION

Dorsal arachnoid web is a rare cause of progressive myelopathy. This type of web consists of an extramedullary transverse band of arachnoid tissue that extends to the dorsal surface of the spinal cord, resulting in massive effect and a dorsal indentation. It is an abnormal formation of the arachnoid membrane in the spinal subarachnoid space that blocks the movement of cerebrospinal fluid components which is usually fast in the longitudinal direction. Syringomyelia is often present above or below the level of cord indentation and associated with the blockage of cerebrospinal fluid flow along with arachnoid cyst (2,3).

This enlarged cerebrospinal fluid space outline on sagittal imaging has been linked to the profile of a surgical scalpel,

with its blade pointing posteriorly, and has been named “scalpel sign” (3).

In the limited literature found, the reported cases have a variety of signs and symptoms attributed to the band, including episodic weakness, and sensory symptoms, hyperreflexia, spastic paraparesis, clonus and hypertonia pain, and gait instability (3). The key feature which implies the diagnosis is the anterior displacement of the cord. Arachnoid webs are not easily visualized through conventional magnetic resonance imaging (MRI) or computed tomography myelography due to their comparative thickness in relation to other structures. MRI provides better visualization (1,3).

A 60-year-old woman presented with 1 year of gradually progressive ataxia, postural instability, and frequent falls. Neurological examination revealed a T4 spinal sensory level,



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Figure 1: Sagittal T2-weighted MRI imaging of the thoracic spine at the T3 vertebral body level revealed the scalpel sign, a radiological entity diagnostic of a dorsal thoracic arachnoid web. Increased cord signal and syringomyelia are present above the level of indentation.

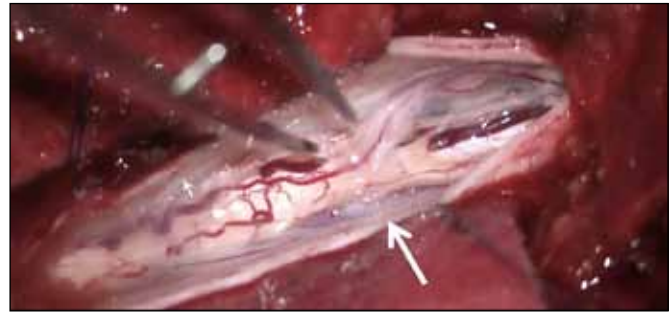


Figure 2: This figure demonstrates the microsurgical identification and techniques of resection of a dorsal arachnoid band.

proprioceptive loss and hyperreflexia. Preoperative imaging (Figure 1) of the thoracic spine revealed the scalpel sign, a radiological entity diagnostic of dorsal thoracic arachnoid web. The MRI demonstrated a focal indentation along the dorsal surface of the spinal cord at the T3 level. Increased T2-weighted signal with cord expansion extended from T1 to T3 and syringomyelia at the C7.

The patient underwent T2-T3 laminectomy with intradural exploration (Figure 2). Careful sectioning of the web resulted in visual apparent relief of the compression with good functional recovery.

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