Traumatic interdural arachnoid cyst in the upper cervical spine

Case report

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The case of an interdural arachnoid cyst of traumatic origin at the C3–5 level in an 18-year-old man was admitted to our hospital with a 1-year history of progressive weakness in left limbs and numbness below the clavicles is reported. He had had a C-2 fracture at the age of 9 years without definite neurological deficits. Magnetic resonance imaging revealed a cystic lesion in the C3–5 level. Laminectomy was performed, and an interdural cyst was found. Histological examination revealed fibrous thickening of the arachnoid membrane. A cyst located in the interdural space of upper cervical spine is extremely rare.

KEY WORDS • arachnoid cyst • cervical spine • pathogenesis

Cysts of the spinal canal are uncommon and most are arachnoid or diverticula, usually presenting in the thoracic region. They may give rise to fluctuating symptoms as a consequence of changes in cerebrospinal fluid (CSF) pressure. They may be located in the extradural or intradural space. Those of traumatic origin are rare. We recently encountered an 18-year-old man in whom an intraspinal cystic lesion was demonstrated on magnetic resonance (MR) imaging studies. His history included a C-2 fracture at the age of 9 years; operative findings revealed this cystic lesion in the interdural space.

Case Report

This 18-year-old man was hospitalized at the age of 9 years for a traumatic C-2 fracture. He was treated with skeletal traction and seemed quite well without definite neurological deficits after that admission. Approximately 1 year prior to the current admission, he began feeling progressive spastic weakness in the left upper limb; this symptom gradually extended to the left lower limb. Numbness below the clavicle was also found.

Examination. On examination, this patient was alert and cooperative. The muscle strength in the left limbs was only Grade 4. Hyporeflexia to all modalities was found below the C-6 dermatome. His deep tendon reflexes increased, and a positive Babinski sign was noted. The results of routine laboratory tests were within normal limits.

FIG. 1. A T1-weighted magnetic resonance image, sagittal view, demonstrating an intraspinal extramedullary tubular lesion anterior to the cord at the C3–5 level.
Plain cervical spine x-ray studies revealed no bone defect. Myelography, via lumbar puncture, showed free passage of contrast material up to the foramen magnum with no filling defect. A T2-weighted MR image demonstrated an intraspinal extramedullary bright signal tubular lesion anterior and left to the cord at the C3–5 level. The cord was compressed (Figs. 1 and 2).

**Operation.** A C3–4 laminectomy was performed. Before opening the dura, an intact thecal sac without cystic pouch or diverticulum was inspected. The dura was opened in the dorsal midline and tented. Under an operating microscope, the left C3–4 dentate ligaments were divided and a transparent lesion was found outside the intact inner layer of the dura. A window was made in the dura, and a cystic structure with a fine membrane between the two layers of the dura was noted (Fig. 3). The fluid that filled the cyst resembled CSF.

**Postoperative Course.** The 2nd day after surgery, the patient’s sensation of numbness was much improved. One month later weakness of limbs had also improved. Pathological examination disclosed normal dural structure of the inner layer of the dura and a fibrous thickening membrane that was compatible with the arachnoid (Fig. 4).

**Discussion**

Spinal arachnoid cysts have been considered to be rare entities, and intradural spinal arachnoid cysts are even less common than extradural cysts. However, they may be underrecognized because of inadequate diagnostic techniques. Extraventricular arachnoid cysts may be partly intraspinal and partly extraspinal. They represent either a congenital diverticulum of the dura mater or a herniation of the arachnoid membrane through a congenital defect in the dura. Identification of a sharp interface between the cyst and subarachnoid space related to the cyst wall and the surrounding dura mater, particularly on T2-weighted MR images, allows easy diagnosis of an extradural subarachnoid cyst.6

In our case, a metrizamide myelogram showed free passage of contrast material up to the foramen magnum with no filling defect. Magnetic resonance imaging revealed an upper cervical anterior intraspinal cystic lesion without extraspinal extension. Preoperatively, we expected an intradural cyst. Before opening the dura, we inspected the left ventrolateral side of the thecal sac and found an intact dural structure without any cystic diverticulum. There was no CSF leakage and an intact outlook of the dura was noted after surgical procedures. The operative and histological findings disclosed that an arachnoid cyst was present between two layers, the stratum meningeale and the stratum periostale, of the spinal dura mater.11 Most cases of spinal arachnoid cysts are idiopathic.1,4,5,8 In this case, there was a definite cervical spine injury. We postulate that this cyst was of traumatic origin, caused by herniation of the arachnoid membrane through a traumatic defect in the inner layer of the dura mater. Because of the one-way valve effect at the neck of the diverticulum, this cyst grew larger, finally compressing the spinal cord.

Radical removal represents the surgical therapy of choice for arachnoid cysts. Sometimes, a limited procedure is performed because total removal is not technically feasible due to the size of the cyst, the presence of adhesion, or the location of the cyst in the anterior aspect of the cord in the cervical region, as in this case. Incision and unroofing of a cyst is then usually performed. Our patient...
experienced rapid recovery from his neurological deficit. This may reveal that the mechanical effect played an important role in the cord damage.

References


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