Surgical Treatment of Spinal Extradural Meningeal Cyst: A Case Report

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Abstract

Intraspinal extradural meningeal cysts are uncommon causes of spinal cord and nerve root compression. We report our experience of a 32-year-old male presented with progressive intermittent back pain. Magnetic resonance image and computed tomography myelography showed an extradural meningeal cyst extending at the T11-12 levels in the thoracic area. The cyst was confirmed as a Type I spinal meningeal cyst via the hemilaminotomy. Total resection of the cyst was not performed because the separation of the cystic bottom was difficult due to adhesion in the surgery. Surgical partial resection of the cyst wall and closure of the dural defect provided a favorable result.

Key words: meningeal cyst, extradural cyst, partial resection, laminotomy

Introduction

Intraspinal extradural meningeal cysts are uncommon causes of spinal cord and nerve root compression. The term "extradural meningeal cyst" is used interchangeably with "extradural arachnoid cyst" [8]. We report a case of intraspinal extradural meningeal cysts in the lower thoracic area, which was identified by magnetic resonance (MR) image and computed tomography (CT) myelography and successfully treated by the T11/12 hemilaminotomy.

Case Report

A 32-year-old male complained of intermittent back pain for 9 years. His sleep was disturbed by progressive intermittent right back pain. The pain was aggravated by cough and sneeze. He denied motor weakness. He had no other prior illness or trauma. On neurological examination, sensory-motor function, bowel and bladder functions were normal. He had a negative sign of Lasegue. Thoracolumbar vertebral radiography shows the right pedicular erosion of T11 by compression from inner and caudal side and the right pedicular erosion of T12 by compression from inner and cranial side (Fig. 1). Magnetic resonance (MR) image showed a laterally located extradural cyst containing cerebrospinal fluid at the T11-12 levels with scalloping of the vertebral body (Fig. 2). The cyst was located lateral to the dural sac, and protruded through the neural foramen laterally and into the vertebral body anteriorly. A computerized...
tomography (CT) scan obtained 3 hours after myelography showed the communication between the cystic cavity and the subarachnoid space (Fig. 3). A tentative preoperative diagnosis was thought to be “extradural meningeal cyst with or without nerve root fibers.” A right T11/12 hemilaminotomy was performed to expose a cyst (Fig. 4). The cyst wall was white, fibrous and tense. The dorsal wall of the cyst was opened and the cystic cavity was explored. The CSF flowed out powerfully from this open point. There was no nerve root in the cystic cavity. The dural defect which connected the cystic cavity and the subarachnoid space was observed in the caudal side within the cystic cavity. The dural defect was closed by 5-0 nylons. The posterior wall of the cyst was resected. Histopathological examination of the cyst wall showed nonspecific fibrous connective tissue. No single-cell layer of inner arachnoid lining was observed. These findings were consistent with arachnoid cyst. Postoperative course was uneventful. His back pain was relieved immediately after the operation. Postoperative MR image showed no evidence of the residual extradural cyst (Fig. 5). One year after surgery, he is relieved from the back pain.

Discussion

Spinal meningeal cysts have been described as “arachnoid cysts,” “pouches,” and “diverticula.” Because their terms complicated the classification, Nabros [8] have simplified the classification of spinal meningeal cysts into three major categories: extradural cysts without nerve root fibers (Type I); extradural cysts with nerve root fibers (Type II); and intradural cysts (Type III). Our case was Type I. Intraspinal extradural meningeal cysts occur most frequently in the mid to low thoracic spine (67%), followed by the lumbosacral spine (20%), the
cyst expansion through areas of lower resistance of the dura are ball-valve mechanism[2,3], pulsatile cerebrospinal fluid dynamics[7] and an osmotic spinal gradient between the subarachnoid space and cyst [3].

According to the review of Naidich [9], 58% of patients show localized backache. Progressive paraparesis or quadriplegia is observed in 70% of the population, hyperesthesia in 33%, and radiculopathy in 17%. Symptoms progress over months in the majority of patients, although more than 30% of patients show intermittent remission of symptoms. Intermittent aggravation of symptoms can occur with postural changes and Valsalva maneuvers [2]. Cough and sneeze may increase internal pressure of the cyst. The back pain may be due to an association with the traction of the spinal cord by the weight of the cyst [12] or the direct compression to the spinal cord [6].

Surgical therapy for spinal extradural meningeal cysts varies somewhat in the literature [8,11]. Ideal managements are total resection of the cyst and closure of the dural defect [4]. However, the total resection of the cyst is usually difficult made by the adherence of the cyst membrane to the posterior surface of the dura or by extension of the membrane into the intervertebral foramina. Besides, it is difficult to remove the lateral pouch of the cyst because there is bleeding from the paravertebral venous plexus. If

thoracolumbar region (9%), and the cervical region (4%) [2,5,7,9]. The location in the spinal canal is mostly dorsal position and protruded through the neural foramen laterally.

Nontraumatic spinal extradural meningeal cysts are believed to be congenital[2]. Proposed causes of

Fig. 3: Axial computerized tomography myelogram revealing communication between the cyst and the subarachnoid space.

Fig. 4: The schema after a T11/12 hemilaminotomy showing the extradural meningeal cyst, the spinal cord and the dural defect.

Fig. 5: A T2-weighted MR image of a coronal section of the thoracolumbar spine showing no evidence of the extradural cyst after surgery.
the total resection of the cyst is unnecessary, hemilaminotomy rather than hemilaminectomy is a preferred procedure because of the benign nature of the lesion and because of the need to spare the posterior vertebral arches in order to preserve spinal stability [1,10]. Furthermore, because histopathological findings of the cyst wall show almost no cells had secretory capability [11], the residual cystic wall had no capability of regrowth. Therefore total resection of the cyst could be unnecessary. Options for the surgical therapy include: resection of the posterior wall of the cyst, marsupialization, drainage into the subarachnoid space, or primary closure of the dural defect [8,11]. In the patient presented here, the dural defect was closed and the posterior wall of the cyst was resected. If the dural defect is obscure, it might be easily found by Valsalva maneuvers. If pain is aggravated by Valsalva maneuvers, it is important to occlude the communication between cyst and subarachnoid space. Surgical partial resection of the cyst wall and closure of the dural defect provided a favorable result.

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References

Reviewer's comment : Minoru Akino, M.D.
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This paper clearly demonstrated that partial resection of meningeal cyst and the closure of the dural defect was sufficient procedure for the surgical treatment of a Type I meningeal cyst. It is very important to decide the classification of spinal meningeal cysts before surgical maneuver. For further examination, 3D CT myelography, 3D-MR myelography and echo sonography might be valuable for the preoperative evaluation of the type of spinal meningeal cysts. This preoperative precise diagnosis might proceed to minimum invasive surgery.

Reviewer's comment : Minoru Hoshimaru, M.D.
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Spinal extradural meningeal cysts are uncommon and rarely cause neural compression. In this report, thoracic extradural meningeal cyst which caused intractable back pain is described. Compression deformity of pedicles of the thoracic spine observed on a plain roentgenograph is outstanding and indicates that this cyst was a long-standing lesion. The authors successfully occluded a hole which communicated the subarachnoid space and a cystic cavity and relieved back pain. This report demonstrates that surgical treatment of spinal extradural meningeal cysts is also applicable to patients who complain of intractable pain without neurological signs and symptoms.