Retroperitoneal Approach for Lumbar Lateral Meningocele
—Case Report—

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Abstract
A 29-year-old female with neurofibromatosis presented with a right lumbar lateral meningocele. Abdominal computed tomography (CT) showed a huge right retroperitoneal cyst expanding anterolaterally and displacing the right kidney. CT following myelography disclosed the cyst expanding through a wide defect of the right pedicles of the T-12 and L-1 vertebrae. The cyst was resected through a retroperitoneal approach with right flank oblique incision. Postoperatively, cerebrospinal fluid leakage occurred, which improved after lumboperitoneal shunt. Careful screening for lateral meningocele, including the lumbar region, should be undertaken in a patient with neurofibromatosis who presents with vertebral anomalies.

Key words: lumbar lateral meningocele, scoliosis, neurofibromatosis, retroperitoneal approach

Introduction
Lateral meningocele is a protrusion of the meninges through a dilated intervertebral foramen or bone defect and usually occurs in the thoracic region in association with neurofibromatosis. Most patients are asymptomatic, but meningoceles increase in size with time and compress the surrounding structures causing dyspnea, cough, and dysphagia. Surgical treatment is advisable for large or symptomatic meningoceles.16) Lateral meningocele located in the lumbar region is extremely rare and its clinical features and treatment are unclear.4,5,8,10,13,14) A review of 233 anterolateral spinal meningoceles found 11 cases of lumbar meningoceles, five of which were associated with neurofibromatosis.16) Since then, six cases of anterolateral lumbar meningoceles have been reported,5,7,10,14,15) and two in association with neurofibromatosis.10,14)

Here we describe a patient with neurofibromatosis who presented with a lumbar lateral meningocele arising from a wide defect of the right pedicles of the T-12 and L-1 vertebrae who was treated by a retroperitoneal approach.

Case Report
A 29-year-old female was diagnosed as having neurofibromatosis when she was 4 years old. She underwent surgery for lumbar scoliosis at the age of 11 years. She suddenly experienced severe pain and acute swelling of her left flank unassociated with trauma and was admitted to another hospital. Abdominal computed tomography (CT) found a subcutaneous hematoma at the left side of the abdomen and a right retroperitoneal cyst. After the removal of the hematoma, she was referred to our hospital.

Physical examination revealed café au lait spots and abnormal hair in the lumbar and gluteal regions. Pachydermatocele was also seen at the left side of the abdomen. She was of normal intelligence and neurological examination showed no abnormalities. Abdominal x-ray films showed remarkable scoliosis

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of the lumbar spine, vertebral scalloping, the previously implanted Harrington rod, and dilatation of the intervertebral foramen (Fig. 1). Precontrast abdominal CT demonstrated the huge right retroperitoneal cyst which had expanded anterolaterally and displaced the right kidney (Fig. 2). Intravenous pyelography showed right pyeloectasis and displacement of the ureter. Lumbar myelography disclosed that the cyst communicated with the lumbar subarachnoid space and a contralateral small protrusion of the meninges but failed to demonstrate the ostium precisely (Fig. 3). CT in the left lateral decubitus position following myelography showed that the cyst had expanded through a wide defect of the right pedicles of the T-12 and L-1 vertebrae. A contralateral small dural ectasia protruded through the dilated intervertebral foramen between the L-1 and L-2 vertebrae (Fig. 4). Magnetic resonance imaging could not be performed because of the Harrington rod.

The cyst was approached through an oblique incision in the right flank. The 11th rib was subperiosteally removed, then the incision was carried through into the retroperitoneal space. The huge cystic mass, which had displaced the right kidney anteriorly, was
carefully dissected from the surrounding structures (Fig. 5 upper). The cyst was punctured and about 2000 ml of cerebrospinal fluid was evacuated. The cystic wall was resected except a part of the posterior wall which was adhered strongly to the periosteum and so was left in place. The orifice was about 3 cm in diameter, through which the spinal cord and nerve roots could be observed (Fig. 5 lower). The residual dura was carefully sutured and reinforced with fibrin adhesive. The diaphragm had been inadvertently injured by the removal of the 11th rib, so the laceration was sutured and a drain was inserted into the intrapleural cavity.

Postoperatively, she was neurologically intact. Four days later, the intrathoracic drain was removed. However, postoperative CT showed retroperitoneal and intrapleural fluid collection. Cerebrospinal fluid had been continuously drained by lumbar puncture for 2 weeks but the leakage continued. After a lumboperitoneal shunt was implanted, CT showed no cerebrospinal fluid leakage and remarkable decrease in the meningocele (Fig. 6). She complained of postural neck pain for about 3 weeks but this improved within 1 month. She was discharged without neurological deficit.

Histological examination showed that the wall of the meningocele consisted of dura mater.

**Discussion**

The pathogenesis of lateral meningocele is unclear. Patients with neurofibromatosis involving mesodermal and ectodermal structures often present with vertebral anomalies such as kyphoscoliosis, enlargement of the intervertebral foramen, scalloping, and pedicular thinning or agenesis, so the pulsatile pressure of the cerebrospinal fluid acting through the dysplastic dura mater or vertebra might erode the surrounding tissue and eventually dilate the local dura mater. There is no adequate explanation for the high incidence in the thoracic region, but a pressure gradient between the subarachnoid and intrapleural spaces may be responsible. O'Neill et al. reported three cases of lateral meningoceles associated with neurofibromatosis, situated in the cervical, lumbar, and sacral regions and suggested that meningocele could occur at any level of the spine.

Anterolateral meningoceles rarely cause local neurological deficits, as the main symptoms are produced by compression and dislocation of the surrounding organs. When located at the lower part of the lumbar spine, a mass in the pelvis or abdomen may be palpable, and the symptoms may consist of low back pain, abdominal pain, leg pain, constipation, and urinary retention. Headache or syncopal attack during defecation, owing to acute variation of the cerebrospinal fluid pressure, also occurs in patients with large lumbosacral meningoceles. In contrast, lumbar meningocele arising from a higher position, as in our case, has no specific signs or symp-
The diagnosis of meningocele is based on myelography. We used a water-soluble contrast material which failed to show the neck because of dilution by the large amount of cerebrospinal fluid in the meningocele. However, CT myelography demonstrated both the communication between the meningocele and the subarachnoid space and the level of the communication and the width of the neck. Magnetic resonance imaging is the most useful method because it can precisely disclose the size, location, extension, and associated anomalies noninvasively.14)

The indications for surgery are unclear because the natural history of lumbar lateral meningocele is unknown. Conservative therapy with serial observation should be considered for small thoracic meningocele. Surgical treatment should be considered only for a symptomatic case.16) We decided to operate because the meningocele was huge and had displaced the kidney.

Selection of the surgical approach for anterolateral meningocele generally depends on the size and projection of the meningocele and the width of the neck. A small meningocele can be treated by a posterior intradural approach with laminectomy but medium to large meningoceles require an extradural approach for complete resection and repair. The posterolateral extradural approach with laminectomy may be useful11) as performed for thoracic meningocele.2) In our case, the Harrington rod, grafted bone plate, and the wide neck of the meningocele excluded the previous two approaches. We employed the retroperitoneal anterolateral extradural approach, which provided a good operative exposure. This approach is the rational way to thoracolumbar junctional lesions and is usually performed for abscess, trauma, and spinal deformities.3,6,9,12) The only difficulty is identifying the diaphragm.3,12) In our case, the postoperative drainage under negative pressure might have been responsible for the cerebrospinal fluid fistula, as reported in a case of thoracic meningocele resected by the transthoracic approach.2) A better technique is to detach the medial half of the 12th rib which carries the attachment of the diaphragm to obtain a wide operative exposure without tearing the pleura.9)

Lateral meningoceles associated with neurofibromatosis may occur at any level of the spine, so this condition should be considered especially in a patient with vertebral anomalies. Like other meningoceles, lumbar lateral meningocele will grow and expand, so surgical intervention is advisable. The retroperitoneal extradural approach is suitable for a large meningocele located at the thoracolumbar junction.

References


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