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Case Report

Subpial Lipoma at the Conus Medullaris Level

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Abstract: We report a rare case of adult subpial spinal lipoma at the conus medullaris level. A 61-year-old man presented with lower back pain, numbness in his legs, difficulty walking and a sensation of residual urine. T1- and T2-weighted magnetic resonance imaging showed a well-demarcated hyperintense intradural tumor level with the lower part of the T12 vertebra. Laminectomy at the T12 level and partial removal of the tumor using ultrasonic aspiration were performed. Pathologically, the excised mass was composed of mature adipose tissue with no evidence of inflammatory cell invasion or malignancy. Symptoms other than numbness and hypoesthesia in the left leg were relieved postoperatively. This case report indicated that partial tumor removal and ultrasonic aspiration are useful methods for removing tumors with significant adhesion to the spinal cord.

Key words: intradural tumors, subpial lipoma, conus medullaris

Introduction

Spinal lipoma is a relatively rare tumor, accounting for approximately 1% of all primary spinal tumors and approximately 5% of intramedullary spinal tumors. Among these tumors, subpial lipoma is extremely rare, and few cases of subpial lipoma without spina bifida have been reported in adults. We report here a case of subpial lipoma that developed in the thoracic spine.

Case Report

A 61-year-old man was admitted to our hospital with lower back pain, numbness in both legs, difficulty walking and a sensation of residual urine. No specific family history was indicated. Lower back pain and numbness in the lower extremities developed without an apparent trigger approximately one year prior to admission, and the intensity of these symptoms gradually increased. In addition, unsteadiness and difficulty walking developed. The patient also experienced a sensation of residual urine. In 2010, computed tomography (CT) revealed a spinal tumor, and he was referred to our department for detailed examination.

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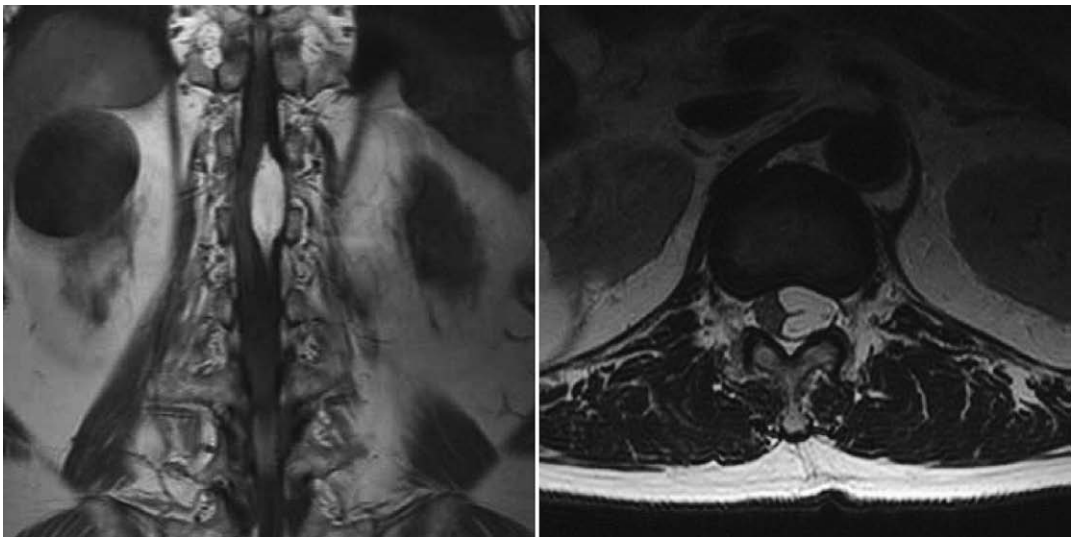

Fig. 1. Preoperative MRI. Coronal T1-weighted and axial T2-weighted images.

The patient complained of pain and numbness from his lumbar region to both legs. He had impaired sensation in the region below the ankle joint. Deep tendon reflexes (knee and ankle jerks) were normal. No pathological reflexes were noted. The straight-leg-raising test was negative in both legs. Muscle strength was normal in both legs. There were no abnormal skin lesions, such as a dimple, in his lumbar region. All hematological and biochemical test results were normal. The Japanese Orthopaedic Association (JOA) scoring system for the evaluation of cervical myelopathy (excluding the upper extremities) result was 7.5/11.

A plain radiograph of the spine showed no evidence of spina bifida. T1-weighted and T2-weighted magnetic resonance imaging (MRI) of the spine revealed a well-demarcated hyperintense intradural tumor level with the lower part of the T12 vertebra. The lesion showed a selectively suppressed intensity on MRI with fat suppression (Fig. 1).

In May 2010, laminectomy at the T12 level was performed followed by partial removal of the tumor. The tumor was present in the subpial space and the surrounding tissue showed involvement of the cauda equina. Part of the cauda equina was separated and adhesion lysis was continued. However, the tumor had adhered tightly to the spinal parenchyma and the cauda equina. Adhesion lysis was considered too difficult to remove and maximal tumor removal was thus performed using ultrasonic aspiration (SONOPET®, UST-2001, Stryker Japan K.K., Tokyo, Japan; Fig. 2). Histopathological findings revealed mature adipose tissue with no evidence of inflammatory cell invasion or malignancy (Fig. 3). Based on the operative and histopathological findings, subpial lipoma was diagnosed.

Following surgery, the patient's walking difficulties and the sensation of residual urine disappeared. One year after surgery, pain and numbness in the right leg had improved while

Fig. 2. Intraoperative findings. A yellowish tumor suspected to be adipose tissue is present in the subpial region.

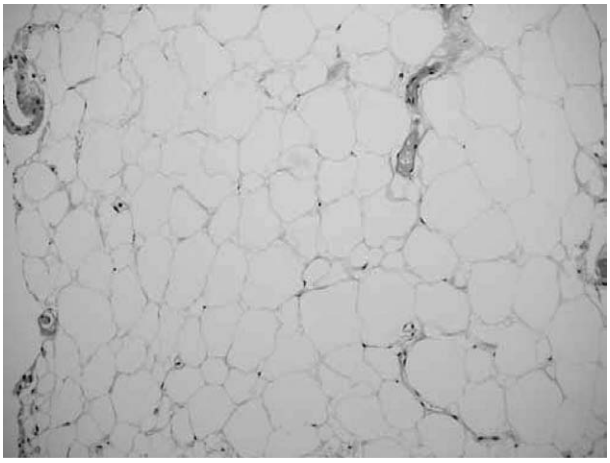

Fig. 3. Pathological findings (hematoxylin and eosin staining, ×200).

the numbness and hypoesthesia in the left leg remained unchanged. MRI showed residual lipoma (Fig. 4). The JOA scoring system for evaluation of cervical myelopathy (excluding the upper extremities) result was 10/11.

Discussion

In recent years, it has been reported that spinal lipoma in the subpial space is more likely to develop at the cervicothoracic junction and thoracic levels. Subpial lipoma that develops at the conus or epiconus levels, such as in the present case, is relatively rare[1, 2]. Subpial spinal lipoma is thought to be a type of congenital tumor[2]. Although it does not

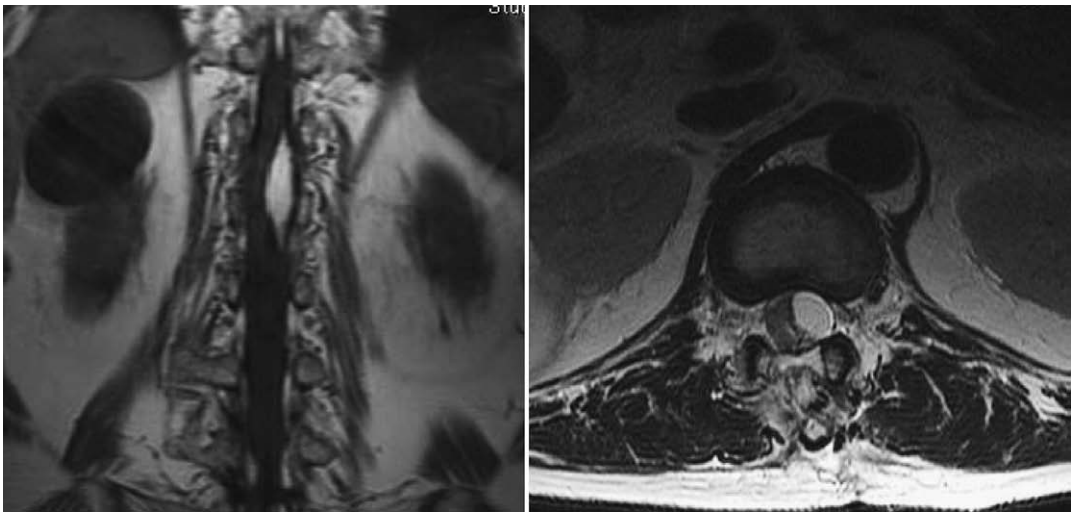

Fig. 4. Postoperative MRI. Coronal T1-weighted and axial T2-weighted images.

show neoplastic proliferation, the adipose tissue proliferates very slowly as patients grow older, leading to neurological symptoms. Thus, subpial spinal lipomas are often huge by the time they are found. There is no typical age of onset, with ages ranging widely between 30 and 60 years. A conservative reduction in the amount of fat tissue is ineffective for tumor regression. When neurological symptoms develop, surgical intervention is generally selected. The main problem associated with this type of tumor is invasion into the spinal parenchyma. Thus, not only total removal but even partial removal is difficult. In addition, the surrounding bone tissue is already affected by this stage (e.g., erosion of the vertebral bodies, thinning of the facet joints or vertebral arches) due to the tumor's slow growth, and spinal deformity after surgery is therefore common[3].

CT myelography and MRI are able to reveal a clearly defined border between the spinal cord and the lipoma. However, many case studies have reported that lipomas can adhere tightly to neural tissues causing an unclear margin, and that they can be found both within and outside of the spinal cord. Kulkarni *et al.* reported that the incidence of surgical complications was as high as 46% in patients with spinal lipoma of the conus[4]. Therefore, surgical procedures for the total removal of subpial spinal lipoma are usually avoided. Instead, the surgical procedures undertaken generally include internal decompression by partial removal of the tumor and decompression by laminectomy or duraplasty. Partial removal and laminectomy reportedly provide good postoperative outcomes in many cases. Ultrasonic aspirators such as SONOPET® are useful for lipoma removal. To prevent complications including neurological deficits, intraoperative SEP monitoring and ultrasonography have been found to be useful[5]. Surgical results and outcomes depend on the timing of surgery rather than the extent of removal. It is difficult to improve neurological deficits a few years after

their onset[6]. Our patient experienced neurological symptoms one year prior to presentation, and his postoperative course was uneventful after laminectomy and partial removal of the tumor. Few studies have reported long-term outcomes after surgery. One study described a case in which the tumor was slightly increased 3 years after partial removal[5]. Thus, the present patient should be followed-up carefully.

Conclusion

We describe a patient with subpial spinal lipoma, a relatively rare spinal cord tumor. Partial removal of the tumor was performed because of significant tumor adhesion to the spinal cord. Postoperative MRI revealed that the residual tumor had reduced in size. Long-term follow-up should be provided.

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