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High Cervical Intradural Lipoma

—Case Report—

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Abstract

A rare high cervical intradural subpial lipoma unassociated with spinal dysraphism manifested by a slowly progressive myelopathy simulating Brown-Sequard syndrome in a 37-year-old male. The diagnosis was based on neuroradiological imaging. Intraoperative recording of somatosensory evoked potentials showed recovery of the prolonged N_{20} latency, indicating adequate decompression was achieved.

Key words: lipoma, spinal cord, surgery, intraoperative monitoring, somatosensory evoked potential

Introduction

Intradural spinal lipomas unassociated with spinal dysraphism are rare, comprising only 1% of all spinal tumors.[3,5-9,11,14,16,17] They display no gender predominance and present most commonly in the 1st year of life (24%), the 2nd and 3rd decades (55%), and the 5th decade (16%).[8] Several segments of the spinal cord are generally involved, predominantly the thoracic (32%), cervicothoracic (24%), and cervical regions (13%). Involvement of lumbosacral regions is 19%, where most lipomas associated with spinal dysraphism occur. These tumors are usually posterior (67%) or posterolateral (23%) to the spinal cord.[7] We describe a case of high cervical intradural subpial lipoma, the neuroradiological diagnosis, and need for intraoperative monitoring.

Case Report

A 37-year-old male presented with gait disturbance, numbness of all extremities, and loss of temperature sensation in his right hand on August 17, 1989. Nine years before, he had gained 20 kg, become liable to stumble, and developed numbness in bilateral lower extremities. Gradually, the numbness spread to the body and bilateral upper extremities. Five years before, he lost temperature sensation in his right hand. Slow but steady deterioration occurred, and in recent months he developed difficulty in micturition and gait.

Neurological examination on admission revealed mild quadriparesis, diminished sensation to pain and temperature below the C3 dermatome, worse on the right and in the lower extremities, and diminished sensation to light touch below the C3 dermatome, worse on the left and in the lower extremities. Hyper-reflexia was present in all extremities, marked on the left, and Babinski's sign was positive bilaterally. No atrophy of muscles, nevus, or skin dimple were observed. Electromyograms revealed an increased insertion voltage, and a prolonged duration of motor unit potential with increased voltage. Conduction velocity of the median nerve was 50 m/sec. Somatosensory evoked potentials (SEPs), recorded on the Shagass point[13] by stimulating the median nerve, revealed that the latency of the first negative potential (N_{20}) was apparently prolonged at 22 msec.

Plain x-ray films of the cervical spine were normal. Cervical myelograms revealed an incomplete block at the C3 level and widening of the spinal cord above C3. Computed tomographic (CT) myelograms showed a low-density lesion located at the C1-3 levels

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right posterolaterally to the cervical spinal cord. The Hounsfield's number of the lesion was −113, indicating a fatty tissue (Fig. 1). Cerebral angiograms, including vertebral angiograms, revealed no abnormalities. High-field (1.5 T) magnetic resonance (MR) imaging showed an intradural lesion at the same site appearing intense on the T_1- and T_2-weighted images (Fig. 2 *left*). The interface between the spinal cord and lesion was not well demarcated, but a low-intensity band caused by the chemical shift effect was noted. Gadolinium-diethylenetriaminepenta-acetic acid (Gd-DTPA) enhancement was not significant. The cervical spinal cord appeared atrophic on the sagittal section. No syringomyelic or cystic changes were present. The preoperative diagnosis was cervical myelopathy due to a C1-3 lipoma.

The cervical cord was decompressed by a C1-3 laminectomy in the sitting position. The spinous processes appeared intact, but the C1-2 laminae were thin. The apparently intact dura mater overlying the lesion was opened at the C3 level, and the opening extended rostrally. The yellowish tumor covered the dorsal part of the cord, under the thickened arachnoid membrane. The tumor margins were generally well demarcated, but were attached in places to the cord, separately at the rostral end. Several nerve roots were incorporated in the lesion, and no cleavage plane was found. About 40% of the tumor was removed (Fig. 2 *right*). Intraoperative SEP monitoring showed that the latency of N_{20} was shortened following the surgical procedure (Fig. 3). Histological investigation found mature adipose tissue covered by thickened pia mater.

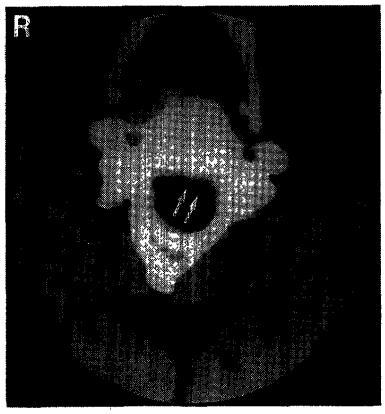

Fig. 1 CT myelogram at the C2 level, showing an intradural low-density mass and the displaced cervical cord (*arrows*).

Fig. 2 T_1-weighted sagittal MR images. *left*: Preoperatively, a homogeneous intense signal lesion dorsal to the cervical cord is shown. The tumor margin is not well demarcated. *right*: Postoperatively, about 40% of the tumor was removed.

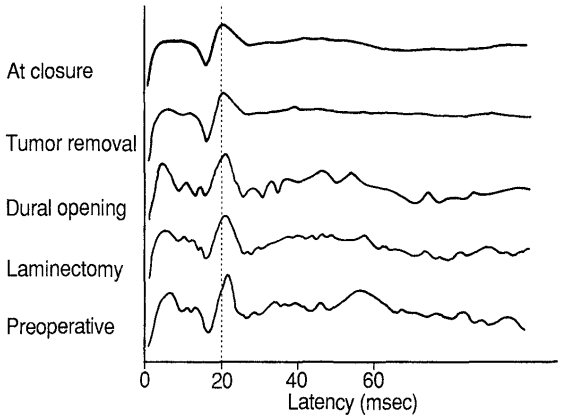

Fig. 3 Intraoperative SEP recordings, showing the recovery of prolonged N_{20} latency after decompression of the spinal cord.

Improvement of sensation was noted immediately after the operation. His motor function also recovered, with improvement more prominent on the right. The right-sided hyper-reflexia and Babinski's sign disappeared.

He was discharged on September 30, 1989, with improved but symmetrically diminished sensation to all modalities. Possible left-sided weakness with hyper-reflexia and positive Babinski's sign also persisted. His improved neurological condition was stable for about 1 month. The right-sided hyper-reflexia and hypesthesia returned to the preoperative state after 6 months, but other improvements continued. Follow-up MR imaging showed no evidence of tumor growth.

Discussion

Vertebral and dermal abnormalities are not characteristics of lipomas unassociated with spinal dysraphism, in contrast to those associated with

spinal dysraphism.[6,8] Very slowly progressive myelopathy is the usual clinical presentation, as in this case, and radicular pain is common.[6,8,17] Lipomas, if not liposarcomas, do not proliferate but may grow, probably following fat accumulation within the tumor cells.[8] The clinical manifestation in our case may have coincided with the weight increase.

The low CT density,[17] and high intensity on T_1- and T_2-weighted MR images,[3,9] non-enhancement with Gd-DTPA,[12] and MR chemical shift effect[1] are highly specific to lipomas.[3,4,9] Intramedullary tumors such as astrocytomas and ependymomas are differential diagnoses, but their MR imaging appearances are quite different, with high intensity on T_2-weighted images, iso- to low intensity on T_1-weighted images, and variable enhancement with Gd-DTPA. The diagnosis of lipomas is, therefore, relatively easy with neuroradiological methods.

Associated cord abnormalities are common in lipomas associated with dysraphism, but rare unassociated with dysraphism. In our case, cord atrophy was the only abnormality. Cord cavitations or syringomyelic changes occur in 31% of intramedullary tumors.[2] Syringomyelia and hydromyelia with lipomas unassociated with spinal dysraphism has occurred only twice.[8] Intramedullary tumors with exophytic growth are rarely associated with syrinx and cyst.[15] Lipomas typically have such tumor growth,[6-8,16] as in this case, which may be one reason why syringomyelia occurs so rarely.

Current therapy for lipomas is surgical removal. However, total excision can never be achieved without causing neurological damage, because the spinal nerve roots are frequently trapped and the tumor is usually closely adherent to the cord, so a cleavage plane is absent or at best partially recognizable,[8] as in our case. Clinical improvement in the short term and failure to improve are irrespective of the type of surgery performed.[8] The long-term results are independent of the extent of tumor removal,[14] and subtotal removal is not superior to simple decompression.[16] Therefore, surgery must aim to achieve clinical improvement without neurological complications. We used SEPs for intraoperative monitoring, which showed when the decompression was sufficient to expect clinical improvement.[10] The method of evaluation will depend on the tumor location. Brainstem auditory evoked responses will be useful for a tumor in the posterior fossa[11] and SEPs obtained by tibial nerve stimulation for a tumor in the thoracic regions.

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