Large intramedullary lipoma of the cervical cord and posterior fossa

Case report

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A large intramedullary lipoma of the cervical cord extending into the posterior fossa is reported in a 7-year-old boy. Magnetic resonance imaging was very useful for delineation of the anatomy of the lipoma as an aid in planning the operation.

KEY WORDS lipoma • brain stem • spinal cord • posterior fossa • magnetic resonance imaging

Spinal lipomas not associated with spinal dysraphism are rare. We report a case of a large intraspinal intradural subpial lipoma of the cervical cord extending into the posterior fossa in a young child. The child was thought to have a birth injury because tetraplegia was present at birth. The location of the lipoma was well delineated by magnetic resonance imaging (MRI). Neurological improvement was obtained after reconstructive posterior fossa craniotomy, laminotomy, and partial removal of the lipoma. Intraoperative recording of the brain-stem auditory evoked response was useful for monitoring surgical decompression during the operative procedure.

Case Report

This 7-year-old boy, who had a normal full-term delivery and an unremarkable prenatal history, was noted to have tetraplegia immediately after birth, thought to be caused by birth injury. At 5 years old, he was admitted to the Kochi Prefectural Institute for Crippled Children for rehabilitation. A few months after admission, he started to have attacks of tonic-clonic convulsions in the left upper extremity, each episode lasting several minutes. Computerized tomography (CT) was performed at another hospital and showed a large low-density lesion in the posterior fossa, without hydrocephalus. He was referred to the Department of Neurosurgery of Kochi Medical School Hospital for further examination and treatment of the posterior fossa lesion.

Examination. On admission the patient was incontinent and slightly mentally retarded for his age, with poor neck fixation. Cranial nerves were all intact. Nystagmus was not observed. All four extremities were flaccid. He was able to flex his forearm and abduct the shoulder about 90°. His lower extremities were paraplegic, with talipes equinovarus. Deep-tendon reflexes were not elicited except for hyperactive knee jerks; otherwise no pathological reflexes were present and sensory function seemed to be intact. Scoliosis was present.

Laboratory studies, including a complete blood count and blood chemistry, were all within normal limits. Plain roentgenograms of the skull were not remarkable. X-ray films of the cervical spine showed an increase of the interpedicular distance and the anteroposterior diameter. On CT scanning a large low-density lesion within the posterior fossa, with a CT number of -103, was revealed (Fig. 1 left). The vertebral arteries were seen as two high-density spots on the margin of the low-density lesion. The fourth ventricle could not be identified. On metrizamide myelography, contrast medium did not ascend above C-7. Following metrizamide myelography, CT scans of the cervical area showed that the low-density lesion in the posterior fossa extended into the cervical canal to the C-7 vertebral level. A high-
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**FIG. 1.** *Left:* Plain computerized tomography (CT) scan showing a large low-density mass with a CT number of -103 in the posterior fossa. Two high-density spots (arrows) are visible on the margin of the low-density mass, corresponding to the vertebral arteries. The fourth ventricle is not identified. *Right:* A CT scan of the cervical spine obtained after metrizamide myelography showed a high-density area (arrow) corresponding to the cervical cord ventral to the low-density mass.

**FIG. 2.** Magnetic resonance image, sagittal section, revealing an extra-axial mass ventral to the brain stem. The fourth ventricle (arrow) is identified lying posterosuperior to the mass.

**FIG. 3.** Photograph of the operative field showing a yellowish tumor (T) in the lower portion of the posterior fossa and the dorsal portion of the cervical canal, extending down to the C-7 vertebra. C = cerebellar hemisphere.

Density area corresponding to the cervical cord was located ventral to the low-density lesion (Fig. 1 *right*). Vertebral angiograms showed that the basilar artery and the junction of two vertebral arteries were pushed upward and backward and deviated to the left, with elevation of the origin of the posterior inferior cerebellar artery. These findings were compatible with an extra-axial avascular mass located ventral to the brain stem, and MRI was performed to delineate the location of the lesion. The sagittal section showed a large intramedullary lipoma of the cervical cord extending into the posterior fossa. The mass in the posterior fossa was extra-axial and ventral to the brain stem, and the fourth ventricle could be identified posterosuperior to the mass (Fig. 2).

**Operation.** Surgery was carried out to confirm the histological diagnosis of the mass and to decompress neural structures in the posterior fossa and cervical canal. The patient was placed in the prone position in three-pin skeletal fixation. A vertical midline skin incision was made from a point superior to the inion down to the T-3 spinous process. Reconstructive suboccipital craniotomy and laminotomy were performed. The dura overlying the posterior fossa was not tense. When the dura was opened, a yellowish tumor was seen in the lower portion of the posterior fossa and the dorsal portion of the cervical canal extending to the C-7 vertebral level, as had been shown on the MRI scan (Fig. 3). About 40% of the mass was resected under the operating microscope using the Cavitron ultrasonic aspirator.* Nerve roots of the cervical cord were found within the tumor during its resection and these were left intact without injury. Intraoperative recording of brain-stem auditory evoked response after partial resection of the tumor showed marked improvement. A dural substitute was patched to the dura of the posterior fossa and the entire length of the cervical canal. The occipital bone flap was replaced and fixed. The cervical laminae were also replaced and fixed loosely without compromise of the cervical canal.

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*Ultrasonic aspirator manufactured by Cavitron, Cooper Medical, Stamford, Connecticut.
Postoperative Course. The postoperative course was uneventful. Although the mobility of the patient's upper extremities was unchanged, he withdrew his lower extremities on painful stimulation immediately after the operation. The improvement of motor activity was more pronounced in the left lower extremity.

Discussion

Although it is not certain whether a lipoma is a malformation or a neoplasm, the progression of clinical symptoms suggests that this lesion does grow. Because lipomas are frequently seen in the midline and are occasionally associated with such anomalies as absence of the corpus callosum, embryonic aberration is the most likely pathogenetic mechanism. In the present case, tetraplegia was thought to be caused by a birth injury.

The lipoma in this patient was located in the posterior fossa and cervical canal. Intracranial lipomas are rare, while intraspinal lipomas are often found, with or without spinal dysraphism. Extension of an intraspinal lipoma into the posterior fossa is unusual. The lipoma in the present case was attached to or arose from the posterior surface of the cervical cord and was thought to be a congenital spinal, intradural, subpial, or intramedullary tumor that had extended into the posterior fossa.

The diagnosis of intracranial lipoma is established by CT scanning on the basis of the typical low density and location. In the present case, the lipoma in the posterior fossa was detected without difficulty, but the relationship of the tumor to the fourth ventricle was not clear. We found MRI very useful for delineation of its location and thus for planning the operation.

Although lipomas are not true neoplasms, they have the capacity to grow. Indications for surgery still remain controversial. Most lipomas cannot be removed from the parenchyma. Adhesion of lipomas to the adjacent neural parenchyma is a well-known complication, and excessive removal of the mass may impair neurological function immediately after surgery due to intraoperative parenchymal injury. The main purpose of surgery for lipoma is not total removal but decompression of the adjacent neural structures. Intraoperative recognition of the necessary extent of surgical decompression is aided by monitoring electrophysiologic responses. As reported elsewhere, brain-stem auditory evoked responses were helpful in determining the extent of tumor removal in the posterior fossa in the present case. In decompression operations for benign spinal lesions in young children, reconstructive bone surgery should be considered to prevent future deformity of the spinal column. For this reason, we performed reconstructive suboccipital craniotomy and laminotomy in our case.

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References