Intracranial Lipoma in Medulla Oblongata

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Intracranial lipomas are rare, and most of these tumors are found in the region of the corpus callosum, followed by cerebellar pontine angle. We present a case of a intracranial lipoma in 30-year-old man. Brain computed tomography (CT) scan and magnetic resonance images (MRI) showed a mass in the medulla oblongata extending to foramen magnum. The histopathologically, diagnosis of lipoma was confirmed. Although there were several cases of cervical intraspinal lipoma extending into posterior cranial fossa, there have been no previous reports of a lipoma arising from the medulla oblongata that extended into the foramen magnum. We describe a rare case of intradural subpial lipoma in the medulla oblongata with a review of the literature.

KEY WORDS: Intracranial lipoma · Medulla oblongata · Extracranial extension.

Introduction

Intracranial lipomas are accepted to be congenital malformations that results from abnormal persistence and maldifferentiation of the meninx primitiva, the mesenchymal precursor of leptomeninges, during the development of the subarachnoid cisterns1,2,3,6. Other brain malformations are often seen in association with intracranial lipoma1,4,5). The involved locations are; corpus callosum (64%), quadrigeminal ambient cistern (13%), infundibular-chiasmatic region (13%), cerebellopontine angle (0.06%), and sylvian fissure (0.03%) in order of frequency4).

Although there were several cases of cervical intraspinal lipoma extending into posterior cranial fossa, there have been no previous reports of a lipoma arising from medulla oblongata. We describe a rare case of medullary intradural subpial lipoma in the medulla oblongata with a review of the literature.

Case Report

A 30-year-old man presented with complaints of gait disturbance due to dizziness, headache, and vomiting for two days prior to admission.

General physical findings were normal. On neurological examination, he showed no neurological deficit except for gag reflex which was decreased markedly.

Plain radiographs of the skull and cervical spine were unremarkable. A brain computed tomography (CT) scan demonstrated a low density mass extending from the medulla oblongata through the foramen magnum and well down into the upper cervical segment (Fig. 1). The mass was located at the posterior aspect of the medulla oblongata and the Hounsfield's number of the lesion was -107, indicating a fatty tissue. The T1-weighted magnetic resonance images (MRI) showed a hyperintense mass at the medulla oblongata. In T2-weighted MRI images, this mass showed mixed iso to high signal intensity. The tumor base was attached to the medulla and infiltrated it (Fig. 2). The tentative diagnosis was lipoma.

Due to symptoms and signs of brain stem compression, surgery was recommended.

Fig. 1. Brain computed tomography (CT) at admission demonstrating a 1.9 × 1.2 cm sized low density mass.
Yag laser (Multidimensional Contact Laser System, Surgical Laser Technologies, USA). Using the laser, we operated very carefully and did not attempt to resect the lipoma in toto. We performed subtotal removal of the mass and did not remove the tumor base attached to the medulla oblongata. The histopathological diagnosis of lipoma was confirmed (Fig. 4).

After operation, the patient was slightly weaker in right upper extremity. Six days after operation, weakness was aggravated and hypesthesis and paresthesia were developed in both upper arms. We speculated that the cause of postoperative symptoms was thermal injury induced by laser because postoperative follow up of brain MRI showed abnormal high signal intensity in the medulla oblongata that was not seen on preoperative brain MRI (Fig. 5). Several months after operation, although the remnant mass was visible on brain MRI (Fig. 5), his neurological deficit was improved except for a difficulty in fine skills due to mild spasticity.

Discussion

Intracranial lipomas are rare, accounting for about 0.1-0.34% of all intracranial tumors, and no more than 0.08% of tumors on autopsy. But, some authors have described that intracranial lipomas constitute 0.46-1% of intracranial tumors.

Intracranial lipomas usually occur at or near the midlines and most frequently interhemispheric lesions, accounting for 45% of cases. The remainder of the lesions were clustered in the quadrigeminal cistern/superior cerebellar (25%), suprasellar/interpeduncular (14%), cerebellopontine angle (9%) and sylvian cistern (5%). Rarely, they can be located on the surface of cerebral hemispheres. In our case, the lipoma was thought to arise from medulla oblongata and extended into foramen magnum.

Intracranial lipomas are often associated with various anomalies of the central nervous system (CNS), such as agenesis/dysgenesis of the corpus callosum, absence of septum pellucidum, cranial bifidum, spina bifida, encephalocele, myelomeningocele,
hypoplasia of vermis and malformation of the cortex. But, our case exhibited none of these anomalies.

Whether the symptoms are due to the lipoma or to associated congenital malformation is not clear. Symptomatic intracranial lipomas are very rare, and symptoms differ according to the location of the lipoma. Eighty percent of cerebellar pontine angle lesions, 50% of callosal, 50% of sylvian tissue and 20% of quadrigeminal-ambient cistern lipoma become symptomatic. The clinical presentation may include convulsive seizures, paralysis, and mental retardation, especially in lipomas in the corpus callosum. Cranial nerve impairment, behavioral disturbances, and headaches are other symptoms. Lipomas localized in the ambient and quadrigeminal cisterns often present with signs of intracranial pressure caused by hydrocephalus. Other neurological symptoms or endocrinological disturbances are very rare.

Intracranial lipomas are generally treated conservatively for several reasons. First, the intracranial lipomas grow very slowly and are generally asymptomatic. Second, they are usually located in deep sites. Third, surgical interventions are often complicated by their adhesive nature and propensity of engulf vital structures, such as blood vessels and cranial nerves. But surgical intervention is necessary in symptomatic patients, such as neuralgia, epilepsy and other specific symptom that are related to lipoma.

With increasing experience and skill with microsurgical dissection technique using the laser in functionally important structures, the laser has some advantage in neurosurgical application. Use of the laser reduces the operation time and the intraoperative blood loss because the lipoma is vaporized and small vessels are sealed simultaneously. Use of the laser also reduces the need to manipulate the tissues and the consequent operative trauma. By far, the most commonly used laser in neurosurgery is the carbon dioxide (CO₂) laser. Because the energy emitted from a CO₂ laser is immediately absorbed by fluid, and conversely, has the lowest degree of scatter, the tissue penetration depth is shallow. So, it is most effective in the vaporization of extra-axial tumors that are fibrous and relatively avascular, or lipomatous tumors involving the skull base or spinal canal. The neodymium : yttrium-aluminum-garnet (Nd : YAG) laser seems particularly suited for removal of high vascularity, such as arteriovenous malformations, glioblastomas, glomus tumors, and hypervascular meningiomas because this laser is more strongly absorbed in hemoglobin than in other tissue components and has relatively long penetration depth.

Thirteen cases of intradural cervical lipomas with intracranial extension has previously been reported in the English literature. However intracranial lipomas are very rarely associated with extracranial extension. Fitzow et al. reported only one lipoma that extended into scalp through the foramen ovale.

Conclusion

This case report is a reminder that intracranial lipomas may rarely be located in the medulla oblongata that can extend through foramen magnum. If the lipoma is symptomatic lesion, surgical intervention is considered. When considering the use of a laser, the benefit/risk ratio must be determined and the selection of the proper type of the laser is important.

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References