CASE REPORT

J Korean Neurosurg Soc 41 : 330-332, 2007

Intracranial Lipoma in Medulla Oblongata

Ji Kwang Yun, M.D., Dae Won Kim, M.D., Tae Young Kim, M.D., Jong Moon Kim, M.D.

Department of Neurosurgery, School of Medicine, Wonkwang University, Iksan, Korea

Intracranial lipomas are rare, and most of these tumors are found in the region of the corpus callosum, followed by cerebellopontine 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 cisterns[3,5,16]. Other brain malformations are often seen in association with intracranial lipoma[7,14,15]. 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 frequency[15].

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.

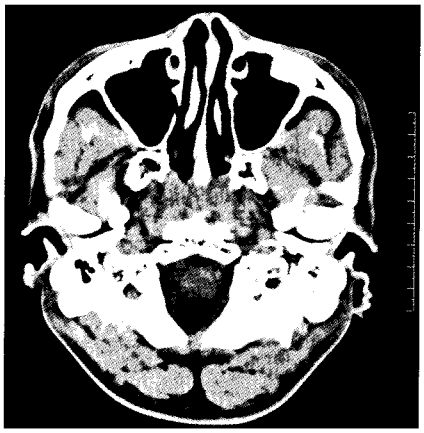

Fig. 1. Brain computed tomography (CT) at admission demonstrating a 1.9×1.5cm sized low density mass.

• Received : October 26, 2006 • Accepted : March 6, 2007

• Address for reprints : Tae Young Kim, M.D., Department of Neurosurgery, School of Medicine, Wonkwang University, 344-2 Sinyong-dong, Iksan 570-711, Korea Tel : +82-63-850-1267, Fax : +82-63-852-2606, E-mail : tykim@wonkwang.ac.kr

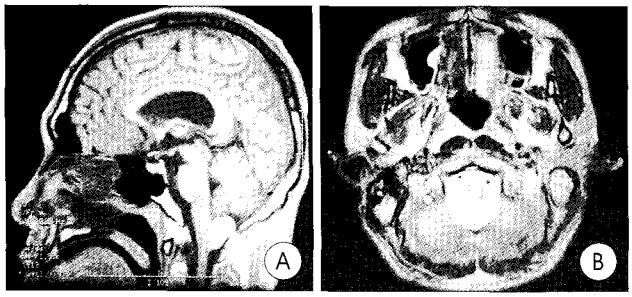

Fig. 2. Brain T1-weighted sagittal magnetic resonance images (MRI) showing a high signal intensity mass extending from the medulla oblongata and well down into the upper cervical segment through the foramen magnum (A). The mass is seen as high signal intensity at T2-weighted axial image (B).

Fig. 3. Intraoperative photograph showing yellowish mass, attached to the medulla oblongata.

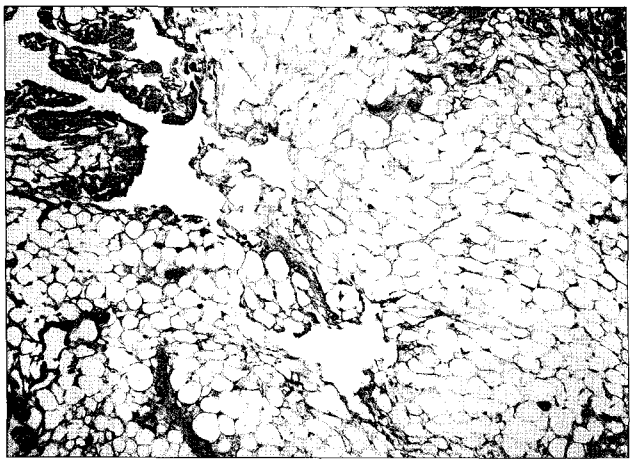

Fig. 4. Histological examination revealing that the mass is composed of normal-appearing adipose cells in a connective tissue stroma with no features different from those of the usual lipoma (hematoxylin-eosin stain, ×100).

He underwent suboccipital craniectomy and C1 laminectomy. The dura mater and arachnoid were opened in separate layers. The lipoma was located entirely subpial and attached to the medulla oblongata, with no plane of dissection or visual interface between them (Fig. 3). Because the tumor was not removed easily by ultrasonic aspirator, we used the continuous wave Nd : Yag laser (Multidimentional 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).

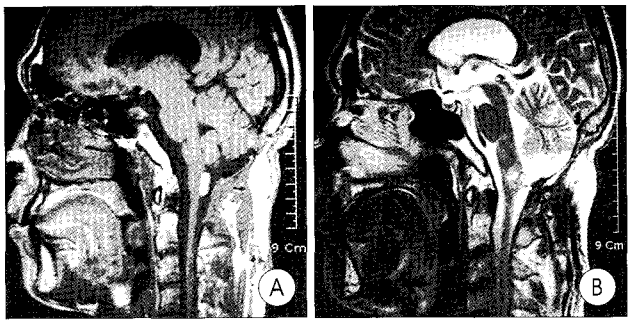

Fig. 5. Postoperative follow up of brain MRIs (T2-weighted sgittal image) demonstrating remnant mass (A) and abnormal high signal intensity (B) in medulla oblongata.

After operation, the patient was slightly weaker in right upper extremity. Six days after operation, weakness was aggravated and hypesthesia 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[3,12]. But, some authours have described that intracranial lipomas constitute 0.46-1% of intracranial tumors[5].

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[6,14-16]. 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, cranium bifidum, spina bifida, encephalocele, myelomeningocele,

hypoplasia of vermis and malformation of the cortex[3,6-8,14,15]. But, our case exhibited none of these anomalies.

Whether the symptoms are due to the lipoma or to associated congental malformation is not clear[15]. Symptomatic intracranial lipomas are very rare, and symptoms differ according to the location of the lipoma[7]. Eighty percent of cerebellopontine angle lesions, 50% of callosal, 50% of sylvian fissure 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 disturebances are very rare[5,7,14,16].

Intracranial lipomas are generally treated conservatively for several reasons[4]. First, the intracranial lipomas grow very slowly and are generally asymptomatic[14]. Second, they are usually located in deep sites[6,7,14]. Third, surgical interventions are often complicated by their adhesive nature and propensity of engulf vital structures, such as blood vessels and cranial nerves[4-7,14]. But surgical intervention is necessary in symptomatic patients, such as neuralgia, epilepsy and other specific symptom that are related to lipoma[5-8,13].

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[9]. By far, the most commonly used laser in neurosurgery is the carbon dioxide (CO_2) laser. Because the energy emitted from a CO_2 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[1].

Thirteen cases of intradural cervical lipomas with intracranial extension has previously been reported in the English literature[8,10,11]. However intracranial lipomas are very rarely associated with extracranial extension[3,4]. Fitoz et al.[3] 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.

• Acknowledgement
This paper was supported by Wonkwang University in 2005.

References

1. Boggan JE, Powers SK : Use of lasers in neurological surgery in Youmans JR (ed) : **Neurological surgery**, ed4. Philadelphia : W.B. Saunders Co., 1996, Vol 1, pp797-799
2. Fan CJ, Veerapen RJ, Tan CT : Subdural spinal lipoma with posterior fossa extension. **Clin Radiol 40** : 91-94, 1989
3. Fitoz S, Atasoy C, Erden I, Akyar S : Intracranial lipoma with extracranial extension through foramen ovale in a patient with encephalocraniocutaneous lipomatosis syndrome. **Neuroradiology 44** : 175-178, 2002
4. Given CA, Fields TM, Pittman T : Interhemispheric lipoma connected to subcutaneous lipoma via lipomatous stalk. **Pediatr Radiol 35** : 1110-1112, 2005
5. Ichikawa T, Kumazaki T, Mizumura S, Kijima T, Motohashi S, Gocho G : Intracranial lipomas : demonstration by computed tomography and magnetic resonance imaging. **J Nippon Med Sch 67** : 388-391, 2000
6. Kakita A, Inenaga C, Kameyama S, Masuda H, Ueno T, Honma J, et al : Cerebral lipoma and underlying cortex of the temporal lobe : pathological features associated with the malformation. **Acta Neuropathol 109** : 339-345, 2005
7. Kurt G, Dogulu F, Kaymaz M, Emmez H, Onk A, Baykaner MK : Hypothalamic lipoma adjacent to mamillary bodies. **Childs Nerv Syst 18** : 732-734, 2002
8. Le Feuvre DE, Semple PL, Peter JC : Intradural cervical lipomas with intracranial extension : a management strategy based on a case report and review of the literature. **Br J Neurosurg 18** : 385-388, 2004
9. McLone DG, Naidich TP : Laser resection of fifty spinal lipomas. **Neurosurgery 5** : 611-615, 1986
10. Mori K, Kamimura Y, Uchida Y, Kurisaka M, Eguchi S : Large intramedullary lipoma of the cervical cord and posterior fossa. **J Neurosurg 64** : 974-976, 1986
11. Rappaport ZH, Tadmor R, Brand N : Spinal Intradural Lipoma with Intracranial Extension. **Childs Brain 9** : 411-418, 1982
12. Saatci I, Aslan C, Renda Y, Besim A : Parietal Lipoma Associated with Cortical Dysplasia and Abnormal Vasculature : Case Report and Review of the Literature. **Am J Neuroradiol 21** : 1718-1721, 2000
13. Shin SH, Jung HW, Chi JO, Han DH : Cerebropontine Angle Lipoma Presenting with Trigeminal Neuralgia : case report. **J Korean Neurosurg Soc 25** : 2336-2338, 1996
14. Yildiz H, Hakyemez B, Koroglu M, Yesildag A, Baykal B : Intracranial lipomas : importance of localization. **Neuroradiology 48** : 1-7, 2006
15. Yilmazlar S, Kocaeli H, Aksoy K : Quadrigeminal cistern lipoma. **J Clin Neurosci 12** : 596-599, 2005
16. Yilmaz N, Unal O, Kiymaz N, Yilmaz C, Edik O : Intracranial lipomas : a clinical study. **Clin Neurol Neurosurg 108** : 363-368, 2006