—**Report on Experiments and Clinical Cases**—

Intracranial Lipomas

Demonstration by Computed Tomography and Magnetic Resonance Imaging

Taro Ichikawa[1], Tatsuo Kumazaki[2], Sunao Mizumura[2], Tetsuji Kijima[2],
Syouzou Motohashi[3] and Gyoko Gocho[3]

[1]Department of Radiology, Tama Nagayama Hospital, Nippon Medical School
[2]Department of Radiology, Nippon Medical School
[3]Nerima Medical Association

Abstract

We present two cases of a very rare tumor, intracranial lipoma, diagnosed by computed tomography (CT) and magnetic resonance imaging (MRI). In one case, the lipoma was in the superior cerebellar cistern, the other was in the periphery of the corpus callosum. In the case in which MRI was used, identification of the lipoma using a routine MRI examination was difficult. These cases are reported now because the incidental diagnosis of intracranial lipoma is likely to increase due to advanced neuroradiological techniques such as CT and MRI. (J Nippon Med Sch 2000; 67: 388—391)

Key words: intracranial lipoma, pericallosal lipoma, CT, MRI

Introduction

Intracranial lipomas are very rare tumors. It is reported that they account for less than 0.1 percent of diagnosed brain tumors, and for no more than 0.08% of tumors found on autopsy[1,2].

They are mostly found in the midsagittal region, the most common of all being the vicinity of the corpus callosum, where approximately half of the total are found[3]. Other sites where they have been reported to occur include the choroid plexus, the quadrigeminal cistern, the interpeduncular cistern, the ambient cistern and the cerebellopontine cistern[4,5].

Intracranial lipomas are considered not to be true tumors, but are taken by some to be persistent meninx primitiva that accompany developmental anomalies[5]. However, there is no generally accepted theory. They have been sometimes associated with intracranial malformations.

We report two cases in which, using computed tomography (CT) and magnetic resonance imaging (MRI), we made incidental diagnoses of intracranial lipoma without any other developmental anomalies.

Case Reports

Case 1: The patient was a 53-year-old woman who was examined with unenhanced CT because she had complained of vertigo. No particular problems were found in her family history, and she exhibited no neurological anomalies. Unenhanced CT was performed with slices 10 mm thick at 10 mm intervals.

CT revealed a mass 2.2×0.6 cm in size with homogeneous low attenuation values in its interior. These low attenuation values were clearly even lower than those obtained from cerebrospinal fluid (**Fig. 1**). No anomalous complications were detected.

These findings led to a diagnosis of a lipoma in the superior cerebellar cistern.

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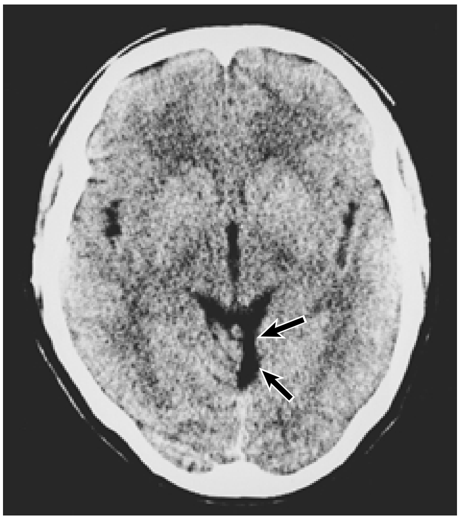

Fig. 1 Case 1: Unenhanced CT shows a very low attenuation tumor compared with surrounding cerebrospinal fluid in the superior cerebellar cistern (arrows).

Case 2: This patient was a 54-year-old woman whose chief complaint was headaches. She was examined with both CT and MRI. There was nothing remarkable in the family history, and no neurological abnormalities were found. Unenhanced CT with 10 mm slice thick, 10 mm slice intervals, revealed a 0.8 × 0.4 cm area of homogeneous low attenuation, suggesting adipose tissue, in the periphery of the corpus callosum (**Fig. 2 a**).

The first MRI performed using conventional spin-echo (CSE) T 1-weighted images (T 1 WI) (**Fig. 2 b**), fast spin-echo (FSE) T 2-weighted images (T 2 WI), and fluid attenuated inversion recovery (FLAIR). When the slice thickness was 7 mm, an inter-slice gap of 1 mm. In this initial MRI, it was not possible to find the lipoma detected by CT, and the second MRI examination was carried out 7 days later.

In the second MRI examination, CSE T 1 WI with fat saturation method was performed, and the slice thickness was reduced to 4 mm, and no inter-slice gap was used. As a result, the lipoma was well demonstrated, presenting a strong signal with CSE T 1 WI and FLAIR, while the signals from the fatty tissue were completely suppressed by the chemical shift selective imaging (**Fig. 2 c, d, e**). No accompanying anomalies were observed.

The diagnosis based on the above findings was a pericallosal lipoma.

Discussion

The two cases reported herein were examined with CT and MRI because of complaints of vertigo and headache, but later, the patients became asymptomatic and are still alive. Many intracranial lipomas are asymptomatic, but reported symptoms include seizures, headaches, vertigo, intellectual disturbances, hemiplegia. The symptoms in our two cases were transitory, and we consider that it was unlikely that they were caused by the intracranial lipomas.

Case 2 was a case of the relatively common pericallosal lipoma, but in case 1, the tumor was in a rarely affected site. Both were in the midline. Neither of our two cases were complicated with any malformation. Anomalous complications that have been reported include agenesis or dysplasia of the corpus callosum, encephalocele, agenesis of vermis, cranium bifidum, absence of septum pellucidum[3]. Studies in adults report that intracranial lipomas are common in the choroid plexus, and some state that they are more common in lateral locations that in median sites[6]. The authors of this report also consider that few anomalous complications are found in adults. This suggests that the clinical feature of such cases varies with age, and it would seem to be necessary to carry out some investigation of the occurrence of pericallosal lipomas and intracranial lipomas that appear in other sites.

Most intracranial lipomas were previously diagnosed incidentally at autopsy examinations, but with the recent progress of the technology and widespread use of CT and MRI, incidental diagnosis with asymptomatic types of these lipomas in adults have increased in number.

In general, MRI can produce sagittal images, and is an excellent technique to use for diagnosing structural anomalies, and can be considered more useful than CT in such purposes. In particular, when a small lipoma is present in the choroid plexus, the contrast between the cerebrospinal fluid and the tumor is poor on CT image, and in such points the usefulness of MRI is thought to be superior[7,8]. However, in our case 2, although the lipoma was depicted in a routine CT image, it was difficult to identify by routine MRI. This problem arose because the slice thickness and the

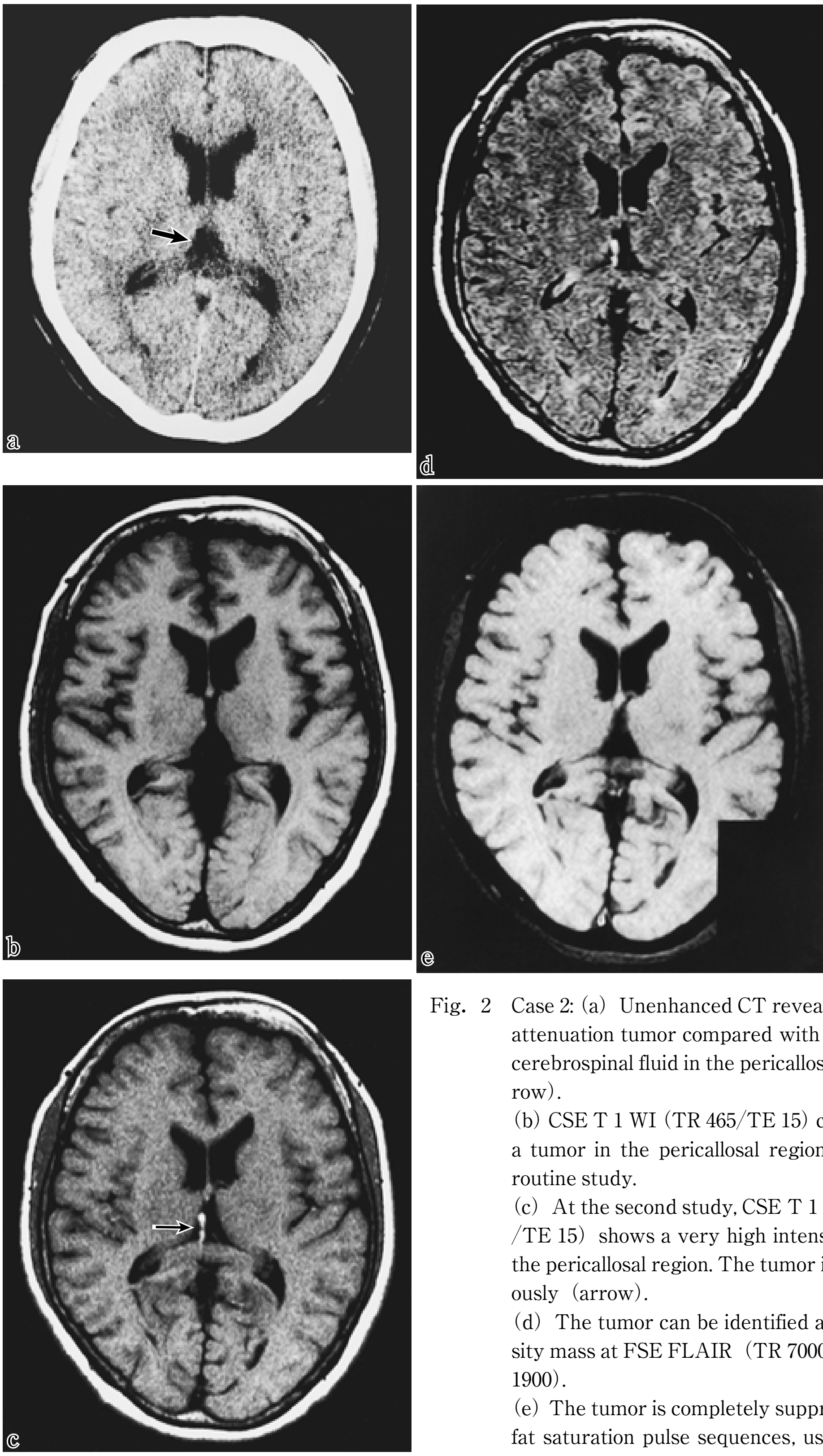

Fig. 2 Case 2: (a) Unenhanced CT reveals a very low attenuation tumor compared with surrounding cerebrospinal fluid in the pericallosal region (arrow).

(b) CSE T 1 WI (TR 465/TE 15) cannot detect a tumor in the pericallosal region at the first routine study.

(c) At the second study, CSE T 1 WI (TR 465/TE 15) shows a very high intensity tumor in the pericallosal region. The tumor is homogeneously (arrow).

(d) The tumor can be identified as high intensity mass at FSE FLAIR (TR 7000/TE 120/TI 1900).

(e) The tumor is completely suppressed on the fat saturation pulse sequences, using a chemical shift selective method. This image is confirming that the tumor contains fat tissue.

inter-slice gap were not suitable for detecting a small tumor. With CT, on the other hand, it is probable that, because of the partial volume phenomenon, the routine examination settings of a 10 mm slice thickness with the equal slice interval had possibility of depicting the tumors. Accordingly, there can be said to be a good reason for employing both CT and MRI.

In the two cases presented above, histological confirmations were not obtained. However, with the strong low-attenuation values on CT, and the high signal intensity with CSE T 1 WI on MRI, each technique offered its characteristic image of adipose tissue. Moreover, in case 2, since the tumor signals were completely suppressed on chemical shift selective imaging, the diagnosis of lipomas by imaging technique can be said to present no major problems.

References

1. Kazner E, Stochdorf O, Wende S, Grumme T: Intracranial lipoma: Diagnostic and therapeutic considerations. J Neurosurg 1980; 52: 234–245.
2. Vonderahe AR, Niemer WT: Intracraial lipoma: A report of four cases. J Neuropathol Exp Neurol 1944; 3 : 344–354.
3. Zettner A, Netsky M: Lipoma of the corpus callosum. J Neuropathol Exp Neurol 1960; 19: 305–319.
4. Kash F, Brown G, Smirniootopoulos JA, Boyer R, Osborn AG: Intracranial lipomas: Pathology and imaging spectrum. Int J Neuroradiol 1996; 2: 109–116.
5. Truwit CL, Barkovich AJ: Pathogenesis of intracranial lipoma: An MR study in 42 patients. AJNR 1990; 11: 665–674.
6. Bakshi R, Kamran S, Shaikh ZA, Kinkel PR: MRI findings in 32 consecutive lipomas using conventional and advanced sequences. J Neuroimaging 1999; 9: 134–140.
7. Olm M, Blesa R, Ribera G, Cardenal C: Lipoma of the corpus callosum: CT and MRI for diagnosis. AJR 1988; 151: 613–614.
8. Rubio G, Guijo CG, Mallada JJ: MR and CT diagnosis of intracranial lipoma. AJR 1991; 157: 887–888.

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