

Cranial Meningioma of Unusual Location: Two Cases Report

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<국문초록>

비전형적인 위치에서 발생한 수막종 : 2예 보고

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저자들은 비전형적인 위치에서 발생한 2예의 수막종을 보고하는 바이다. 한 예는 2세 남아에서 발생했으며, 수막과 부착이 없는 경계가 명확한 종괴가 Sylvian 열구내에 위치하고 있었다. 다른 예는 50세 여자에서 발생했으며, 두개골 판간층을 팽창시키는 종괴가 두개강내로 일부 연장하고 있어서 그 원발부위가 두개골 판간층임을 시사하였다. 이 2예의 방사선학적 소견을 문헌 고찰과 함께 보고하는 바이다.

We report two cases of meningioma in unusual location: one, 2-year-old male patient, revealing a well defined mass in deep Sylvian fissure with no dural attachment. Two 50-year-old female patient, manifesting as an expansile diploic mass with a small intracranial extension, suggestive of diploic origin of the tumor. The radiologic findings and a brief review of the literature are presented.

Introduction

Meningiomas are known to arise from arachnoid cells and usually occur intracranially with

dural attachment. However, the intracranial meningiomas without dural attachment and the extracranial meningiomas have been rarely reported. In this report, we present two cases of meningioma in unusual location; one within the deep Sylvian fissure without dural attachment, the other in the diploic space of skull vault.

Case Reports

Case 1.

A 2-year-old boy presented with generalized

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seizure and left hemiparesis. He had been well until 6 months after birth, when he experienced generalized tonic clonic seizure followed by left hemiparesis. Physical examination demonstrated no remarkable finding except left hemiparesis.

His plain skull showed no abnormal finding. Precontrast CT scan disclosed a well-defined, slightly high density mass with calcification in the right Sylvian fissure. The tumor showed homogeneous dense enhancement after contrast injection(Fig. 1A-B). The shape of the mass was round. There were severe peritumoral edema and prominent mass effect in the surrounding structure. No direct contact between the mass and the dura was demonstrated. Right common carotid digital subtraction angiogram showed a homogeneous tumor stain in the late arterial phase through the venous phase, fed by the branches of the right middle cerebral artery in the right Sylvian fissure area. However, the external carotid artery gave no blood supply to this tumor.

Right frontoparietal craniectomy and a total removal of the tumor were done. When the dura was incised the tumor mass was not visualized. However, hard mass feeling could be felt under the brain surface. The tumor was located in the right Sylvian fissure without any attachment to dura or to the choroid plexus of the ventricle. The tumor did not invade into the brain parenchyme.

The histologic diagnosis was meningioma of transitional cell type(Fig. 2).

Case 2.

A 50-year-old female patient presented with headache and a mass involving the vertex of skull. It had been slowly growing over the past 3 years. Physical examination demonstrated a hard mass palpable over the vertex of skull. There was no remarkable neurologic finding.

Her plain skull showed the ballooning of diplo-

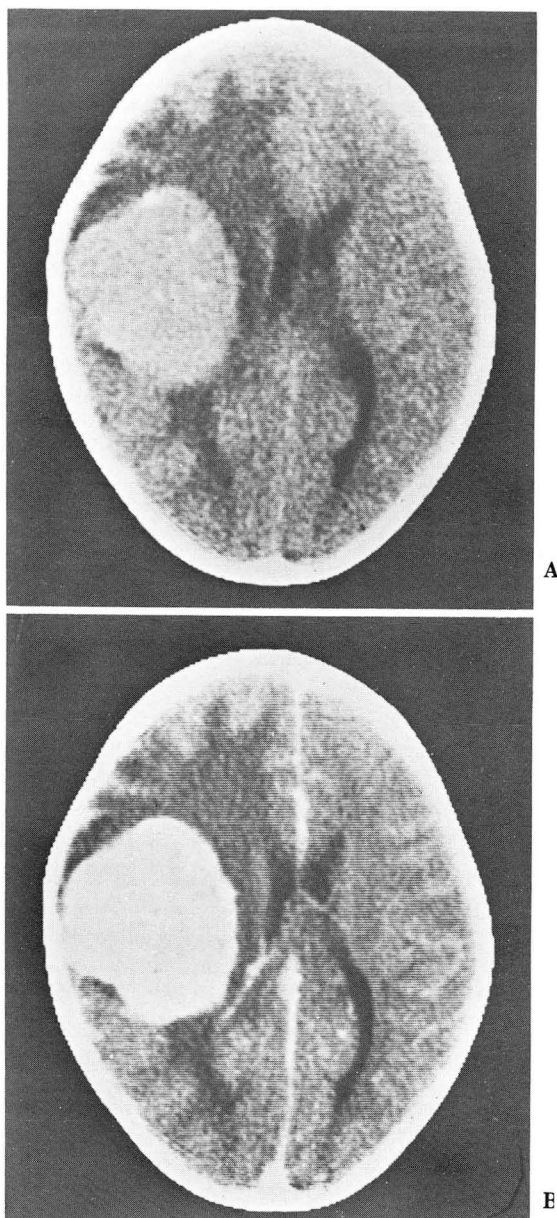


Fig. 1. A. A well-defined, slightly high density mass with calcification in area of right Sylvian fissure, B. Homogeneous dense enhancement after contrast injection.

oic space of the midline skull vault with sclerotic margin. There was internal septations in the mass and ballooned sella was present(Fig. 3A, B). CT scan demonstrated isodense mass

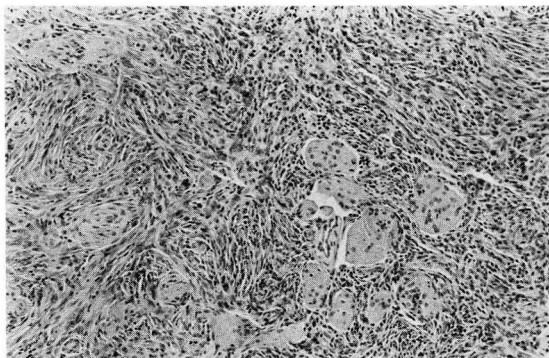


Fig. 2. Photomicrograph of meningioma, showing scattered whorls of meningeal cells in the background of plump spindle cells. Syncytium formation and a moderate vascularity are also seen. H-E x100.

with dense homogeneous enhancement after contrast injection, that located mainly in ballooned diploic space and extended intracranially through the bony defect of inner table (Fig. 3C, D, E). External carotid angiograms showed slight tumor vascularity without definite tumor stain, fed by enlarged both middle meningeal arteries and superficial temporal arteries in both sides.

Midline frontoparietal craniectomy was performed with en-bloc removal of the tumor and bone. There were adhesions between the inner table of bone, underlying dura and intracranial mass. Central portions of thinned inner table and underlying dura were destroyed, through which diploic mass was connected to the intracranial mass.

It was histologically diagnosed meningioma of the transitional cell type (Fig. 4).

Discussion

It is believed that most intracranial meningiomas arise from arachnoid cells within the arachnoid villi and have dural attachment from which the tumor receives blood supply via meningeal vessels^{1,2,3}). However, the meningiomas

may occur in unusual locations such as intracranium without dural attachment and extracranium²⁻¹¹).

Cushing and Eisenhardt divided meningiomas without dural attachment into four groups: (a) the wholly intraventricular tumors of the choroid plexuses; (b) the so called subcortical meningiomas, partly embedded in the brain, most of which arise from the lateral margin of the superior tela; (c) tumors of the deep Sylvian cleft anchored to the internal carotid and its branches; (d) an exceptional free subtentorial psammomeningioma of inconclusive origin²).

Of these, the meningiomas in group C to which the present case 1 belongs have been rarely reported^{2,4,5}). Sylvian meningiomas tend to occur in somewhat younger age group than usual meningiomas and there have been a few reports of Sylvian meningiomas in children^{1,4}). To our knowledge, case 1 in our series, 2-year-old male, is the youngest one among those reported in the literature.

On reviewing the literature, the simple radiographs of Sylvian meningiomas usually disclose no abnormality but occasional calcification, and CT reveals a well defined mass with slightly high density and homogeneous dense enhancement after contrast injection in temporo-parietal region. On carotid angiography the tumor stain fed by the branches of middle cerebral artery is demonstrated^{2,4,5}). External carotid artery have no concern with this tumor. These radiologic findings were suggestive of a meningioma. However, because of the rarity of deep Sylvian meningiomas, intraaxial tumors such as glioma or malignant lymphoma should be excluded. The importance of angiography in a deep Sylvian meningioma has been stressed by several workers^{2,6}). Okamoto et al²) suggested that a accurate preoperative diagnosis can be possible by stereoscopic angiography revealing extraaxial location of the tumor.

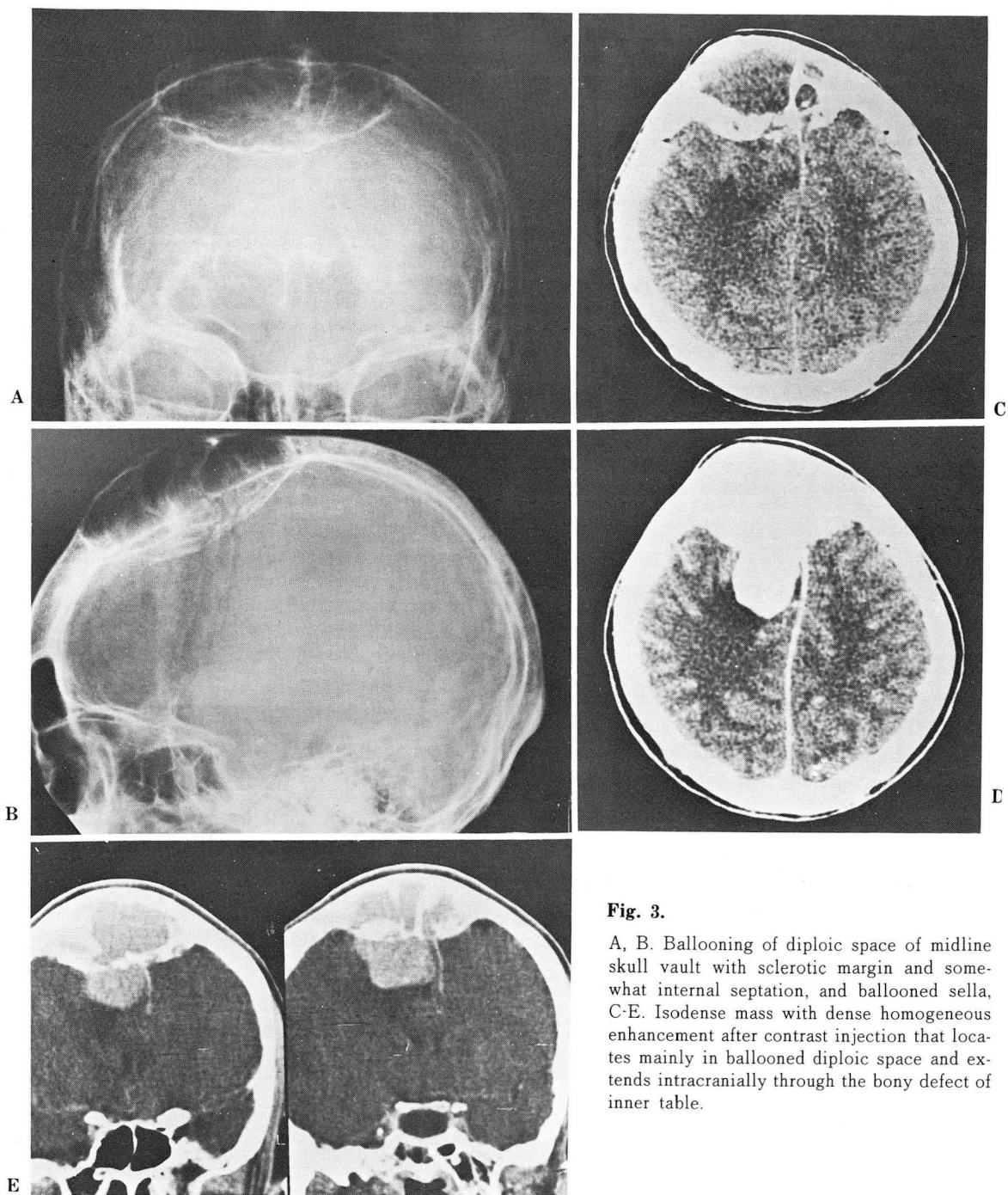


Fig. 3.

A, B. Ballooning of diploic space of midline skull vault with sclerotic margin and somewhat internal septation, and ballooned sella, C-E. Isodense mass with dense homogeneous enhancement after contrast injection that locates mainly in ballooned diploic space and extends intracranially through the bony defect of inner table.

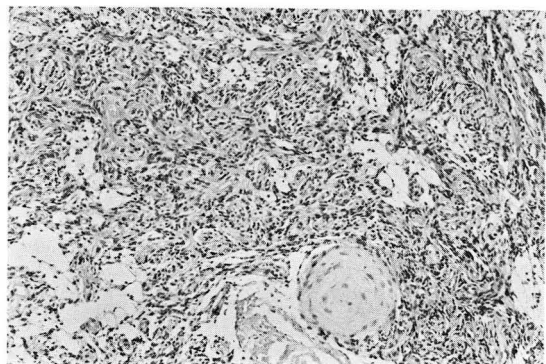


Fig. 4. Photomicrograph of meningioma. It shows a haphazard arrangement of elongated cells forming collagen bundles and a round concentric whorl(right lower). Scattered collections of xanthoma cells are also noted as irregular unstained spots. H-E x100.

Extracranial meningiomas, either primary or secondary, are infrequent with incidence of 2.0% or less⁶). Four mechanisms of the formation of extracranial meningiomas have been suggested as follows; 1) direct extension of primary intracranial tumor through the foramina of the base of the skull, 2) extracranial growth from arachnoid cells within the sheaths of cranial nerves, 3) extracranial growth of embryonic rest of arachnoid without obvious connection to the foramina of the skull base or cranial nerves(It is speculated that it happened to lodge elsewhere than in the dura during embryological development of skeletoneural intertissue.), 4) distant metastasis of intracranial meningioma^{7,8,9}). Among these, secondary extension from an intracranial primary is the most common cause and the orbit, paranasal sinus, parapharyngeal space and outer table of skull are the most common sites^{3,6,7,8}).

One case of diploic meningioma in orbital roof was reported by Shigaki et al who thought it originate from adjacent frontal sinus and extend the diploic space of orbital roof¹⁰). However, diploic meningioma of skull vault appearing

as expansile diploic mass has not been reported to date. In our second case, we are unable to determine definitely whether this case originated from diploic space or intracranial dura. However, the ballooning of both tables of skull and location of main mass in diploic space suggest primary diploic origin with intracranial extension than diploic extension of intracranial meningioma. This case may be confused with either fibrous dysplasia or other benign bone tumors on plain skull. However, in fibrous dysplasia involving the convexity, the inward bulging of the inner table of skull is rare and the presence of pressure effect on the brain is unusual¹¹). Also, associated round enhancing intracranial mass on CT and enlarged middle meningeal and superficial temporal arteries on angiography are not consistent with the fibrous dysplasia or other tumors. We believe that accurate preoperative diagnosis can be made by both CT and external carotid angiography even in expansile diploic meningioma.

REFERENCES

1. Rosenbaum AE and Rosenbloom SB: *Meningiomas revisited. Seminars in Roentgenology* 19(1): 8-26, 1984
2. Okamoto S, Handa H, Yamashita J, et al: *Deep Sylvian meningiomas. Surg Neurol* 23:303-308, 1985
3. Geoffray A, Lee YY, Jing BS, et al: *Extracranial meningiomas of the head and neck. AJNR* 5:559-604, 1984
4. Hirao M, Oka N, Hirashima Y, et al: *Deep Sylvian meningioma. A case report and the review of literature. Neurol Surg(Tokyo)* 14(12):1471-1478, 1986
5. Saito A, Mizuno Y, Adachi Y, et al: *Deep Sylvian psammomeningioma. Report of a case. Brain Nerve* 31:79-83, 1979
6. Batsakis JG: *Pathology consultation. Extracranial meningiomas. Ann Otol Rhinol Laryngol* 93:282-283, 1984

7. Pendergrass EP and Hope JW: *An extracranial meningioma with no apparent intracranial source. AJR* 70(6):967-970, 1953
8. Waga S, Nishikawa M, Ohtsubo K, et al: *Extracalvarial meningiomas(2 cases). neurology* 20:368-372, 1970
9. Hoge SJ, Hoar CS and Murray JE: *extracranial meningioma presenting as a tumor of the neck. Am J Surg* 100:486-489, 1960
10. Kobayashi S, Kyoshima K, Nakagawa F, et al: *Diploic meningioma of the orbital roof. Surg Neurol* 13:277-281, 1980
11. Leeds N and Seaman WB: *Fibrous dysplasia of the skull and its differential diagnosis. A clinical and roentgenographic study of 45 cases. Radiology* 78: 570-582, 1962