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Case Report

Deep Sylvian Meningioma without Dural Attachment – A Case Report

Masayuki Yamagishi,[1*] Manoj Bohara,[1*] Soichiro Komasaku,[1] Masahiko Yamada,[1] Dan Kawahara,[1] Yuko Sadamura,[1] Masanao Mori,[1] Yosuke Nishimuta,[1] Takeshi Ishii,[1] and Hiroshi Tokimura[1]

Deep Sylvian meningiomas are rare, accounting for 0.3–0.4% of all meningiomas, and mostly present in young adults and children. We report on a 32-year-old man who presented with headache but had no neurological deficits. Computed tomography of brain revealed a 24 × 19 × 21 mm^3 mass lesion in the right Sylvian fissure with calcification. Magnetic resonance imaging showed that the lesion was isointense on T_1- and T_2-weighted images (WI), with homogenous enhancement on post-gadolinium T_1WI. The lesion was surgically removed via right frontotemporal craniotomy. The tumor was located in deep Sylvian fissure and had no dural attachment. Histopathological examination of the lesion revealed both meningothelial and fibroblastic features, thereby suggesting the diagnosis of transitional meningioma (WHO grade I), with Ki-67 labeling index of 6.9%. Thus, meningioma should be considered as a differential diagnosis of enhancing mass lesions in the Sylvian fissure even in the absence of dural tail sign, especially in young adults and children.

Keywords: deep Sylvian meningioma, meningioma without dural attachment, Sylvian fissure

Introduction

Meningioma without dural attachment is rare, accounting for 12.5% of all meningiomas.[1)] Among these, deep Sylvian meningioma represents one of the subtypes and comprises 0.3–0.4% of all meningiomas.[2,3)] It was first identified by Cushing and Eisenhardt in 1938.[4)] To the best of our knowledge, 36 cases of deep Sylvian meningioma have been reported so far. We here report on a 32-year-old man with deep Sylvian meningioma and review the literature regarding clinical, radiological, surgical and histopathological features.

Case Report

A 32-year-old man presented with history of pulsatile headache especially in the right occipital region. He had past history of syphilis and hepatitis B. Clinical examination revealed no focal neurological deficits. Computed tomography (CT) of brain revealed a 24 × 19 × 21 mm^3 mass lesion in the right Sylvian fissure with calcification (Fig. 1). Magnetic resonance imaging (MRI) showed that the lesion was isointense on T_1- and T_2 weighted images (WI), with homogenous enhancement on post-gadolinium T_1WI (Figs. 2A–2C). Dural tail sign was not observed. MR angiogram demonstrated no supply from middle meningeal artery (Fig. 2D). Considering these preoperative investigations, the differential diagnoses included meningioma without dural attachment and glioma. Considering his young age and symptom of headache, surgical resection was planned.

The lesion was surgically removed via right frontotemporal craniotomy. The tumor was located in deep Sylvian fissure and had no dural attachment. Most of the tumor was free from the arachnoid layer except for the deeper portion that was adherent to the arachnoid but the pia mater was intact. After coagulation of small feeding arteries branching from right middle cerebral artery (MCA), we removed the tumor in one piece (Fig. 3A). Histopathological examination of the lesion revealed both meningothelial and fibroblastic features, thereby suggesting the diagnosis of transitional meninigioma (WHO grade I) (Figs. 3B and 3C). No malignant cells were evident and Ki-67 labeling index was 6.9% (Fig. 3D). The patient had no postoperative neurological deficits and MRI performed on the 3rd postoperative day revealed complete removal of the tumor (Fig. 2E).

Discussion

Meningiomas are mostly benign, slow-growing and dural-based tumors, which are thought to originate from meningothelial or arachnoid cap cells in the meningeal arachnoid layer.[5)] Meningiomas without dural attachment are uncommon tumors. Cushing and Eisenhardt divided these into three major subtypes: intraventricular, subcortical, and deep Sylvian.[4)] Zhang et al.[6)] classified meningiomas without dural attachment, based on their locations, into five supratentorial types (intraventricular, pineal region, deep Sylvian, intraparenchymal or subcortical and others) and four infratentorial types (intraventricular, inferior telachoroidea, cisterna magna and intraparenchymal). Deep Sylvian meningiomas probably originate from the arachnoid cap cells in the arachnoid and pia of the Sylvian fissure or Virchow–Robin space along the branches of the middle cerebral artery.[2)] These are mostly located in the distal Sylvian fissure in close proximity with the insula and the M2 and M3 branches of MCA; however, these are also found in proximal Sylvian fissure in some patients.[7)] Thus, the venous return may be via superficial or deep Sylvian veins depending on the location of the tumor.

[1]Department of Neurosurgery, Kagoshima City Hospital, Kagoshima, Kagoshima, Japan

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*These authors contributed equally to this work.

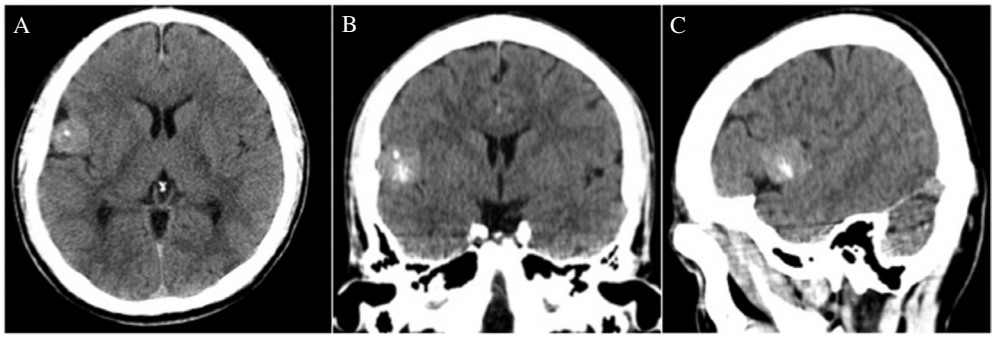

Fig. 1 Plain axial (A), coronal, (B) and sagittal (C) computed tomography brain scans showing a 24 × 19 × 21 mm^3 mass lesion in the right Sylvian fissure with calcification.

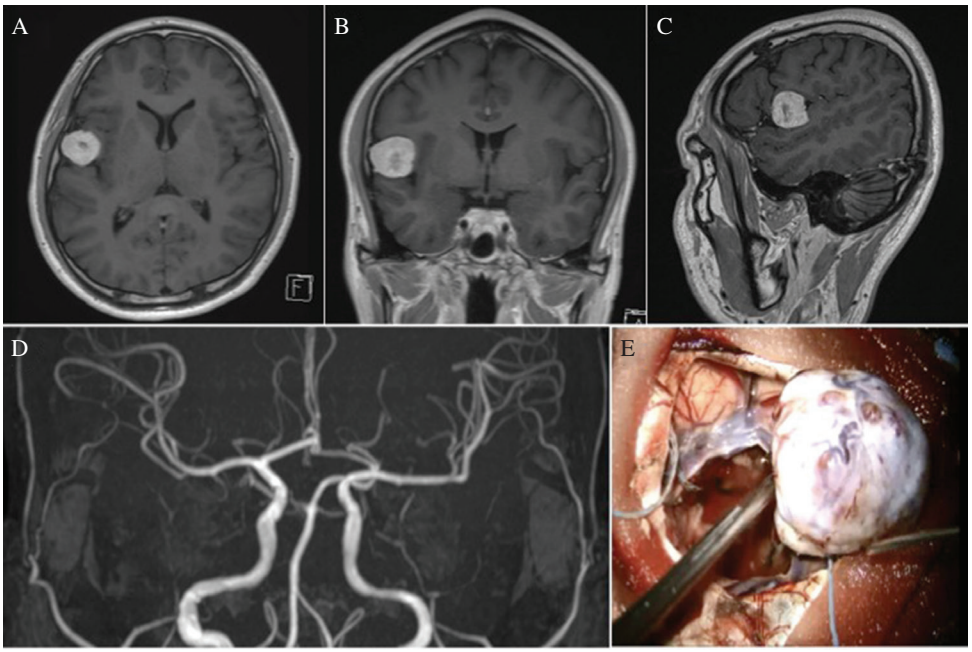

Fig. 2 Post-gadolinium axial (A), coronal, (B) and sagittal (C) magnetic resonance imaging demonstrating homogenous enhancement of the lesion. MR angiogram (D) showing no supply from middle meningeal artery. Intraoperative picture (E) demonstrating en bloc removal of the tumor.

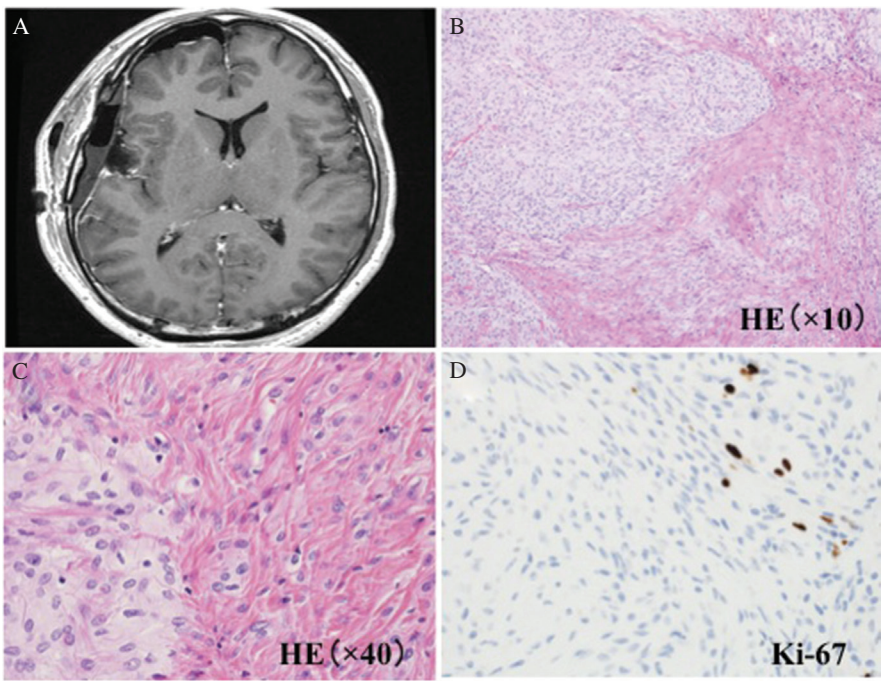

Fig. 3 Postoperative gadolinium-enhanced axial magnetic resonance imaging (A) showing complete removal of the tumor. Hematoxylin and eosin staining (B and C) of the lesion showing both meningothelial and fibroblastic features, suggesting transitional meninigioma (WHO grade I), with Ki-67 labelling index of 6.9% (D).

Table 1 Reported cases of deep Sylvian meningioma

No.	Authors (year)	Age/Sex	Clinical features	Size	Edema	Removal	Histopathology	Follow-up
1	Cushing et al. (1938)[4]	8/M	Epilepsy	5 cm	N/A	Partial	Psammomatous	5 y: died
2	Cushing et al. (1938)[4]	48/F	Epilepsy	8 × 7 cm^2	N/A	Partial	Psammomatous	1 d: died
3	Barcia-Goyanes et al. (1953)[11]	20/F	Epilepsy	N/A	N/A	N/A	Psammomatous	N/A
4	Mori et al. (1977)[12]	23/M	Epilepsy	N/A	N/A	Subtotal	Transitional	N/A
5	Saito et al. (1979)[13]	31/F	Epilepsy	1.7 cm	N/A	Gross total	Psammomatous	N/A
6	Tsuchida et al. (1981)[14]	46/M	Headache	N/A	N/A	Gross total	Psammomatous	4 y: no recurrence
7	Awa et al. (1982)[15]	16/M	Headache	N/A	N/A	Gross total	Meningothelial	2 y: no recurrence
8	Okamoto et al. (1985)[1]	27/F	Headache	N/A	N/A	Gross total	Fibroblastic	5 y: died
9	Okamoto et al. (1985)[1]	35/F	Headache, visual disturbance	N/A	(+)	Gross total	Fibroblastic	N/A
10	Hirao et al. (1986)[16]	34/F	Epilepsy	6 cm	(–)	Gross total	Fibroblastic	N/A
11	Drake et al. (1986)[3]	3/F	Headache, vomiting	5 cm	N/A	Gross total	Malignant	5 m: mild left hemiparesis, hemianopia
12	Silbergeld et al. (1988)[10]	4/F	Epilepsy	N/A	(–)	Subtotal + RT	Meningothelial	N/A
13	Cho et al. (1990)[17]	2/M	Epilepsy, hemiparesis	N/A	(+)	Gross total	Transitional	2 y: no recurrence
14	Mori et al. (1994)[9]	12/M	Headache	7 cm	(+)	Gross total	Transitional	1 y: no recurrence
15	Chiocca et al. (1994)[5]	26/F	Epilepsy	1.7 × 1.4 cm^2	(+)	Gross total	Fibrous	N/A
16	Matsumoto et al. (1995)[18]	62/F	Epilepsy	N/A	(–)	Gross total	Psammomatous	6 m: no seizure
17	Cooper et al. (1997)[19]	4/M	Headache	N/A	(+)	Gross total	Transitional	1 y: no recurrence
18	Mitsuyama et al. (2000)[8]	1/M	Epilepsy	3 × 3 × 4 cm^3	(+)	Gross total	Fibrous	N/A
19	Kaplan et al. (2002)[20]	11/M	Epilepsy	4.5 × 4 × 4.5 cm^3	(–)	Gross total	Atypical	N/A
20	Moon et al. (2003)[21]	36/M	Epilepsy	3.5 × 3.5 × 3 cm^3	(+)	Subtotal + GR	Transitional	N/A
21	Chang et al. (2005)[22]	35/M	Epilepsy	3.5 cm	(+)	Subtotal + GR	Transitional	N/A
22	Mclver et al. (2005)[23]	23/M	Epilepsy	N/A	(+)	Subtotal	Chordoid	17 m: stable residual foci
23	Kumar et al. (2009)[2]	6/M	Epilepsy	4.9 × 3.9 × 4 cm^3	(+)	Total	WHO grade I	4 y: no recurrence
24	Cecchi et al. (2009)[7]	23/M	Headache, hemiparesis	N/A	(+)	Subtotal + RT	Atypical	2 y: stable residual tumor
25	Arita et al. (2009)[24]	70/M	Headache	2.5 cm	(–)	1st surgery: subtotal; 2nd: total	Atypical	N/A
26	Miyahara et al. (2011)[25]	34/F	Epilepsy	5 cm	(+)	Total	Transitional	2 y: no recurrence

(*Continued*)

Table 1 Reported cases of deep Sylvian meningioma—Continued

No.	Authors (year)	Age/Sex	Clinical features	Size	Edema	Removal	Histopathology	Follow-up
27	Ma et al. (2012)[26]	53/M	Epilepsy	7 × 6.2 × 5 cm^3	(+)	Subtotal + GR	Atypical	2 y: stable residual tumor
28	Chae et al. (2012)[27]	69/M	Incidental	2.4 × 3 × 2.5 cm^3	(+)	Subtotal	Psammomatous	N/A
29	Aras et al. (2013)[28]	15/M	Epilepsy	5.5 × 6 × 6.8 cm^3	(+)	1st surgery: subtotal; 2nd: total	Fibroblastic	3 y: no recurrence
30	Aras et al. (2013)[28]	28/M	Epilepsy, hemiparesis	5.3 × 3.2 × 4.8 cm^3	(+)	1st surgery: partial; 2nd: total	Meningothelial	5 y: no recurrence
31	Kim et al. (2013)[29]	43/M	Epilepsy	1.5 × 1.6 × 1.6 cm^3	(+)	Subtotal	Lymphoplasmacyte-rich	4 y: stable residual tumor
32	Fukushima et al. (2014)[30]	10/M	Epilepsy	3.5 cm	(–)	Partial	Sclerosing	1 y: stable
33	Matar et al. (2016)[31]	39/M	Epilepsy, headache	5 × 4 cm^2	(+)	Total	Transitional	10 m: no recurrence
34	Donovan et al. (2016)[32]	11/M	Epilepsy, nausea	5 × 5 × 4 cm^3	(–)	Total	Transitional	10 y: no recurrence
35	Donovan et al. (2016)[32]	7/M	Epilepsy, headache	4 × 5 × 4 cm^3	(+)	1st surgery: partial; 2nd: subtotal; 3rd: partial	Fibrous transformed to WHO grade II	2 y: stable residual
36	Donovan et al. (2016)[32]	16/F	Epilepsy	N/A	(–)	Partial	Meningioangiomatosis	5 y: stable
37	Present case (2018)	32/M	Headache	2.4 × 1.9 × 2.1 cm^3	(–)	Total	Transitional	6 m: no recurrence

d: day(s), F: female, GRT: gamma-knife radiosurgery, M: male, m: month(s), N/A: not available, RT: radiation therapy, y: year(s).

Meningiomas without dural attachment are mostly present in young patients, with a male predominance, in contrary to the prevalence of classic meningioma mostly in middle-aged females.[7] To the best of our knowledge, 37 cases of deep Sylvian meningioma including ours have been reported (Table 1). These patients included 25 male and 12 female with the average age of 26.32 years. Majority of the patients (26 of 37 patients; 70.3%) presented with epilepsy, followed by symptoms of increased intracranial pressure such as headache, vomiting, and visual disturbance. Although the tumor lies in close proximity to MCA and its branches, hemiparesis was rarely observed (3 of 37 patients; 8.1%).

The radiological features are almost similar to the meningiomas in other locations. They are mostly iso- to hyperdense on CT scan with homogenous enhancement, with or without calcifications. MRI demonstrates iso- to hypointensity on both T_1WI and T_2WI with homogenous enhancement and frequently peritumoral edema.[2,7] Internal carotid artery angiogram may reveal arterial blush in the Sylvian region but no supply has been reported from external carotid artery.[3,7,8] Mori et al.[9] reported enhancement along the MCA branch, similar to the dural tail seen in classic meningiomas. The non-specific radiological findings and rarity of deep Sylvian meningioma can make the preoperative diagnosis difficult. The differential diagnoses include glioma, metastasis, lymphoma, and cavernous angioma.

Optimal surgical resection is the treatment of choice. This tumor is in close anatomical proximity to the branches of MCA; thus, subtotal resection may be performed in case of severe adherence to these arteries to avoid the postoperative complications.[3,4,7] Adjuvant radiotherapy is advocated in cases of incomplete resection.[8,10] Most of the reported deep Sylvian meningiomas are WHO grade I, the most frequent subtypes being transitional, psammomatous, fibroblastic, and meningothelial. Five cases of WHO grade II deep Sylvian meningioma have been reported (four atypical and one chordoid) whereas only one case of WHO grade III (malignant) type has been reported (Table 1).

Deep Sylvian meningioma without dural attachment is a rare tumor, which mainly affects young adults and pediatric population. Meningioma should be considered as a differential diagnosis of enhancing mass lesions in the Sylvian fissure even in the absence of dural tail sign, especially in young adults and children presenting with epilepsy.

Conflicts of Interest Disclosure

All authors report no conflicts of interest regarding this article.

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Corresponding author:
Hiroshi Tokimura, MD, PhD, Department of Neurosurgery, Kagoshima City Hospital, 37-1 Uearata-cho, Kagoshima, Kagoshima 890-8760, Japan.
✉ hiroshitok@nag.bbiq.jp