Deep Sylvian Meningioma without Dural Attachment – A Case Report

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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 mm3 mass lesion in the right Sylvian fissure with calcification. Magnetic resonance imaging showed that the lesion was isointense on T1- and T2-weighted images (WI), with homogenous enhancement on post-gadolinium T1WI. The lesion was surgically removed via right fronto-temporal 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 1938.4–5 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 mm3 mass lesion in the right Sylvian fissure with calcification (Fig. 1). Magnetic resonance imaging (MRI) showed that the lesion was isointense on T1- and T2-weighted images (WI), with homogenous enhancement on post-gadolinium T1WI(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 fronto-temporal 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 meningioma (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 meningotheelial or arachnoid cap cells in the meningeal arachnoid layer.5–7 Meningiomas without dural attachment are uncommon tumors. Cushing and Eisenhardt divided these into three major subtypes: intraventricular, subcortical, and deep Sylvian.6–8 Zhang et al.6–8 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 telachoroidae, 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.7–8 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.7–8 Thus, the venous return may be via superficial or deep Sylvian veins depending on the location of the tumor.

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Fig. 1  Plain axial (A), coronal, (B) and sagittal (C) computed tomography brain scans showing a 24 × 19 × 21 mm³ 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 meningioma (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)<sup>a</sup> | 8/M     | Epilepsy          | 5 cm | NA    | Partial | Psammomatous    | 5 y: died |
| 2   | Cushing et al. (1938)<sup>b</sup> | 4/M     | Epilepsy          | 8 × 7 cm² | NA    | Partial | Psammomatous    | 1 d: died |
| 3   | Baca-Goyanes et al. (1953)<sup>c</sup> | 24/F    | Epilepsy          | 5 cm | N/A   | Partial | Psammomatous    | 3 y: died |
| 4   | Mori et al. (1977)<sup>d</sup> | 48/M    | Epilepsy          | 8 × 7 cm² | N/A   | Subtotal | Transitional    | 5 y: no recurrence |
| 5   | Saito et al. (1979)<sup>e</sup> | 20/F    | Epilepsy          | 1.7 cm | N/A   | Gross total | Psammomatous | N/A |
| 6   | Tsuchida et al. (1981)<sup>f</sup> | 46/M    | Headache          | N/A  | N/A   | Gross total | Transitional    | 4 y: no recurrence |
| 7   | Awa et al. (1982)<sup>g</sup> | 16/M    | Headache          | N/A  | N/A   | Gross total | Meningothelial | 2 y: no recurrence |
| 8   | Okamoto et al. (1985)<sup>h</sup> | 27/F    | Headache          | N/A  | N/A   | Gross total | Psammomatous    | N/A |
| 9   | Hirao et al. (1986)<sup>i</sup> | 20/F    | Epilepsy          | 6 cm | NA    | Subtotal | Transitional    | N/A |
| 10  | Drake et al. (1986)<sup>j</sup> | 3/F     | Headache, vomiting| 5 cm | N/A   | Gross total | Fibrous | 5 m: mild left hemiparesis, hemianopia |
| 11  | Silbergeld et al. (1988)<sup>k</sup> | 4/F     | Epilepsy          | N/A  | N/A   | Subtotal + RT | Meningothelial | N/A |
| 12  | Cho et al. (1990)<sup>l</sup> | 4/F     | Epilepsy          | N/A  | N/A   | Gross total | Transitional    | N/A |
| 13  | Coyle et al. (1990)<sup>m</sup> | 3/F     | Headache, vomiting| 17 × 1.4 cm² | N/A   | Gross total | Transitional    | N/A |
| 14  | Churchill et al. (1994)<sup>n</sup> | 3/F     | Headache          | 6 cm | N/A   | Gross total | Transitional    | N/A |
| 15  | Mooney et al. (1999)<sup>o</sup> | 3/F     | Headache          | 3 × 3 × 4 cm³ | N/A   | Gross total | Transitional    | N/A |
| 16  | Cooper et al. (1999)<sup>p</sup> | 4/F     | Epilepsy          | 4.7 cm | N/A   | Gross total | Transitional    | N/A |
| 17  | Cooper et al. (1999)<sup>q</sup> | 4/F     | Epilepsy          | 4.5 cm | N/A   | Gross total | Transitional    | N/A |
| 18  | Cooper et al. (1999)<sup>r</sup> | 4/F     | Epilepsy          | 3.5 cm | N/A   | Gross total | Transitional    | N/A |
| 19  | Cooper et al. (1999)<sup>s</sup> | 4/F     | Epilepsy          | 5 cm | N/A   | Gross total | Transitional    | N/A |
| 20  | Cooper et al. (1999)<sup>t</sup> | 4/F     | Epilepsy          | 4.9 × 3.9 × 4 cm³ | N/A   | Total | WHO grade I | N/A |
| 21  | Cooper et al. (1999)<sup>u</sup> | 4/F     | Epilepsy          | 2.5 cm | N/A   | Total | Atypical | N/A |
| 22  | Cooper et al. (1999)<sup>v</sup> | 4/F     | Epilepsy          | 7 cm | N/A   | Total | Transitional    | N/A |
| 23  | Cooper et al. (1999)<sup>w</sup> | 4/F     | Epilepsy          | 7 cm | N/A   | Total | Atypical | N/A |
| 24  | Cooper et al. (1999)<sup>x</sup> | 4/F     | Epilepsy          | 7 cm | N/A   | Total | Transitional    | N/A |
| 25  | Cooper et al. (1999)<sup>y</sup> | 4/F     | Epilepsy          | 7 cm | N/A   | Total | Atypical | N/A |
| 26  | Cooper et al. (1999)<sup>z</sup> | 4/F     | Epilepsy          | 7 cm | N/A   | Total | Transitional    | N/A |

Continued...
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. 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 T1WI and T2WI with homogeneous enhancement and frequently peritumoral edema. Internal carotid artery angiogram may reveal arterial blush in the Sylvian region but no supply has been reported from external carotid artery. Mori et al. 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. Adjuvant radiotherapy is advocated in cases of incomplete resection. 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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Deep Sylvian Meningioma

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