Deep Sylvian Meningioma: A Case Report and Review of the Literature

Nidhal Matar[1] Kais Maamri[1] Adnene Boubaker[1] Jalel Kallel[1] Hafedh Jemel[1]

[1] Department of Neurological Surgery, Institut National de Neurologie, Tunis, Tunisia

Address for correspondence Nidhal Matar, MD, Institut National de Neurologie, Tunis, Tunisia (e-mail: matarnidhal2007@yahoo.fr).

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Abstract

Introduction Meningiomas are extra-axial tumors. They usually display a dural attachment, although meningiomas without dural attachment are extremely rare and reported only occasionally in the literature. In this article, the authors present a new case of a deep sylvian meningioma and briefly review the relevant literature.

Case Report We present the case of a 39-year-old man presented with 1- month history of headache associated with an episode of generalized tonic–clonic seizure. Neurological examination showed no abnormality. Magnetic resonance imaging (MRI) demonstrated a lesion located in the right temporo-frontal region which was isointense on T1 and hypointense on T2 with homogeneous enhancement after gadolinium administration. Coronal, axial, and sagittal MRI revealed no dural attachment and the mass appeared to be completely surrounded by brain parenchyma. Intraoperatively, the lesion was presented as a subcortical mass and was mainly in the posterior part of right sylvian fissure. The histological diagnosis showed a World Health Organization grade I meningioma, transitional type.

Conclusion Deep sylvian meningiomas are a rare entity. Preoperative diagnosis is difficult. Nevertheless, neurosurgeons and neuropathologists should be aware of this possibility and should include this hypothesis in the differential diagnosis of an intraparenchymal tumor.

Keywords
- meningioma
- sylvian
- dural attachment

Introduction

Meningiomas are extra-axial tumors deriving from the arachnoid cap or meningothelial cells. They usually display a dural attachment. Whereas, meningiomas without dural attachment, are extremely rare and reported only occasionally in the literature. In this paper, the authors present a new case of deep sylvian meningioma and briefly review the relevant literature.

Case Report

A 39-year-old man presented at hospital with a 1-month history of headache associated with only one episode of generalized tonic–clonic seizure. Neurological examination showed no abnormality. Computing tomography (CT) of the brain revealed an isodense mass lesion in the right temporo-frontal region with homogeneous enhancement. Magnetic resonance imaging (MRI) demonstrated a 50 × 40 mm mass lesion which was isointense on T1- (►**Fig. 1**) and hypointense on T2-weighted images (►**Fig. 2**), with an homogeneous enhancement after gadolinium administration. A small cystic lesion was adjacent to the interior pole of the tumor. Coronal, axial, and sagittal MRI (►**Fig. 3**) revealed no dural attachment. The mass appeared to be mainly located near the deep right sylvian fissure. The tumor caused peritumoral white matter edema. The first diagnosis was brain metastasis.

The patient underwent a right fronto-pterional craniotomy. The dura and cortical surface appeared intact. Through a cortical incision, a brown tumor was reached ~1.5 cm below the surface. It was a solid mass and well demarcated from normal parenchyma. However, inferior pole of the tumor was

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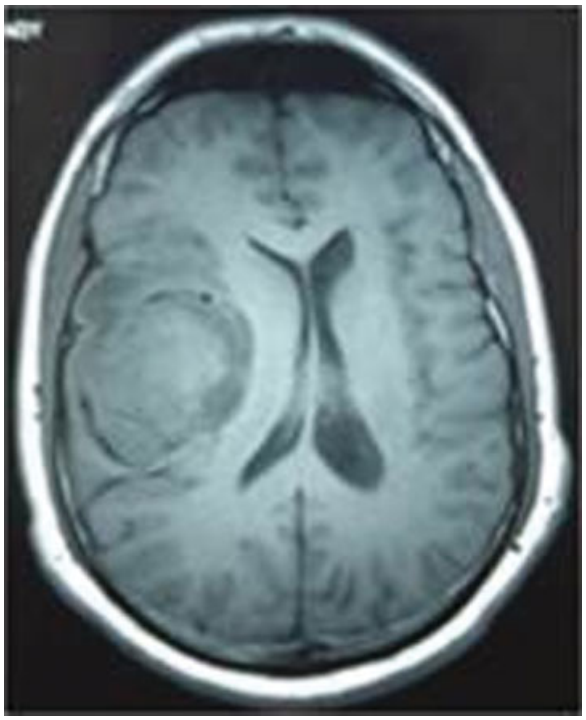

Fig. 1 Axial T1-weighted image reveals a well-defined mass that is isointense with the brain.

firmly adherent to the superior division of the middle cerebral artery and contained numerous perforators. The cyst contained xanthochromic fluid. The tumor was dissected carefully and removed totally. The postoperative course was uneventful and the patient was discharged without any neurodeficit.

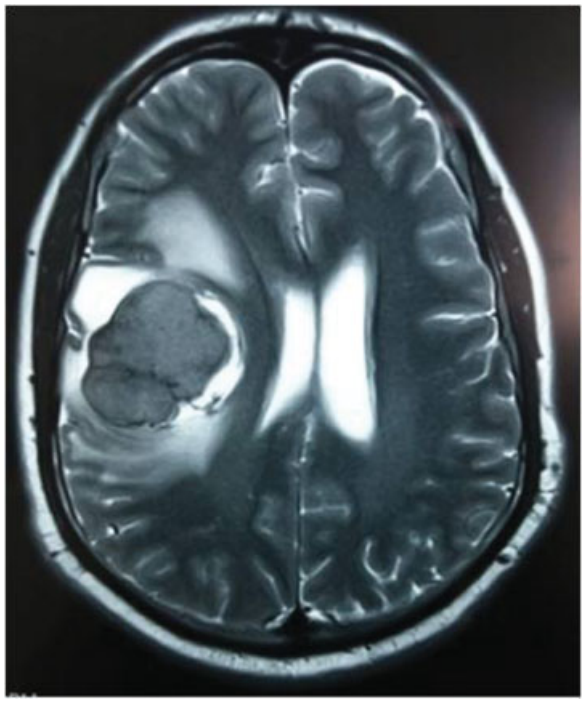

Fig. 2 Axial T2-weighted axial image reveals an iso-hypointense mass with marked peritumoral edema.

The histological examination revealed a tumor tissue composed of meningeal cells arranged in whorls and interesting beams, mitoses were rare and there was no necrosis. Immunohistochemical findings showed that the tumor cells were positive for vimentin and focally positive for epithelial membrane antigen. On the basis of these findings, it was concluded that the tumor was a World Health Organization (WHO) grade I meningioma of transitional type. Ten months after surgery, upon check-up, brain MRI showed no recurrence of the tumor.

Discussion

Meningiomas arise from meningothelial cells that line the arachnoid membrane, hence most of them are dural-based lesions and commonly located along the falx, tentorium, sphenoid bone, or over the convexity. Meningiomas without direct contact to the dura mater have been scarcely described. Cushing and Eisenhardt[1] first recognized and described these tumors using the term "meningiomas without dural attachment," and classified them into five varieties: intraventricular, pineal region, deep sylvian, intraparenchymal or subcortical, and others.

Deep sylvian meningiomas are a very rare entity.[2] To our knowledge, including the present case, only 27 cases are reported in the international literature (►**Table 1**). According to some authors, these meningiomas probably arise from arachnoid cap cells that are found in the Virchow–Robin spaces along the cerebral vasculature.[3]

By reviewing the literature, these meningiomas occur mainly in young adults with a middle age around 26.5 years (8 cases were aged less than 14 years). There is a significant male predominance especially in the pediatric cases (pediatric sex ratio, 7/1). This epidemiological description seems in sharp contrast with the well-known middle-aged female prevalence of the "classic" meningioma. Clinically, the majority of patients presented with seizure (20 cases). Three patients complained from motor weakness, and six others from headache.

On MR imaging, there were the same characteristics as for "classic meningioma": isointense T1, hyperintense T2, and homogenous enhancement with gadolinium, but without any dural attachment and totally surrounded by brain parenchyma. When reported, peritumoral edema is described as severe or moderate in most patients. Calcifications are rarely described and there is only one patient with an intratumoral hemorrhage.

On histopathological examination, twenty-one were WHO grade I, two WHO grade II, and two WHO grade III. Psammomatous and transitional types are the most common (16 cases). Prognostic factors are the same as for the other types of meningioma. They basically depend on the histological grade, quality of resection, and the importance of vessels sacrifice.

Conclusion

Deep sylvian meningiomas are a rare entity. Preoperative diagnosis is difficult considering the rarity and the similarity of imaging findings to other more common intra-axial lesions.

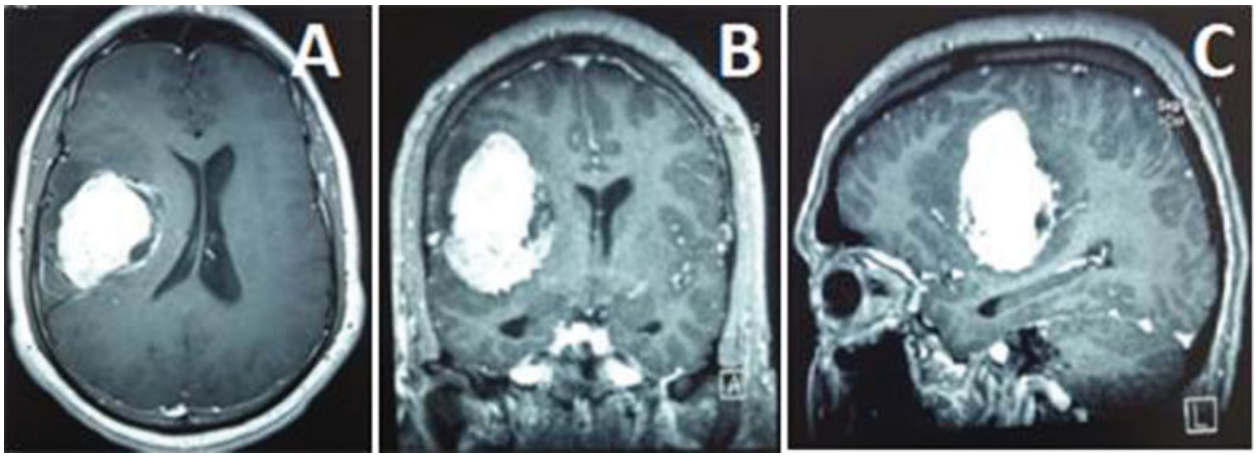

Fig. 3 T1-weighted images with gadolinium demonstrating the homogenously enhanced tumor without dural attachment: Axial (**A**), Coronal (**B**), and sagittal (**C**).

Table 1 Reported cases of deep sylvian meningiomas

Authors (year)	Age	Sex	Clinical presentation	Tissue type
Cushing et al (1938)[1]	8 y 48 y	M F	Seizures Seizures	Psammomatous Psammomatous
Barcia-Goyanes et al (1953)[4]	20 y	F	Seizures	Psammomatous
Mori et al (1977)[5]	23 y	M	Seizures	Transitional
Saito et al (1979)[6]	31 y	F	Seizures	Psammomatous
Tsuchida et al (1981)[7]	46 y	M	Headache	Meningotheliomatous
Okamoto et al (1985)[8]	27 y 35 y	F F	Headache Seizures	Fibroblastic Fibroblastic
Hirao et al (1986)[9]	34 y	F	Seizures	Fibroblastic
Silbergeld et al (1988)[10]	4 y	F	Seizures	Meningotheliomatous
Drake et al (1986)[11]	3 y	M	Headache	Malignant
Cho et al (1990)[12]	2 y	M	Seizures, hemiparesis	Transitional
Graziani et al (1992)[13]	19 y	M	Headache, hemiparesis	Psammomatous
Mori et al (1994)[14]	12 y	M	Headache	Transitional
Chiocca et al (1994)[15]	26 y	F	Seizures	Fibroblastic
Matsumoto et al (1997)[16]	62 y	F	Seizures	Psammomatous
Cooper et al (1997)[17]	62 y	F	Seizures	Transitional
Mitsuyama et al (2000)[18]	20 mo		Seizures	Fibroblastic
Kaplan et al (2002)[19]	11 y	M	Seizures	Atypical
Chang et al (2005)[20]	35 y	M	Seizures	Transitional
Mclver et al 2005[21]	23 y	M	Seizures	Chordoid
Eghwrudjakpor et al (2006)[22]	73 y	F	NS	NS
Samson et al (2009)[2]	6 y	M	Seizures	WHO G I
Cecchi et al (2009)[3]	23 y	M	Headache, hemiparesis	Atypical
Miyahara et al (2011)[23]	34 y	F	Seizures	Transitional
Fukushima et al (2014)[24]	10 y	M	Seizures	Sclerosing
Our case	39 y	M	Seizures	Transitional

Abbreviations: F, female; G, grade; M, male; NS, not stated; WHO, World Health Organization.

Nevertheless, neurosurgeons and neuropathologists should be aware of this possibility and should include this hypothesis in the differential diagnosis of an intraparenchymal tumor.

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