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Brief communication

Sphenoid and optic nerve sheath meningioma revealed by recurrent brain infarctions

Infarctus cérébraux récidivants révélant un méningiome sphénoïdal et de la gaine du nerf optique

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INFO ARTICLE

Article history:

Received 28 October 2008

Received in revised form

5 January 2009

Accepted 15 February 2009

Published on line 25 March 2009

Keywords:

Meningioma

Brain infarction

Carotid artery thrombosis

Calcifications

Mots clés :

Méningiome

Infarctus cérébral

Thrombose carotide

Calcifications

ABSTRACT

Meningioma, though benign, may invade adjacent structures such as bone, soft tissues, dural sinuses and arteries. However brain infarctions secondary to meningioma involving the cavernous sinus and encasing and narrowing the intracranial carotid artery are rare. We report the case of a young man with recurrent left carotid artery infarctions due to a left sphenoid meningioma infiltrating the posterior optic nerve sheath through the optic canal and circumscribing the intracranial carotid artery. The patient had a gradually progressive occlusion of the middle cerebral artery, the distal internal carotid artery and finally the anterior cerebral artery ipsilateral to the sphenoid meningioma.

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RÉSUMÉ

Les méningiomes sont les tumeurs cérébrales extra-axiales les plus fréquentes. Bien que d'évolution bénigne, elles peuvent infiltrer les structures avoisinantes telles que le parenchyme cérébral, les structures osseuses, les sinus veineux ou les artères. Cependant, les méningiomes se compliquent rarement d'un infarctus cérébral. Nous rapportons l'observation d'un jeune homme chez qui fut découvert un méningiome sphénoïdal infiltrant la gaine du nerf optique et enrobant le siphon carotidien à l'occasion d'un infarctus sylvien. L'évolution fut marquée par la répétition des infarctus cérébraux secondaires à l'occlusion progressive de l'ensemble de l'axe carotidien au contact de la tumeur.

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doi:10.1016/j.neurol.2009.02.004

1. Introduction

Meningioma is the most common extra-axial brain tumour in adults. Though benign, meningiomas may invade adjacent structures such as brain parenchyma, bone, soft tissues, dural sinuses and arteries (Shaffrey et al., 1999). Brain infarctions secondary to meningioma involving the cavernous sinus and encasing and narrowing the intracranial carotid artery (ICA) are however rare although microscopic invasion of carotid wall has been shown by several recent studies (Shaffrey et al., 1999; Abdel-Aziz et al., 2004; Komotar et al., 2003). We report a young man with recurrent left ICA due to a left sphenoid meningioma involving the ICA and progressively occluding the middle cerebral artery, the distal internal carotid and finally the anterior cerebral artery.

2. Case report

A 36-year-old man with previous history of deep venous thrombosis, pulmonary embolism, cocaine and LSD use and cannabis dependency developed, at age 29, multiple sudden transient episodes of motor deficit and aphasia involving the right arm and face. Physical examination showed a left Marcus Gunn pupil and left optic disk pallor. Brain MRI and MRA showed left fronto-insular and deep paraventricular infarctions (Fig. 1A) with narrowing of the left ICA and total obstruction of the distal branches of the middle cerebral artery (MCA) (Fig. 1C). There were in addition multiple small linear calcifications along the left MCA (Fig. 1B) and an enhancing extra-axial calcified lesion of the sphenoid ridge infiltrating the posterior optic nerve sheath through the optic canal. The intracranial portion of the lesion arose from the medial aspect of the anterior clinoid process spreading to the optic foramen and the planum sphenoidale (Fig. 2A). The intra-orbital segment of the lesion showed "tram-tracking" enhancement extending along the left optic nerve on axial and sagittal views (Fig. 2B) and circumferential enhancement around the left optic nerve on a coronal plane (Fig. 2C). No osseous changes in the region of the optic nerve canal could be identified on the CT scan which showed the lesion circumscribing the ICA.

These radiological findings were highly suggestive of a sphenoid meningioma with extension into the optic nerve sheath and into the carotid artery. Because of the preserved visual acuity and the impossibility of total resection of the tumor without damaging the carotid artery, no surgical procedure was undertaken.

From age 29 to 36, the patient experienced recurrent episodes of left carotid ischemic strokes. At each recurrence he was either on warfarin or aspirin but with poor compliance. MRA showed first occlusion of the left MCA, then occlusion of the left carotid siphon (Fig. 1B) and finally occlusion of the left anterior cerebral artery. There was in addition a newly appearing asymptomatic anterior communicating artery aneurysm (Fig. 1B). The sphenoid and orbital mass had a very slow-growing pattern consistent with a benign tumor.

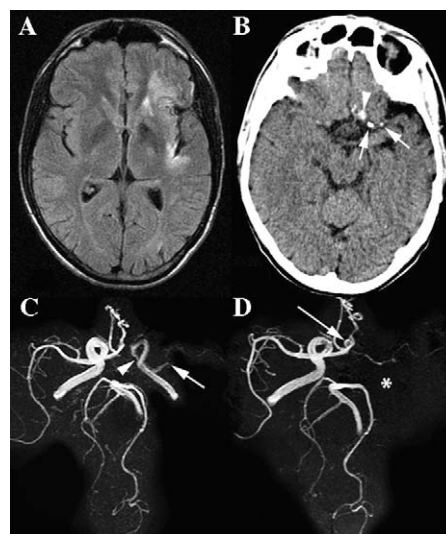


Fig. 1 – Brain imaging shows in axial T2 FLAIR. A. Left fronto-insular and deep paraventricular infarctions; in axial unenhanced CT-scan. B. Linear calcifications along the left MCA (arrow) and extra-axial calcified lesion (arrow head); in initial MRA, axial view. C. Stenosis of the left internal carotid (arrow head) and middle cerebral artery distal branches occlusions (arrow). D. Two years later, occlusion of the left carotid artery (asterisk). Newly appearing anterior communicating artery aneurysm (long white arrow).

L'imagerie cérébrale montrant en séquence T2 FLAIR axiale. A. Des séquelles d'infarctus fronto-insulaire et paraventriculaire gauche ; sur le scanner non-injecté en coupes axiales. B. Des calcifications linéaires sur le trajet de l'artère cérébrale moyenne gauche (flèche) et en extra-axiale (tête de flèche). C. AngioRM initiale en vue axiale montrant une sténose serrée du siphon carotid (tête de flèche) et des occlusions de branches distales de l'artère cérébrale moyenne gauche (flèche). D. AngioRM de suivi à deux ans montrant une occlusion de la carotidie interne gauche ().*

Clinically, the patient recovered almost completely after each episode. Visual acuity remained normal. Extensive hematological and immunological investigations, CSF examination and transthoracic echocardiography showed no abnormalities.

3. Discussion

We report a patient with recurrent unilateral carotid infarcts which developed over several years secondary to a sphenoid meningioma extending to the optic nerve sheath and encasing the ICA. The unique feature of this case is the involvement of the intradural branches of the ICA as demonstrated by the presence of multiple small linear calcifications along the MCA.

Few cases of cerebral infarction as a result of meningioma related ICA compression have been reported (Komotar et al., 2003). Both thrombotic and hemodynamic

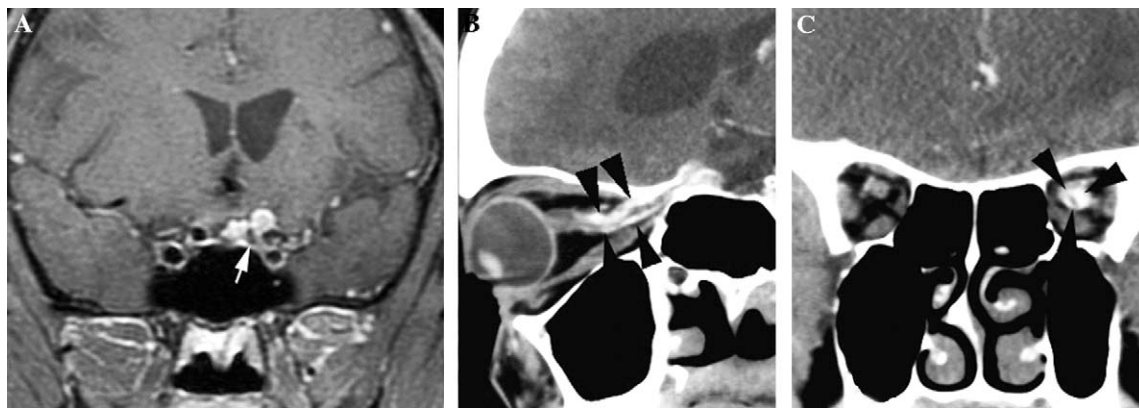


Fig. 2 – Brain imaging shows in coronal T1 Gado enhancing. A. Extra-axial lesion of the clinoid process spreading to the optic foramen and the planum sphenoidale. The lesion is circumscribing the ICA (arrow); enhanced CT-Scan showing in sagittal reformatting. B. Along the left optic nerve the intra-orbital segment of the lesion with “tram-tracking” enhancement extending along the left optic nerve (arrow heads) and in coronal reformatting. C. The circumferential enhancement around the left optic nerve (arrow heads).

L'imagerie cérébrale montre sur les coupes coronales T1 après injection de Gadolinium. A. Un processus infiltrant de la clinioïde avec extension vers le foramen optique et la sphénoïde. La lésion englobe le siphon carotid (flèche). Scanner injecté en reconstruction sagittale. B. Montrant le segment tumoral intra-orbitaire avec prise de contraste le long du nerf optique gauche (têtes de flèche), et en reconstruction coronale. C. Montrant une prise de contraste circonférentielle autour du nerf optique (têtes de flèche).

mechanisms have been suggested as underlying brain infarction related to meningioma (Heye et al., 2006). In our patient, however, a thrombo-occlusive mechanism is more likely as occlusions of distal MCA branches occurred first, followed by occlusion of the proximal MCA and finally the distal ICA.

In addition to the sphenoid mass, use of cocaine and cannabis may have increased the risk of arterial thrombosis in our patient. Indeed he had previous venous thromboembolic disease and cocaine use has been associated with an increased risk of acute myocardial infarction and ischemic strokes (Wright et al., 2007).

One limitation of our study is the lack of histological confirmation of the meningioma; the diagnosis was made on the basis of the typical radiological features and the very slow-growing pattern on successive brain images obtained over several years.

In conclusion, we report an additional patient with sphenoid meningioma related recurrent carotid ischemic strokes with progressive MCA and ICA occlusion.

Conflict of interest: None.

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