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Case Report

Intracerebral Hematoma Revealing a Meningioma: About a Case and Review of the Literature

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Abstract

Meningiomas are often benign tumors, discovered incidentally or following an insidious neurological symptomatology. Hemorrhages in such situations may occur intra-tumorally, in sub-arachnoidal space, in sub-dural space, or in cerebral parenchyma, and the mechanism is still poorly understood. This last location is exceptional.

Imaging allows one to orient the diagnosis and establish an adequate therapeutic strategy.

CT is often the examination of choice in emergencies; MRI remains the modality of choice.

Keywords: *Hemorrhagic Brain Tumor; Meningioma; Intracerebral Hematoma; CT; MRI*

Introduction

The most frequent extra-axial primary brain tumor is a meningioma. It is characterized by a female predominance and can happen at any age. Intracranial hypertension and epilepsy predominate among the complications of meningiomas. Hemorrhage is a rare-onset symptom.

We report in this paper a case of a right frontal meningioma complicated by an intracerebral hematoma documented in our hospital structure by reviewing the epidemiological, clinical, and radiological characteristics.

Observation

A 64-year-old woman presented with sudden onset of left hemiplegia with a background of chronic headaches. There was no particular pathological history, especially no cardiovascular risk factor.

The neurological examination revealed a confused patient (GCS: 14/15), decreased muscular strength (0/5) and hypoesthesia of the left hemisphere with a pyramidal syndrome without sphincter disorders.

A brain scan without injection of contrast media was performed showing a right frontal intra-parenchymal hematoma, heterodense, surrounded by a peri-lesional edema. It was associated with the presence of an extra-axial right frontal formation, well limited, isodense,

with some spontaneously hyperdense areas, measuring 42 x 34 mm. The whole was responsible for a mass effect on the median line with subfalcine herniation (Figure 1).

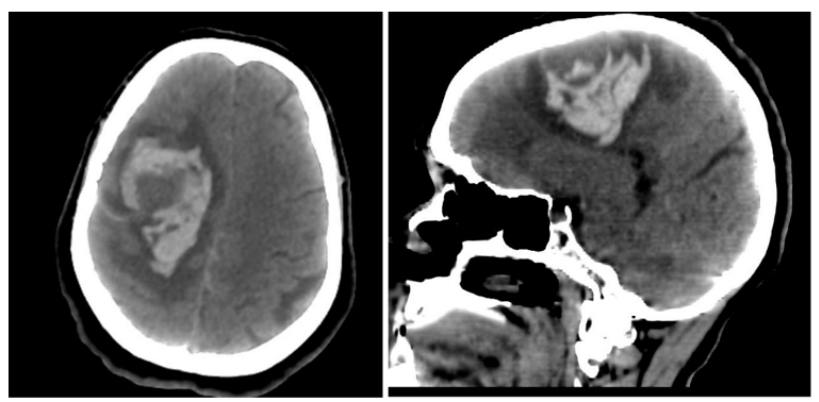

Figure 1: *Cerebral CT scan in axial (A) and sagittal (B) sections showing the right frontal intra-parenchymal hematoma with significant peri-lesional edema: Note the adjacent extra-axial structure containing hemorrhagic areas.*

A brain MRI before and after injection of gadolinium showed a well-limited extra-axial right frontal tissue process with a broad meningeal base and a strongly enhanced tissue signal, producing the "dural tail sign". T1 hypersignal was observed in some areas related to intra-tumoral hemorrhage. There was an associated intra-parenchymal hematoma of heterogeneous signal measuring 49 x 45 mm, surrounded by a border in hyposignal T1 and hypersignal T2 Flair in connection with a peri-lesional edema (Figure 2).

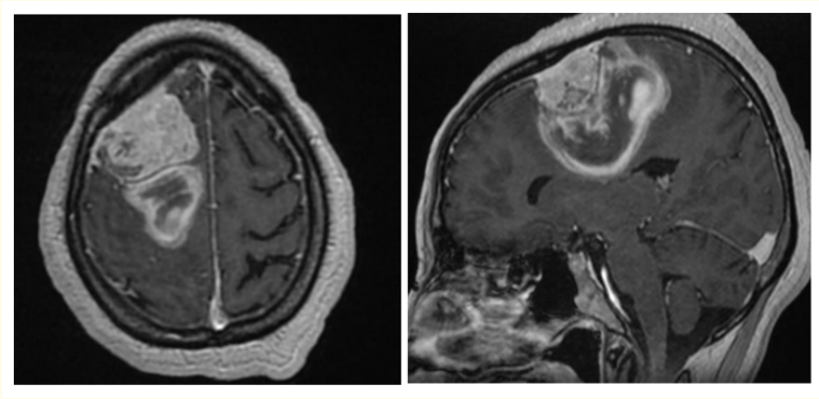

Figure 2: *Axial (A) and sagittal (B) sections of brain MRI in T1 sequence after gadolinium injection: The extra-axial structure is intensely and heterogeneously enhanced with a large meningeal implant base realizing the "dural tail sign" related to the meningioma. The intra-parenchymal hematoma is surrounded by peri-lesional edema (in T1 hyposignal).*

Discussion

Hemorrhagic complications, occurring in a neoplastic context, are rare and mostly concern malignant tumors (1.4 - 10%) [1,2,6]; they can develop extraparenchymal and more rarely intraparenchymal. The most prevalent causes are metastases from melanoma, followed by choriocarcinomas, renal adenocarcinomas, bronchogenic carcinomas, and glioblastomas [1,2].

Meningiomas, which make up 20 - 37% of all brain tumors, are frequently benign, slow-growing tumors. Associated hemorrhagic events are exceptional (0.5 to 2.4%) and mostly affect subjects under 30 or over 70 years of age, without sexual predominance [1,3,4,6].

Histologically, meningothelial and angioblastic meningiomas are the most associated types with bleeding complications; the angioblastic type is characterized by the presence of an extensive vascular system, whereas the meningothelial type may contain angioblastic areas where thin-walled vessels develop [1,2,6].

The mechanism remains unclear, and some hypotheses suggest a rupture of the dilated vessels in contact with the brain parenchyma; in fact, the increase in tumor volume leads to architectural distortion and abnormalities of the vascular walls with ischemic and thrombotic phenomena that may, in the presence of some factors (intake of anticoagulants, hypertensive peaks, or secretion of vasoactive substances by the meningioma), lead to a hemorrhage [1,2].

According to a research by Niiro M., *et al*. meningiomas with a high proliferative index and tissue factor expression had a greater risk of bleeding [4].

The clinical symptomatology is not specific and the patient typically presents with stroke-like symptoms. The state of consciousness may be altered by the development of intracranial hypertension.

Radiological exploration is based on CT and MRI: CT has a good sensitivity for the detection of hemorrhage, while MRI allows a better characterization of brain tumors. The patient's level of consciousness and the urgency will be the key determinants of the exploration modality [8].

Hemorrhage on a CT scan can conceal the presence of an underlying tumor; Lefranc F., *et al*. described a case of subdural hematoma operated twice in which an MRI scan later revealed a meningioma [7].

Subarachnoid hemorrhage is the most common imaging finding, followed by intraparenchymal hematomas. Bleeding may be localized subdurally; Lefranc., *et al*. suggested that diffusion of intratumoral bleeding from proximal to proximal or rupture of veins at the base of implantation of the meningioma would explain this presentation [6,7].

The heterogeneity of the tumor's density or signal, the presence of levels within it, the presence of nodular or annular enhancement of the tumor tissue, and the existence of significant peri-lesional edema that does not subside on follow-up exams are semiological features of imaging (CT or MRI) that point to a hemorrhagic tumor [3].

According to the research done by Xie ZR., *et al*. in 2022, a radiological categorization with patterns that correspond to clinical manifestations and aid in therapy was proposed (Figure 3):

- Type 1: Intra-tumoral bleeding.
- Type 2: Extra-tumoral bleeding (subarachnoid hemorrhage, subdural hematoma, intra-parenchymal hematoma).
- Type 3: Intra- and extra-tumoral bleeding.

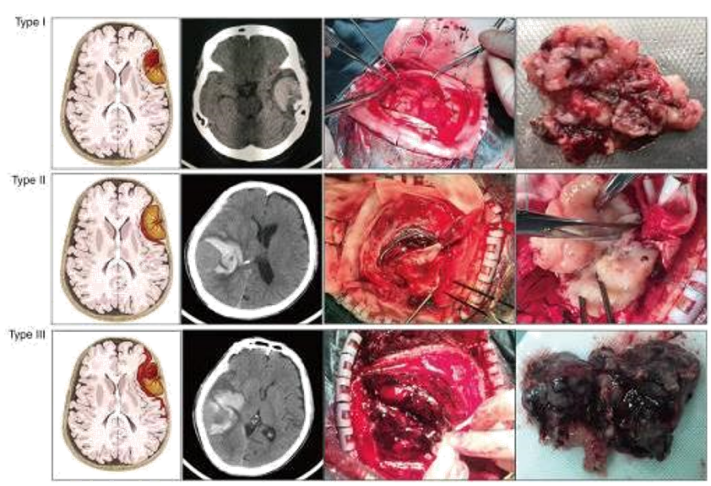

Figure 3: *Xie ZR., et al.'s illustrations link the various forms of hemorrhagic meningiomas to scannographic presentations and intraoperative features [9].*

In this classification, the symptomatology in type 1 was moderate and surgery was performed after adequate preoperative evaluation, whereas in type 2 and 3 the clinical presentation was severe which most often required urgent surgery [9].

Meningioma bleeding worsens the prognosis and increases the mortality and morbidity rates (to 21.1% and 32.6%, respectively) [9]. Treatment is based on evacuation of the hematoma and resection of the meningioma in the same surgical procedure [8].

Conclusion

Meningioma-associated hemorrhages present in different patterns and are rarely revealing. Morbidity and mortality are considerably increased, and treatment is often carried out as an emergency due to the severity of the clinical presentation.

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