Acute recurrent haemorrhage of an intracranial meningioma

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Abstract

Meningioma-associated haemorrhages are rare. To our knowledge this is the first report of a patient with an acute two-stage haemorrhage of a benign intracranial meningioma (World Health Organization grade I) verified by cranial CT scan and histopathological examination. Early surgery with complete tumour removal led to a good outcome for the patient.
Acute two-stage haemorrhage of an intracranial meningioma

Case Report

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Abstract:
Meningioma-associated haemorrhages are rare. We report for the first time the case of a patient with an acute two-stage haemorrhage of a benign intracranial meningioma (WHO grade I) verified by cranial computed tomography and histopathological examination. Early surgery with complete tumour removal led to a preferable outcome for the patient.
Keywords: meningioma, two-stage, intracerebral haemorrhage, intraventricular haemorrhage

Introduction:
Spontaneous intracerebral haemorrhage rates in patients with brain tumour range from 1.4% to 10.0% in the literature. These haemorrhages occur more frequently in malignant tumours, particularly metastases, than in benign tumours (1). For instance, Kondziolka et al. have reported a macroscopic haemorrhage incidence of 6.9% among 264 glioblastoma patients and even up to 29% among patients with oligodendrogliaoma and 50% in melanoma metastasis (2). In contrast, Wakai et al. have detected only four haemorrhages (1.3%) in 310 meningiomas (3). In cases of tumour-associated haemorrhages, the clinical condition and outcome of the patient deteriorate due to the acute effects of the expansive process (4). Intratumoural and intracerebral haemorrhages associated with benign intracerebral tumours such as meningiomas are rare: only 68 cases have been described in the literature (4-6). No cases of neuroradiologically detected and clinically examined two-stage haemorrhages associated with meningiomas (WHO grade I) have been reported to date.

Case report:
Presentation and examination
A 65-year-old man admitted himself to a regional hospital, complaining of headache and vertigo lasting for 24 hours, but demonstrated no other neurological deficits. The patient had no history of chronic disease and took no regular medication. The blood exam showed normal platelet counts, haemoglobin levels, INR and aPTT. Contrast-enhanced
CT imaging showed a round, hypodense, partially haemorrhagic lesion with dural attachment in the area of the left superior frontal gyrus that showed slight homogenous contrast-enhancement (Figure 1). Thirty hours after onset of symptoms and six hours after admission to the regional hospital, the patient was transferred to the Department of Neurosurgery. During transport, the patient suddenly became comatose and was stabilised. A CT scan performed after transport showed a massive intracerebral and intraventricular haemorrhage surrounding the lesion (Figure 2). The time course of the symptoms and neuroradiological imaging suggest the rare event of severe two-stage bleeding associated with a benign meningioma.

**Neurosurgical treatment**

During the immediate emergency operation, the solid extra-axial tumour and the surrounding massive intracerebral haemorrhage were completely removed macroscopically, and an external ventricular drain was placed in the left lateral ventricle.

**Postoperative course**

After surgery, the patient was transferred to the ICU and presented with high-grade haemiparesis of his right side (M1/5), motor aphasia and swallowing disturbances. On the 25th day after surgery, the patient was transferred to a neurorehabilitation clinic. At this time, he still suffered from swallowing disturbances, but the haemiparesis of his right side had improved (M3/5). The external ventricular drain was removed uneventfully prior to discharge, and no signs of hydrocephalus were detected. At the follow-up examination three months after surgery, the patient presented with improved
haemiparesis of the right side (M4+/5) and no other neurological deficits. MR imaging showed a complete removal of the meningioma without any signs of haemorrhage.

**Histopathology**

The histopathological examination revealed a transitional meningioma (WHO grade I) that did not infiltrate the brain parenchyma but showed acute and residual haemorrhagic components. No pathological vessels, infarction, necrosis or morphological signs meeting the criteria for atypia were found. The histopathological detection of areas with erythrocyte-rich acute haemorrhage as well as small areas exhibiting haemosiderin deposition and early resorptive processes points to the occurrence of previous micro-bleedings of this benign meningioma.

**Discussion:**

Haemorrhages associated with meningiomas are rare, and most reported cases are associated with subdural haemorrhages (4). Only 68 cases of patients with meningiomas associated with intracerebral haemorrhages have been described in the literature to date (4-6). In some publications, possible mechanisms for unexpected meningioma-associated tumour bleeding were discussed, but none were adequately proven. Although some risk factors have been described, including individual patient condition (e.g., age younger than 30 or older than 70 years, patients with anticoagulation) and tumour-related factors (tumoural infarction or fibrous, atypical or anaplastic meningiomas), the ultimate determining condition is still unknown (4, 6). In the case described here, the histopathological examination showed a transitional meningioma with none of the afore mentioned risk factors, with the exception of focal
fibrous tumour components. Additionally, the histology did not meet the criteria for atypia, and no pathological vessels, necrosis or infarction were found. The age of the patient and the absence of any regular medication do not align with any of the discussed explanations for this type of haemorrhage. Interestingly, the histological examination revealed signs of acute haemorrhage as well as haemosiderin deposition, suggesting a history of at least one minor haemorrhage prior to the clinical presentation of the patient. The bleeding risk in transitional meningiomas has been estimated at approximately 0.3% (5). The previous study included intraventricular types of meningiomas, which showed a higher bleeding tendency, suggesting that an even lower risk of haemorrhage may be associated with the type of tumour described here (4,5). Convexity meningiomas showed the lowest risk for bleeding but generally presented with a subdural haematoma, in contrast to the present case.

**Conclusion:**

The present case provides an example of rapid, life-threatening deterioration due to two-stage bleeding associated with an intracranial meningioma. Two-stage bleeding of a transitional meningioma (WHO grade I) has not been previously described in the literature. In cases of meningioma-associated haemorrhages, the clinical condition of the patient typically deteriorates due to the acute effects of the expansive process. Early surgery with complete tumour removal is recommended even in cases of only slightly haemorrhagic benign meningiomas because the present case shows that two-stage bleeding can worsen the clinical condition of the patient. If any signs of on-going or more advanced-stage bleedings with mass effects are present, surgical intervention is imperative.
Figure legends:

Figure 1: Axial (A, B) CT scans (first imaging).

Figure 2: Axial (C, D) and coronary (E, F) CT scans (after second haemorrhage).
References:


