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Case Report

A Dangerous Acute Presentation of Hemorrhagic Meningioma

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ABSTRACT

Background and Importance: Meningioma is one of the most common intracranial tumors. Its incidence rate is 37.6% of all primary brain tumors and 53.3% of benign tumors. Hemorrhagic meningioma is rare, with only 120 cases reported in the literature between 1980-2021. The most common type of hemorrhagic meningioma is acute subdural hematoma (SDH) and then intraparenchymal (IPH)
(49 cases and 44 cases, respectively, approximately one case per year). The risk of rebleeding in this case is high (74%), therefore prompt surgical treatment is recommended.

Case Presentation: The presenting case is a very rare hemorrhagic meningioma associated with SDH and IPH. A 69-year-old woman with a history of hypertension complained of severe and sudden headaches and mild confusion. He had no anticoagulant in her drugs. Brain computed tomography (CT) and magnetic resonance imaging (MRI) showed right frontoparietal meningioma with acute SDH and associated IPH with midline shift. The patient was operated and the tumor was resected and the hematoma was evacuated and then discharged in good condition.

Conclusion: Each acute SDH and IPH is a rare presentation of meningiomas and their association as in this case is extremely rare. Due to the high risk of rebleeding in similar reported cases, prompt surgical treatment is recommended. A precise understanding of pathogenesis needs to be evaluated in these cases.

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Highlights

• Each acute subdural hematoma (SDH) and intraparenchymal (IPH) can be a rare presentation of meningiomas and their association as in this case is extremely rare.

• Due to the high risk of rebleeding in similar reported cases, immediate surgical treatment should be done.

• The risk of rebleeding in this case is high (74%), thus quick surgical treatment is recommended.

Plain Language Summary

Meningioma is one of the most common intracranial tumors. Most of these tumors are benign and therefore the risk of bleeding is low. Hemorrhagic meningioma is rare, with only 120 cases reported in the literature between 1980-2021. The presenting case is a very rare hemorrhagic meningioma with an association of acute SDH and IPH. A 69-year-old woman with a history of hypertension complained of severe and sudden headaches and mild confusion. He had no anticoagulant in her drugs. Brain computed tomography (CT) and magnetic resonance imaging (MRI) revealed right frontoparietal meningioma with acute SDH and associated IPH with midline shift. The patient was operated and the tumor resected and the hematoma was evacuated and then discharged in good condition.

1. Background and Importance

While most meningiomas are diagnosed accidentally, they usually cause focal headaches, convulsions, dizziness, or neurological deficits in symptomatic patients. Various clinical characteristics may occur depending on their size, location, and invasion.

Most of these tumors are benign and therefore the risk of bleeding is low. The most common form of hemorrhaging due to meningioma is subdural hematoma (SDH) [1].

Although malignant tumors, such as glioma are associated with spontaneous bleeding, this phenomenon is rare in benign tumors, such as meningioma [1]. The mechanism of hemorrhage in these tumors is not yet fully understood. Hemorrhagic brain tumors, which can cause intracranial hemorrhages, are responsible for 1%-11% of intracranial hemorrhages. Brain tumor-related subarachnoid hemorrhage (SAH) accounts for 0.4% of all SAH cases. Moreover, 1.7% to 10% of brain tumors cause an intracerebral hemorrhage. Intertumoral hemorrhage typically occurs in 11% of head tumors, and its occurrence in glioblastoma multiforme, choriocarcinomas, oligodendrogliomas, pituitary adenomas, choroid plexus papilloma, and meningioma is also prevalent [2].

In this article, we present a case in which meningioma is accompanied by subdural and IPH hematomas.

2. Case Presentation

A 69-year-old woman with a history of hypertension was admitted to the emergency department with a severe and sudden headache complaint.

On computed tomography (CT) scan, a heterogeneous hyperdense area was observed in the right frontoparietal area. The lesion has two components, an iso-intense portion in the anterolateral (tumor) and a hyperdense portion in the posteromedial and compression over brain tissue and there was a mild midline shift.

In magnetic resonance imaging (MRI), it was found that the lesion was heterogeneous and anterolateral portion (tumor) was hypointense on T1-weighted images and hyperintense on T2-weighted images and the posteromedial portion (hematoma) was iso-hypo on T1-weighted and hypo on T2-weighted images. At post-contrast images, the anterolateral portion (tumor) displayed homogenous dense enhancement, and no enhancement was observed at the posteromedial portion (hematoma). Also, crescent shape extension of hematoma was observed in subdural space (free component) which was iso on T1-weighted and hyper on T2, and no enhancement was observed (Figure 1). The mentioned results were supportive of peri-tumoral hematoma.

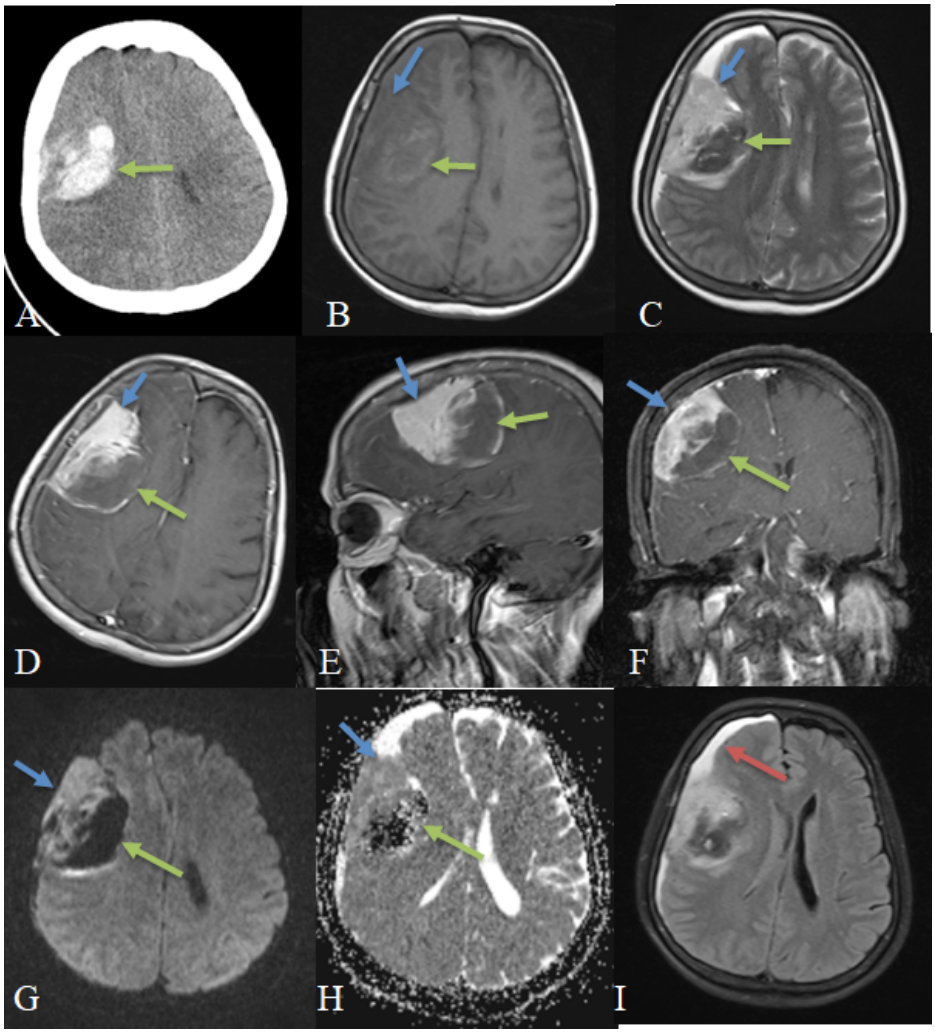

Figure 1. Magnetic resonance imaging

Notes: Green arrow: Showing a hyperdense lesion (hematoma) over the right frontal lobe (A), Blue arrow: Showing tumor iso and hyper in T1-weighted and T2-weighted, Green arrow: Showing hematoma iso and hypo in T1-weighted and T2-weighted (B&C), Blue arrow: Showing enhancing tumors, Green arrows: Showing iso to hypo signal hematoma in post-contrast images (D&F), Blue arrow: Showing restriction in tumor diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) images (G&H), The red arrow: Showing hyperdense SDH in FLAIR image (I).

Operation

The patient underwent an emergent frontoparietal craniotomy. After the dura opening, a SDH was observed and evacuated, and then a mass with a dura base in favor of meningioma was identified, along with IPH hematoma in posteromedial to the tumor. The tumor was resected and the hematoma was evacuated and washed. Ultimately, the duraplasty was performed and a drain was placed at the end (Figure 2).

Postoperative outcome

The patient was admitted to the intensive care unit (ICU). Twenty-four hours later, a post-operative brain CT scan was performed for the patient. No trace of hematoma or tumor tissue was observed on the brain CT therefore we started the anticoagulants. On the second day, the patient was admitted to the ward and got out of bed. The patient was discharged on the third day in good condition. Control MRI showed complete removal of the tumor (Figure 3).

Pathology

Macroscopy

The received sample of the first container (brain mass) contains numerous pieces of cream-brown tissue with a soft to elastic consistency, dimensions of (6×6×2) cm,

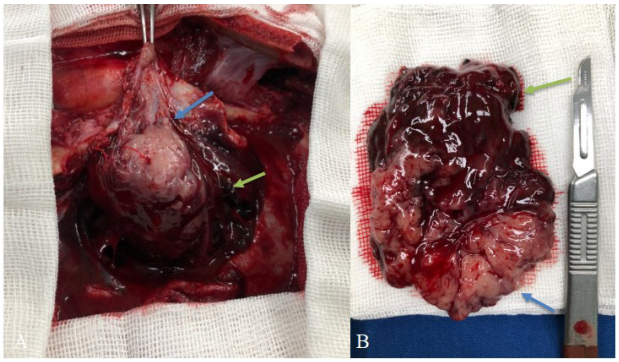

Figure 2. Green arrows showing hematoma and blue arrows showing a tumor in intraoperative images (A&B)

and a nodular growth pattern. On the surface of the cut, the cream is brown and non-uniform. It contains numerous blood clots attached to it. The received sample of the second container contains a piece of brown cream texture with dimensions of 2×1×0.5.

Microscopy

Sections of neoplastic tissue with meningothelial appearance can be observed under the microscope. The neoplastic cells are characterized by round to oval nuclei with vesicular chromatin patterns, sometimes small eosinophilic nuclei are found in dense sheets of cells with a syncytial appearance. A collagenous field has been established. Vascular field of neoplastic tissue and few cystic spaces along with edema vascular congestion and bleeding are evident. No evidence of tissue necrosis increased mitotic activity and patternless and heterogeneous differentiation is observed. Meningioma meningotheliomatous type grade I with intertumoral hemorrhage.

3. Discussion

Primary metastatic and malignant tumors are the most prone to bleeding due to their histological characteristics and association with coagulopathy. However, sometimes benign tumors, such as meningioma and schwannoma can also lead to bleeding. Convexity and intraventricular meningiomas and, fibroblastic or angioblastic subtypes are more likely to bleed. Bleeding raises the mortality rate of benign meningioma. As a result, early diagnosis and surgical treatment by hematoma evacuation with underlying tumor resection are required as we did in our case [1].

Hemorrhage due to meningioma is relatively rare, with an incidence of 1.3% to 2.4%, and 120 cases reported in the literature between 1980-2021, mostly SDH (41%), intraparenchymal (IPH) (37%), SAH (18%), intraventricular hemorrhage (IVH) (4%) [3]. The risk of rebleeding in patients who were not operated on for resection and

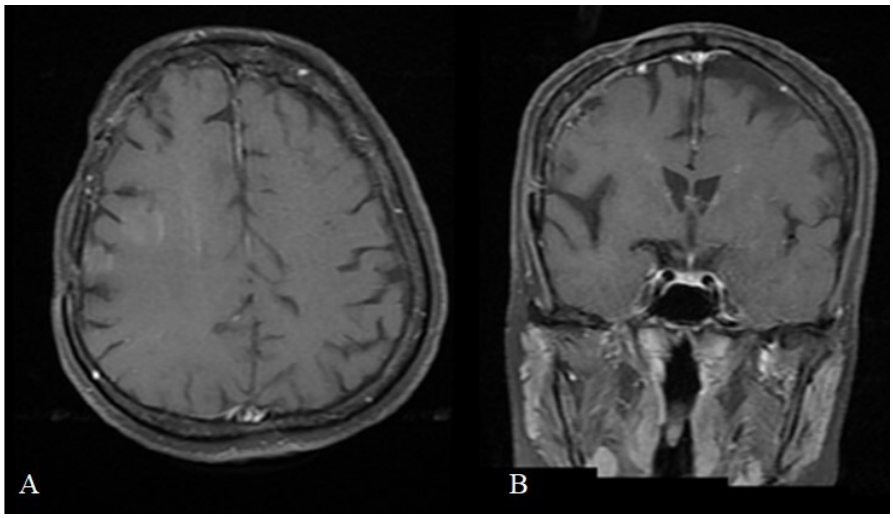

Figure 3. Post-contrast images showing complete resection of the tumor (A&B)

hematoma evacuation was 74% with a median time of 120 days, thus the rebleeding risk is high and it could be dangerous, consequently, prompt surgery is justified. SAH and IVH types and hindbrain location had an association with early rebleeding. Therefore, SDH and IPH in meningioma are rare (reported cases were 49 and 44 respectively) [4-6] and their association as in our case is extremely rare. Ventricular and hindbrain location and IPH can worsen prognosis and outcomes [3].

The most reported histologic subtypes of meningioma are meningothelial and angiomatosis [7]. Hemorrhage in the meningothelial subtype is probably related to the presence of vasoactive substances released by the tumor, which can induce vasodilation and bleeding [1].

In this case, SDH and IPH were both associated with meningioma, which is extremely rare. It may have occurred accidentally or as a result of minor head trauma.

Most patients diagnosed with meningioma are covered without any complication but about 7.5% of the patients died despite proper treatment and also 10% were left with neurological sequelae [1].

4. Conclusion

Each acute SDH and IPH is a rare presentation of meningiomas and their association as in this case is extremely rare. Due to the high risk of rebleeding in similar reported cases, prompt surgical treatment is recommended. Precise pathogenesis understanding needs a more intentional evaluation of these cases.

Ethical Considerations

Compliance with ethical guidelines

Written informed consent was obtained from the patient.

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Authors' contributions

Conceptualization and study design: Mahdi Arjipour; Data collection: Mohammad Mahdi Talimkhani; Data analysis and interpretation: Hamidreza Doostabadi; Writing the original draft: Mahdi Arjipour and Hamidreza Doostabadi; Review and editing: Mahdi Arjipour.

Conflict of interest

The authors declared no conflict of interest.

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