



Hemorrhagic Meningioma With Symptom of Convulsion: A Rare Presentation of Parietal Meningioma

Dinh Thi Phuong Hoai^{1*}, Duong Ngoc Thanh Van¹, Phan Quoc Tho¹, Nguyen Ngoc Anh Thu¹, Le Trong Phuoc¹, Le Trong Hieu¹, Nguyen Vinh Lac¹, Vo Ba Tuong², Nguyen Thanh Minh¹

¹Hue University of Medicine and Pharmacy – Hue University, Hue, Vietnam

²Department of Neurosurgery, Hue Central Hospital, Hue, Vietnam

Abstract

Meningioma is the most common, extra-axial, non-glial intracranial tumor with an incidence of 2.3-5.5/100,000, accounting for 20%-30% of all primary brain tumor diagnoses in adults. Meningiomas associated with intratumoral hemorrhage are very rare occurring in 0.5%-2.4% of individuals. Herein, we report a rare case of hemorrhagic meningioma with the symptom of convulsion. The case was a 68-year-old woman admitted to the hospital with severe headache and convulsions. Computed tomography revealed an increase in heterogeneous lesion measuring 4 × 3 × 2.5 cm at the right parietal lobe. Brain magnetic resonance imaging (MRI) showed a grossly stable homogeneously enhancing extra-axial mass measuring 43 × 33 × 28 mm, small calcified peripheral, intratumoral hemorrhage. Histopathology showed a multi-celled meningioma with bleeding areas (WHO grade I).

Keywords: Hemorrhagic meningioma; Intracranial hemorrhage; Meningioma; Bleeding; Convulsion.

*Correspondence to

Dinh Thi Phuong Hoai, Hue University of Medicine and Pharmacy – Hue University, 06 Ngo Quyen Street, Vinh Ninh Ward, Hue City, Thua Thien Hue Province, Viet Nam (Postcode: 49120).
 Tel: +84 393579437;
 Email: dtphoai@huemed-univ.edu.vn

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Introduction

Spontaneous hemorrhages associated with intracranial tumors are rare and occur only in about 1.4%-10% of all intracranial tumors. These hemorrhages are mainly related to malignancies such as glioblastoma, oligodendrogliomas, and metastatic brain tumors.¹⁻³ Meningioma grows slowly, often benignly and extra-axial tumors arise from meningeal cells with an incidence of 2.3-5.5 per 100,000 people,⁴ comprising 20%-30% of all primary brain tumors.^{4,5}

Meningioma is usually silent upon initial occurrence. Symptoms are variable depending on the origin of the meningioma. The most common symptoms include severe headaches, weakness or paralysis, reduced vision, and speech disorders. Most of the time, patients head to the hospital because of sudden convulsions that are worrisome to them and their families. However, this symptom is quite helpful for suggesting the primary location of meningiomas.

Intra-tumor hemorrhagic meningiomas are rare, and meningioma associated with bleeding inside meningiomas is approximately 0.5-2.4%,¹⁻³ with a mortality rate of 13 and 55%.⁶ Niuro et al,⁷ described only six cases (2%) with hemorrhagic onset in a study of 298 patients with meningioma. Therefore, early diagnosis and appropriate treatment will help reduce symptoms, recurrence rates,

and death caused by the disease. Herein, we report a case of hemorrhagic meningioma with the symptom of convulsion: a rare presentation of parietal meningioma and its diagnosis and treatment to complement the literature.

Case Report

A 68-year-old female patient was hospitalized with severe headaches and convulsion. She was diagnosed with hypertension for two years and complained about her anti-hypertensive medications. Two days prior to admission, she experienced a bilateral headache involving the forehead, temporal regions, and occiput. The pain was persistent, worsening at night, and was exacerbated by coughing and sneezing. The headache was gradually increasing in intensity, then the patient developed projectile vomiting, weakness, and impaired sensation of her left hand, and her right hand had paresthesia. Meanwhile, her blood pressure was 170/90 mm Hg and, therefore, she was transferred to the hospital. On admission, her clinical evaluation revealed headache, projectile vomiting, negative meningeal signs, normal pupillary light reflex, left hemiplegia, urination incontinence, and normal tendon reflexion. Her routine chemistry panel was within normal limits. A brain computed tomography (CT) scan showed a hyperdense extra-axial mass in the occipital lobe

measuring $4 \times 3 \times 2.5$ cm with peripheral calcifications at the border. The brain magnetic resonance imaging (MRI) confirmed the presence of a right parietal extra-axial mass with clear boundaries measuring $43 \times 33 \times 28$ mm. The mass was isointense on T1, hyperintense on T2 and FLAIR images, and showed heterogeneous enhancement in post-contrast T1 film. Intratumor hemorrhage and meningeal thickening were noted. Focal edema was seen around the mass but was not associated with effacement of the ventricular system or midline deviation (Figure 1). Total surgical excision of the meningioma was performed. During surgery, the tumor was dissected into small pieces, withdrawn from the meninges, and the meninges were peeled off. The pathology with fibrous cell proliferative forming of spacings or vascular proliferative tissue with bleeding areas, clear boundaries, was suggestive of a multi-celled meningioma with bleeding areas (WHO degree I) (Figure 2).

In the postoperative period, the patient recovered well. There is no neurological deficiency or convulsions. The patient was discharged from the hospital on the 10th day after surgery. Re-examination after 1 month showed no residual of the tumor postoperatively on MRI. After surgery, the patient's paralysis symptoms improved, the patient no longer had convulsions during the 2-year follow-up period. The patient did not receive physical therapy. So, this patient did not require physiotherapy.

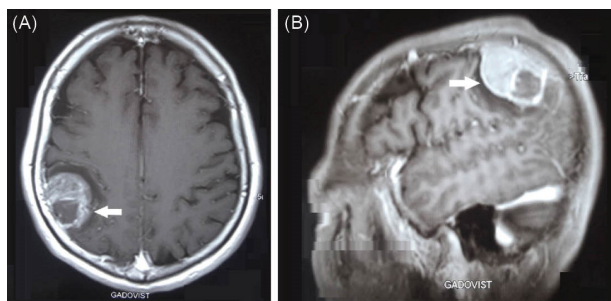


Figure 1. Brain MRI shows the mass in a right parietal extra-axial mass with clear boundaries measuring $43 \times 33 \times 28$ mm. The mass showed heterogeneous enhancement in post-contrast T1 film. (A) The axial plane, (B) sagittal plane.

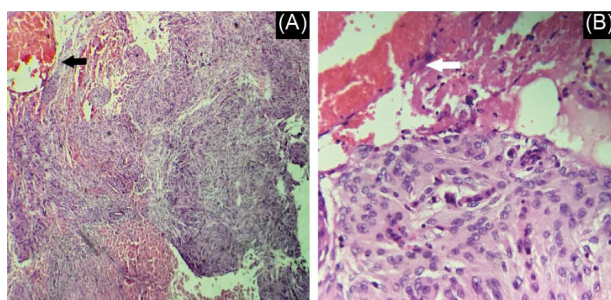


Figure 2. The pathology with fibrous cell proliferative forming of spacings or vascular proliferative tissue with bleeding areas, clear boundaries, was suggestive of a multi-celled meningioma with bleeding areas (arrow marks). (A) 10x magnification; (B) 40x magnification on a microscope.

Discussion

Hemorrhages in meningioma are very rare with an incidence of 0.5-2.4%^{8,9}. The parietal meningioma with generalized convulsions is even rarer. Clinical characteristics that help suggest increased hemorrhage in meningioma include¹⁰ (1) Age >70 years or <30 years, (2) the location of the ventricular or cerebral hemisphere tumor is far from the middle line, (3) histological type: meningotheliomatous, malignant, fibrous, and glioblastoma. In particular, the characteristic hemangioblastoma is formed by abnormal blood vessels, and this abnormal blood vessel may be associated with hemorrhages in the tumor. Helle and Conley¹¹ calculated the “relative bleeding tendency” of meningioma and found that histological hemangioblastoma and malignant tend to bleed more often. These increased bleeding trends are similar to another study¹⁰ as well as the location of the cerebral hemispheres and the type of hemangioblast histology that tends to increase spontaneous bleeding.^{10,11} In our study, the location of the tumor located in the convexity region and the type of hemangioblast indicated a high likelihood of hemorrhage, at the same time, hypertension is also a contributing factor bleeding in this patient's meningioma (with hypertension on regular treatment and the blood pressure on admission is 170/90 mm Hg). Subarachnoid hemorrhage is the most common hemorrhagic site, while subdural and intratumor hemorrhage is less common. Intratumor hemorrhages are quite rare and are often associated with a history of using anticoagulant or preoperative tumor embolism.¹¹⁻¹³ Some authors report that subdural hemorrhages may arise from intratumor hemorrhages entering the subdural space.² Mortality and morbidity rates vary significantly in conscious, permanently unconscious, or patients with clinical cognitive impairment, and are also affected by the type of hemorrhage that occurs.^{10,11} In our case, recovery without signs of a potential resident neurological deficiency is associated with the type of histology and surgery to remove the tumor early.

The Hypothesis of Intratumoral Bleeding

The pathophysiological mechanisms of hemorrhage in spontaneous meningioma are still not well understood, but some of the hypotheses that have been recently proposed include.^{1,8,14}

1. Rupture of the abnormal vascular network of the tumor. This hypothesis is based on histological findings, such as thin-walled vessels or direct peritumoral erosion by the tumor.¹⁵
2. Intratumoral infarct and necrosis caused by the rapid growth of the tumor or by venous thrombosis.
3. Breakdown of blood vessels by direct invasion of blood vessels by tumor cells.¹⁶
4. Stretching of the subdural bridging veins caused by the expansion and tumor growth may cause the veins

to rupture.

5. Vaso-active substances released by meningioma.^{2,16} Mast cells are usually present in the leptomeninges. They can be seen in small numbers in meningiomas, mainly syncytial-type meningiomas. Mast cell granules contain many substances such as histamine, heparin, tryptase, superoxide dismutase, beta-hexosaminidase, leukotrienes, eosinophil, and neutrophil chemotactic factors. These active ingredients in the body such as histamine can cause vasodilation and tumor hemorrhage. The most frequent intratumoral hemorrhage associated with syncytial meningiomas.²
6. Enlarged feeding arteries become tortuous, less resistant to blood pressure changes, and finally susceptible to rupture under stressful conditions.

Diagnosis

The manifestation of meningioma is usually silent and depends on the location of the tumor that appeared initially, but the most common is increased intracranial pressure, movement disorders, and epilepsy with severe headaches, weakness or paralysis, reduced vision and language disorders. And CT scan and MRI play an important role in determining tumor location and size. The extra-axial tumor pushes the brain tissue, there is cerebrospinal fluid between the tumor and brain tissue. The footprint has a wide bottom leaning against the epidural. Thickness meninges with the “meningeal tail” sign. Features in MRI with hemorrhage in the tumor, increase the signal on T2W but not and highly proliferative properties field.⁹

Treatment

Hemorrhagic meningiomas have a certain mortality rate of 21.1% and 9.5% in patients receiving surgical treatment field.¹⁰ Therefore, early diagnosis and appropriate treatment will help reduce symptoms, recurrence, and mortality rates caused by the disease. The general principles in meningioma removal surgery are: If possible, all related or hypertrophic bones should be removed. The tumor-related epidural, as well as the tumor-free epidural rim, should be removed (epidural is performed). The clear “meningeal tail” sign on the MRI is best removed, although may not be related to the tumor. Cut off the blood supply to the meningioma. Meningioma surgery strategies depend on the specific location of the meningioma. Removing the entire tumor with an ultrasound suction machine, with a laser, or with a ring-shaped electric knife. To facilitate a thorough tumor removal, while protecting the surrounding healthy brain tissue, it is necessary to reduce pressure in the skull with mannitol infusion, increase ventilation and drain cerebrospinal fluid from the ventricle and tanks at the bottom of the brain.

Conclusion

Hemorrhagic meningiomas are quite rare. The incidence and mortality rates depend on the location and histology. Clinical diagnosis with increased intracranial pressure syndrome and movement disorders, MRI with increased signaling on T2W. Treatment should remove the tumor early to avoid recurrence and consider radiation therapy for some patients.

Authors' Contribution

Authors equally contributed to the work.

Conflict of Interest Disclosures

The authors declare no conflict of interest.

Ethical Statement

This study accepted by the ethical approval committee/Institutional Review Board of Hue University of Medicine and Pharmacy, No. 2400 / QD-DHYD, January 3, 2022.

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