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Case Report

A Case of Choroidal Arteriovenous Malformation Presenting with Intraventricular Hemorrhage: Successful Resection via High Occipital Transcortical Approach

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Abstract

Background: Choroidal arteriovenous malformations (AVMs) are exceedingly rare vascular lesions that often present with hemorrhage owing to their deep-seated location and complex angioarchitecture.

Case Description: A 70-year-old woman presented with an unknown-onset headache and impaired consciousness. Computed tomography revealed massive intraventricular hemorrhage with acute hydrocephalus. Digital subtraction angiography revealed a choroidal AVM in the right trigonal region, fed by the anterior choroidal arteries. An external ventricular drain was placed immediately. Two weeks after neurological improvement, microsurgical resection was performed using a high occipital transcortical approach. Complete resection of the AVM nidus was achieved while preserving the surrounding structures. Postoperative MRI and MRA confirmed complete obliteration. The patient recovered without any neurological deficits, and at 3-month follow-up remained neurologically intact without evidence of rebleeding.

Conclusion: Although rare, choroidal AVMs can present as intraventricular hemorrhages in elderly patients. This case highlights the feasibility of a high occipital transcortical approach for deep-seated choroidal AVMs and emphasizes the importance of meticulous surgical planning to achieve complete and safe resection.

Keywords: Choroidal Arteriovenous; Malformation Presenting; Intraventricular Hemorrhage; Transcortical

Case Report

A 70-year-old woman presented with an acute-onset headache and impaired consciousness. On admission, her neurological status was poor (Japan Coma Scale [JCS], 200; Glasgow Coma Scale, E1V1M3), with quadriparesis and weak light reflexes. No significant medical or family history was noted.

Computed tomography (CT) demonstrated a massive intraventricular hemorrhage (IVH), predominantly in the right lateral ventricle, associated with acute hydrocephalus (Figure 1). Angiography revealed a choroidal AVM in the right trigonal region that was primarily fed by the anterior choroidal arteries (Figure 2). Emergency external ventricular drainage was performed with the patient in the supine position to relieve hydrocephalus.

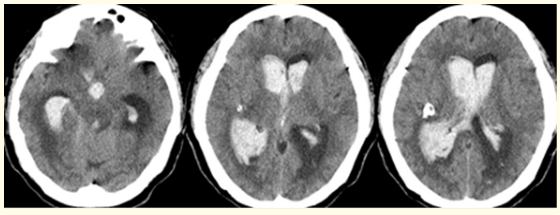

Figure 1: Computed tomography on admission.
CT confirmed severe intraventricular hemorrhage. The hemorrhage was predominantly in the right ventricle.

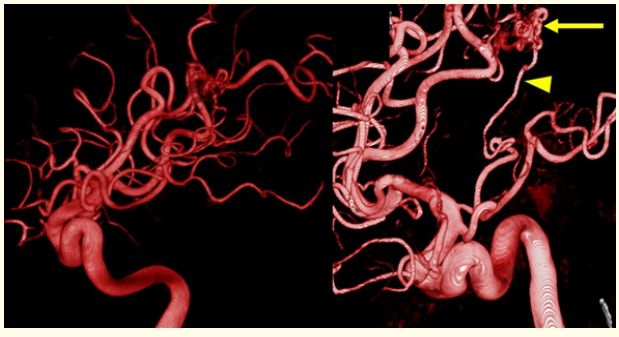

Figure 2: Preoperative angiography.
An AVM feeding mainly from the right anterior choroidal artery was identified and determined to be the source of bleeding.

After two weeks, her consciousness improved (JCS 10), and definitive resection was planned. The patient was placed in the left lateral decubitus position. A right occipital craniotomy (6 cm × 6 cm) was performed, followed by a 2-cm corticotomy to access the trigone (Figure 3A). The intraventricular hematoma was evacuated, and the AVM nidus with the choroid plexus was exposed (Figure 3B). The feeding arteries were coagulated, divided, and circumferentially dissected (Figure 3C). The nidus was removed en bloc after the coagulation and division of the drainage veins.

The patient's postoperative course was uneventful. Postoperative MRI and MRA confirmed complete obliteration of the nidus without ischemic complications (Figure 4). She regained full consciousness without any new neurological deficits, was discharged to rehabilitation in an ambulatory state, and remained neurologically intact at the 3-month follow-up.

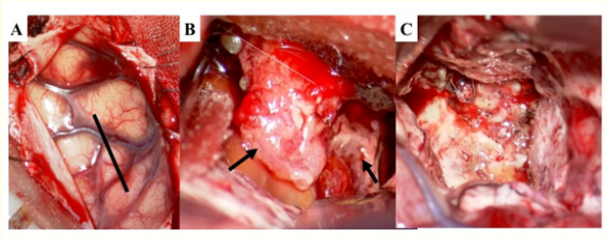

Figure 3: Surgical findings.
A: A 2 cm corticotomy (straight brack line) was made on the cerebral cortex, and deep dissection was performed.
B: After removing the hematoma from the ventricle, an AVM and choroid plexus (arrows) became apparent.
C: The surface of the white matter after total AMV resection.

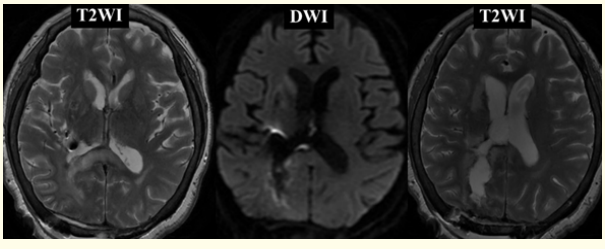

Figure 4: Postoperative magnetic resonance imaging.
A, C (T2WI): AVM and intraventricular hematoma have been completely removed.
B (DWI): No postoperative cerebral infarction occurred.

Discussion

Surgical management of intraventricular arteriovenous malformations (AVMs) remains challenging due to their deep location, proximity to eloquent structures, and complex vascular supply. Multiple treatment strategies, including microsurgical resection, radiosurgery, and endovascular embolization, have been proposed. Among these, microsurgical resection continues to offer the most definitive treatment, especially for ruptured AVMs presenting with intraventricular hemorrhage [1-5].

In our case, the patient underwent microsurgical resection through the high occipital approach. This route provides a direct corridor to the atrium of the lateral ventricle while minimizing cortical transgression. Compared with the high parietal approach, the occipital route avoids direct injury to the motor and sensory cortices, thereby reducing the risk of postoperative hemiparesis or sensory loss [6-9]. However, this approach carries its own risks, most notably postoperative visual field deficits such as homonymous hemianopia or quadrantanopia, given the proximity of the occipital lobe [10-12]. Careful selection of the cortical entry point and the use of neuronavigation are therefore essential to minimize visual complications. In the present case, meticulous surgical planning and technique allowed for complete resection without new neurological deficits.

Unfortunately, postoperative angiographic imaging was not available, which represents a limitation of this report. While intraoperative inspection confirmed gross total resection, the absence of postoperative angiography precludes definitive confirmation of complete AVM obliteration. Future cases should incorporate routine postoperative angiographic evaluation to validate surgical results more objectively.

Another important limitation is the relatively short duration of follow-up. Although the patient remained neurologically intact with no recurrence of hemorrhage at one year after surgery, longer-term follow-up is necessary to assess the durability of cure and to monitor for delayed complications. Previous studies have emphasized the importance of extended follow-up, given the risk of late recurrences or de novo AVM formation [13-16].

Recent literature supports an individualized approach to intraventricular AVMs, integrating microsurgery, radiosurgery, and endovascular therapy depending on lesion size, location, and vascular architecture. Contemporary series have highlighted both the safety and efficacy of tailored microsurgical strategies for intraventricular and choroidal AVMs [17-20]. Our case further reinforces that careful approach selection and meticulous microsurgical technique can result in favorable outcomes, even in complex deep-seated lesions.

Conclusion

Choroidal AVMs are exceedingly rare vascular lesions that present as IVH. Despite being technically demanding, microsurgical resection via a carefully selected approach can achieve complete cure with favorable outcomes. This case highlights the importance of individualized surgical planning and demonstrates that the high occipital transcortical approach is a viable option for deep-seated ventricular AVMs.

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