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Arteriovenous Malformation Associated with Multiple Aneurysms Including Anterior Communicating Artery Aneurysm Located in the Third Ventricle: A Case Report

Arteriovenöz Malformasyona Eşlik Eden, Üçüncü Ventrikül Yerleşimli Anterior Kommunikan Arter Anevrizması: Olgu Sunumu

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ABSTRACT

Following the significant advances in neuroradiology, it has been now recognized that an intracranial arteriovenous malformation (AVM) lesion and vascular aneurysm(s) might coexist more often than estimated before. A 58-year-old female seen due to a subarachnoid hemorrhage (SAH) was subsequently shown to have an AVM lesion fed by the pericallosal frontopolar, M1 segment of the middle cerebral artery along with three cerebral aneurysms. The AVM lesion was totally excised and the coexisting aneurysms were successfully clipped. As a very rare finding, one of the aneurysms originating from the Anterior Communicating Artery was localized in the 3rd ventricle penetrating the lamina terminalis.

KEY WORDS: Third ventricle, Anterior communicating artery aneurysm, Arteriovenous malformation, Lamina terminalis

ÖZ

Günümüzde nöroradyolojideki gelişmelerle arterivenöz malformasyona eşlik eden anevrizmalar daha sık görülmektedir.58 yaşında kadın hasta subaraknoid kanama ile kliniğimize başvurdu. Perikallosal, frontopolar ve orta serbral arter M1 segmetinden beslenen süperior saggital sinüse boşalan arterivenöz malformasyon ve eşlik eden anevrizmalar saptandı. Sol orta serebral arter M1 segmenti, M1 bifurkasyon ve anterior kommunikan arter lokalizasyonunda 3 ayrı anevrizma saptandı. Hasta cerrahiye alınarak Arterivenöz malformasyon çıkarılarak, anevrizmalar kliplendi. Bu yazıda Anterior kommunikan lokalizasyonunda lamina terminalisi penetre ederek üçüncü ventriküle yerleşen anevrizma sunuldu

ANAHTAR SÖZCÜKLER: Üçüncü ventrikül, Anterior kommunikan arter anevrizması, Arteriovenöz malformasyon, Lamina terminalis

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INTRODUCTION

Multiple cerebral vascular aneurysms in company with intracranial arteriovenous malformation (AVM) lesions are being reported more often than previously, unquestionably because of the improvements in neuroradiology imaging technology. In recent series, the incidence of this coexistence varied from 7.5% to 46.1%, and additionally, multiplicity of these aneurysms was reported between 51.2% and 67.2% (5,7,8).

Although angiography studies have shown that partial or complete shrinkage of a proximal aneurysm following AVM occlusion is possible, alternative treatment strategies continue to be suggested for the treatment of these intracerebral vascular lesions. Some authors essentially state that flow-related aneurysms in particular regress through AVM treatment while others have suggested the treatment of aneurysms as a priority to the contrary (4,8).

Herein, we describe a very rare case of an intracranial AVM lesion associated with multiple vascular aneurysms, one of which was located in the 3rd ventricle derived from the Anterior Communicating Artery.

CASE

A 58-year-old woman was admitted to the emergency unit due to a subarachnoid hemorrhage. A subsequent four-vessel angiography revealed three different aneurysms that had developed in the anterior communicating artery (ACoA), the left M1 segment of the middle cerebral artery, and the left M1 bifurcation. There was a coexisting grade 2 AVM (Spetzler-Martin grading scale) lesion that was fed by the pericallosal, frontopolar and M1 segments of the middle verebral artery and drained into the superior sagittal sinus (Figure 1-2). The patient underwent surgery during which we could not expose the posterior inferior dome of aneurysm and failed to confirm the anatomic relationship of the optic tract to the aneurysm. Following meticulous dissection, the posterior inferior lobule of ACoA aneurysm was actually shown to penetrate the posterior side of the lamina terminalis into the third ventricle (Figure 3). The ACoA aneurysm was first successfully clipped, and each of the other aneurysms was then successfully obliterated with clip ligation and the AVM lesion was excised. Postoperative recovery was uneventful and there was no recorded visual deficit. Her follow-up angiograms confirmed the obliteration of all aneurysms and total AVM excision together with patency of the major vessels. (Figure 4)

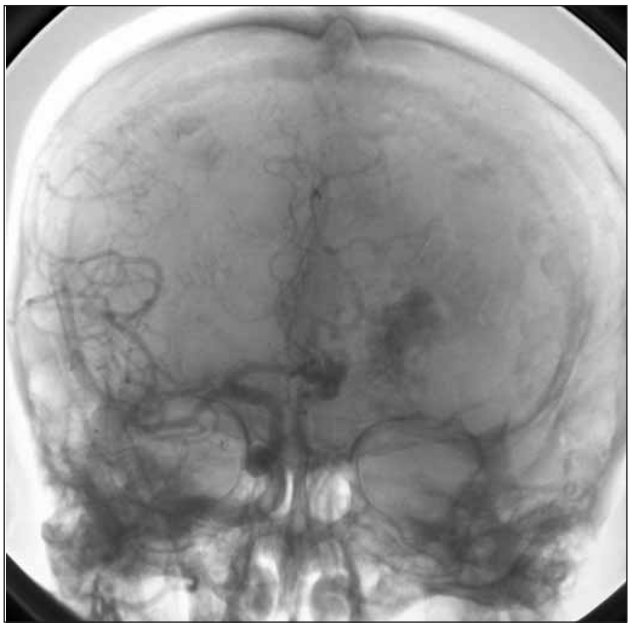

Figure 1: *Preoperative right internal carotid angiogram, demonstrating multilobule aneurysm on the ACoA. One lobule of aneurysm projected superiorly and the other projected inferiorly, and left frontal AVM.*

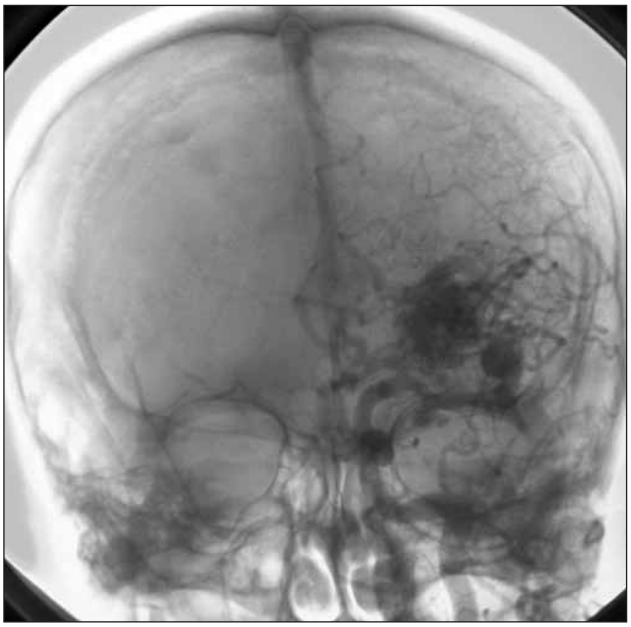

Figure 2: *Left internal carotid angiogram showing a 10 mm Proximal M1 aneurysm (projecting inferiorly), M1 bifurcation aneurysm and arteriovenous malformation was fed by the pericallosal, frontopolar and M1 drained into the superior sagittal sinus.*

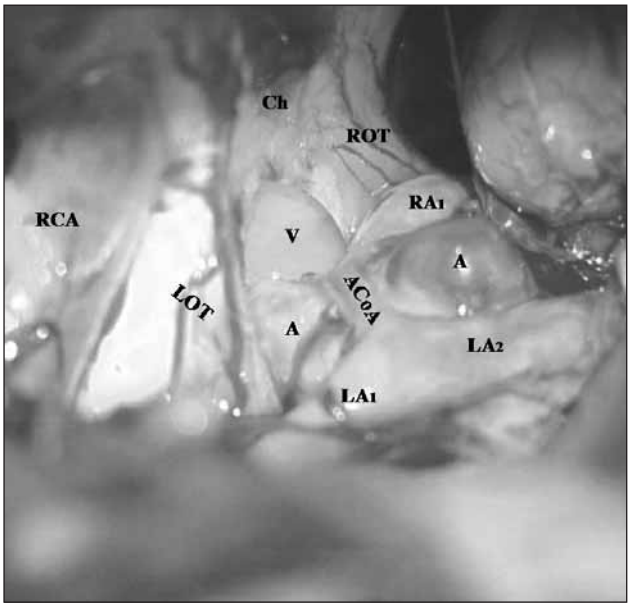

Figure 3: *Intraoperative photograph taken during a Left frontotemporal craniotomy, back of the lamina terminalis(anterior chamber of third ventricle) was penetrated by posterior-inferior lobule of ACoA aneurysm.*
Ventricle(V), left optic tract (LOT) ,right optic tract (ROT), chiasm (Ch),right carotid artery(RCA),A1 segment of right anterior cerebral artery(RA1), A1 segment of left anterior cerebral artery (LA1), A2 segment of left anterior cerebral artery (LA2).

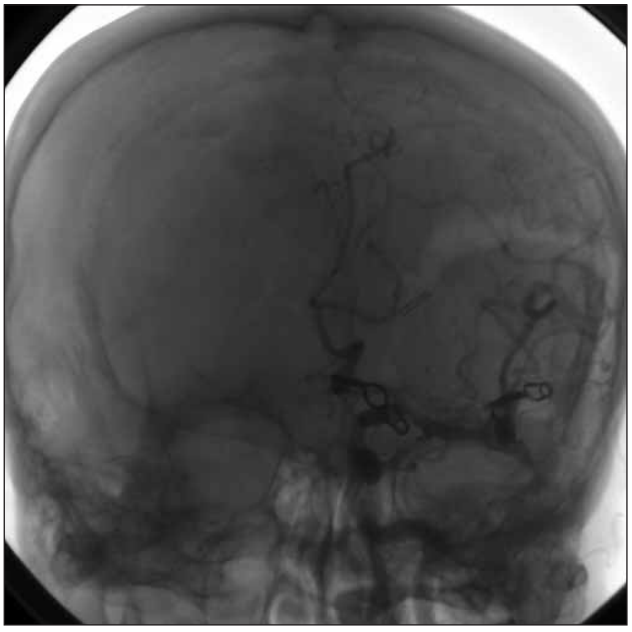

Figure 4: *Postoperative angiogram showing complete clip ligation of the aneurysm and AVM excision.*

DISCUSSION

Cerebral AVMs are difficult to treat with microsurgical, radiosurgical, or endovascular techniques. Coexistence with aneurysms increases their rate of hemorrhage up to 7% per year (1). Different treatment algorithms have been suggested for aneurysms associated with AVM. In some angiogram studies, proximal aneurysms were shown to regress following permanent AVM occlusion. In a report by Redekop et al., two patients experienced bleeding following a partial embolization and radiation therapy whereas aneurysmal hemorrhage was not seen in any one of the patients with total AVM embolization (7). In another series, Thompson et al. noted five cases with bleeding due to their aneurysms among 45 patients. After the embolization, two of their patients suffered bleeding, in addition, new aneurysms were recorded in 5 patients during the 3-year follow-up. Consequently, Thompson et al. recommended endovascular or microsurgical treatment of the aneurysm(s) before the treatment of AVM (8).

Although ACoA aneurysms are classified as anterior, posterior, inferior and superior according to their projections, they can rarely be complex such as multiple aneurysms on the same artery (3). Inferiorly projected ACoA aneurysms usually indent the superior chiasmatic surface and may adhere to the underlying optic chiasm. Date et al. have reported a ruptured ACoA aneurysm causing visual disturbances by penetrating the optic chiasm (2). Murai et al. encountered considerable technical difficulties with intracellular ACoA aneurysm thrombosis (6) and underlined the significance of stalk protection by way of using the visualization apparatuses of the hypophysis gland during the surgery.

In our case with subarachnoid hemorrhage, aneurysms of the ACoA and MCA proximal and MCA bifurcation localizations were operated on along with the grade I AVM. As known and applied by many neurosurgeons, the chiasmatic and carotid cisterns are opened during the Circle of Willis aneurysm surgery, and a more comfortable operation is achieved by opening the lamina terminalis following CSF aspiration. In this particular case, we saw that the lamina terminalis was penetrated after ACoA neck dissection. We think that there is a need to be cautious about the posterior chiasm while dissecting the aneurysm projecting

into the third ventricle. The presence of an aneurysm dome in the lamina terminalis region should be kept in mind during the preoperative evaluation. In our case, the penetration of the posterior lamina terminalis was due to posterior inferior lobule of the ruptured ACoA aneurysm. To the best of our knowledge, no previous case in the literature provides descriptions of anterior communicating artery aneurysm in the third ventricle.

REFERENCES

1. Brown RD, Wiebers DO, Forbes GS: Unruptured intracranial aneurysms and arteriovenous malformations: Frequency of intracranial hemorrhage and relationship of lesions. J Neurosurgery 73: 859-863, 1990
2. Date I, Akioka T, Ohmoto T: Penetration of the optic chiasm by a ruptured anterior communicating artery aneurysm. Case report. J Neurosurg 87: 324–326, 1997
3. Inci S, Ozgen T: Multiple aneurysms of the anterior communicating artery: radiological and surgical difficulties. J Neurosurg 102 :495–502, 2005
4. Liu Y, Zhu S, Jiao L, Wang H, Li X, Li G: Cerebral arteriovenous malformations associated with aneurysms - a report of 10 cases and literature review Journal of Clinical Neuroscience 7(3): 254–256, 2000
5. Meisel HJ, Mansmann U, Alvarez H, Rodesch G, Brock M, Lasjaunias P: Cerebral arteriovenous malformations and associated aneurysms: analysis of 305 cases from a series of 662 patients. Neurosurgery. Apr; 46(4): 793-800, 2000
6. Murai Y, Kobayashi S, Mizunari T,Teramoto A: Anterior communicating artery aneurysm in the sella turcica: Case report. Surg Neurol. Jul; 62(1): 69-71, 2004
7. Redekop G, Terbrugge K, Montanera W, Willinsky R: Arterial aneurysms associated with cerebral arteriovenous malformations: classification, incidence, and risk of hemorrhage. J Neurosurg 89: 539–546, 1998
8. Thompson RC, Steinberg GK, Levy RP, Marks MP: The management of patients with arteriovenous malformations and associated intracranial aneurysms. Neurosurgery. Aug; 43(2): 202-11; discussion 211-212, 1998