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Case Report

A case of meningolacrimal artery aneurysm associated with meningioma

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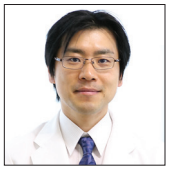

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ABSTRACT

Background: Intraorbital aneurysms are rare, and most of them originate from the ophthalmic arteries. Herein, we report a case of meningolacrimal artery aneurysm associated with a meningioma.

Case Description: A 55-year-old woman had a frontal convexity meningioma identified by brain magnetic resonance imaging during a checkup. Cerebral angiography revealed the middle meningeal artery as a feeding artery as well as the presence of an aneurysm associated with the meningolacrimal artery. Embolization of the feeding artery was performed before the removal of the meningioma. The meningioma was resected, and the aneurysm was removed with a bone flap. The patient was discharged without any complications.

Conclusion: We report a meningolacrimal artery aneurysm associated with a meningioma. Embolizing the feeding artery of the aneurysm was helpful in safely resecting the meningioma.

Keywords: Interventional radiology, Intraorbital aneurysm, Meningioma, Meningolacrimal artery

INTRODUCTION

Intraorbital aneurysms are a rare occurrence, and most of them originate from the ophthalmic artery. A standard treatment for these aneurysms is yet to be established. We report a case of a meningolacrimal artery aneurysm of the feeding artery associated with a frontal convexity meningioma. The patient has provided informed consent to publish this report.

CASE DESCRIPTION

Case presentation and imaging

A 55-year-old woman was incidentally found to have a brain tumor on brain magnetic resonance imaging (MRI) at a checkup. The tumor was considered to be a frontal convexity meningioma based on contrast-enhanced brain MRI, and tumor resection was planned after informed consent was obtained [Figure 1a-c]. Cerebral angiography was performed before the operation, and the external carotid artery angiography revealed the middle meningeal artery (MMA) as a feeding artery as well as the presence of an aneurysm [Figure 1d and e]. The diameter of the aneurysm was about 6 mm, and the aneurysm was present in the meningolacrimal artery in the orbital

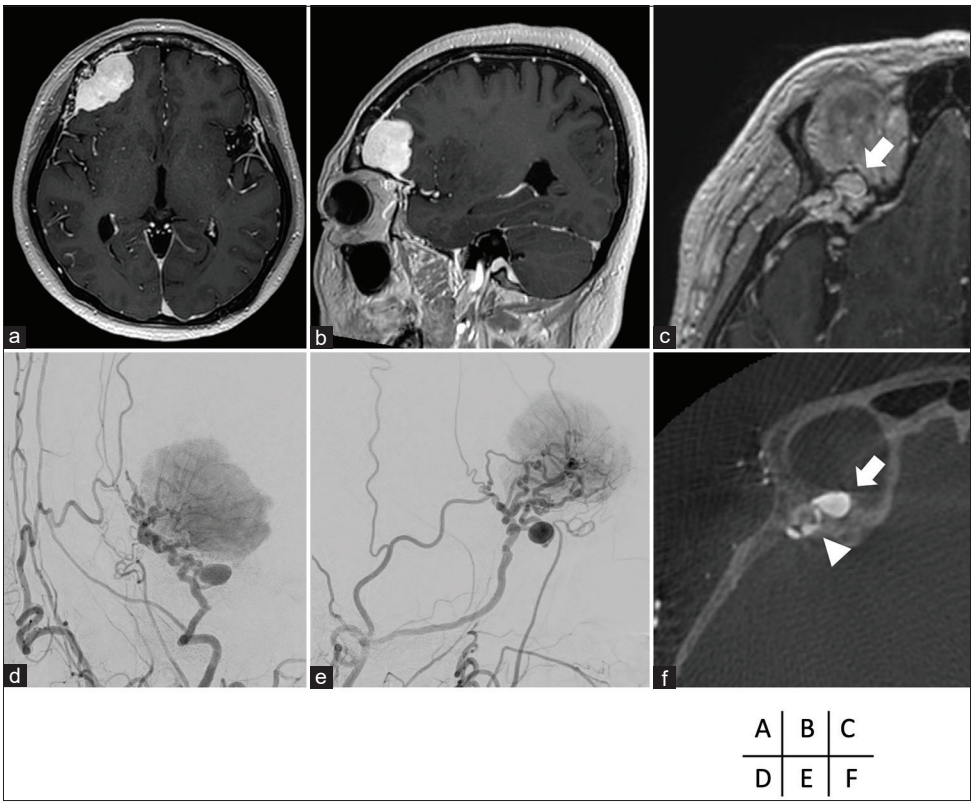

Figure 1: (a and b): T1-weighted axial (a) and sagittal (b) contrast-enhanced magnetic resonance imaging (MRI) showing a meningioma in the right convexity region, (c) T1-weighted axial contrast-enhanced MRI showing the aneurysm in the orbital cavity (white arrow), (d and e) frontal (d) and side (e) views by angiography of the right external carotid showing that the meningioma had blood flow mainly from the middle meningeal artery and the presence of a right intraorbital aneurysm, (f) axial imaging of enhanced cone-beam computed tomography showing that the aneurysm is associated with the meningolacrimal artery through the cranio-orbital foramen (white arrow head) and is present in the orbit cavity (white arrow).

cavity [Figure 1f]. The artery flow into the tumor was distal to the aneurysm.

Interventional radiology

Embolization of the feeding artery was performed before resecting the meningioma to reduce intraoperative bleeding. We normally use N-butyl-2-cyanoacrylate (NBCA) for embolization of a feeding artery. Therefore, to prevent the migration of NBCA into the ophthalmic artery, we decided to occlude the meningolacrimal artery proximal to the aneurysm before injection of NBCA. The procedure was performed under local anesthesia. A 5-Fr long sheath was placed into the right femoral artery. A 5-Fr guiding catheter (ENVOY; Johnson and Johnson, New Brunswick, NJ) was placed into the right external carotid artery, and a microcatheter (Marathon; Medtronic, Dublin, Ireland) was placed into the meningolacrimal artery using a microguidewire (CHIKAI10; Asahi Intecc, Aichi, Japan). Then, five detachable coils (ED coil; Kaneka Corporation, Tokyo, Japan) were inserted into the meningolacrimal artery [Figure 2a and b]. After that, the MMA and deep anterior artery were embolized with 20% NBCA diluted with lipiodol. Final angiography revealed a small amount of blood supplied from the superficial temporal artery [Figure 2c].

Resection of the meningioma

We performed an orbitofrontal craniotomy for resection of the meningioma [Figure 3a]. During the craniotomy, the aneurysm was removed with an orbitofrontal bone flap [Figure 3b]. However, less bleeding was observed because of the embolization of the meningolacrimal artery. Intraoperative bleeding was mild and there was no need for a blood transfusion. Postoperative MRI revealed that the meningioma (Simpson Grade 2) and the aneurysm [Figure 3c and d] were resected. There were no postoperative complications, and the patient was discharged 12 days after the operation.

DISCUSSION

Intraorbital aneurysms are rare – there are only 22 reported cases to the best of our knowledge,[1] and most

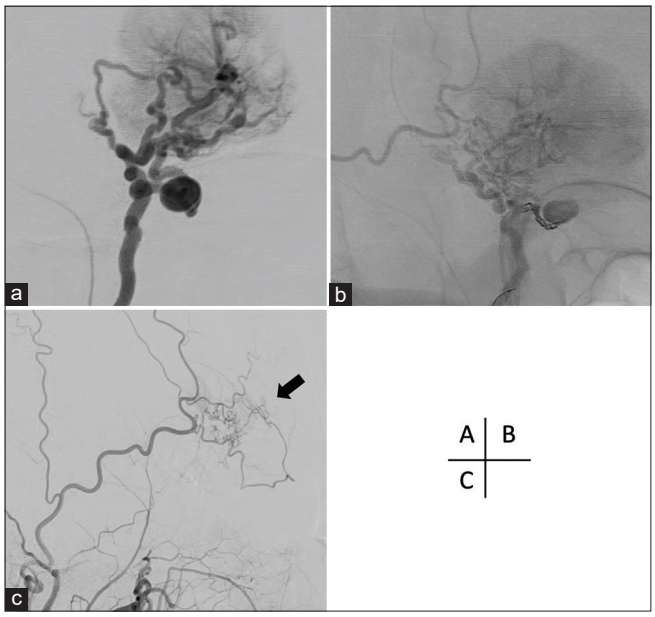

Figure 2: (a) The right external carotid angiography in the oblique view showing the blood supply for the meningioma and the aneurysm, (b) the right external carotid angiography showing insertion of coils in the meningo-lacrimal artery, (c) the right external carotid angiography after interventional radiology showing remaining blood supply from the superficial temporal artery (arrow).

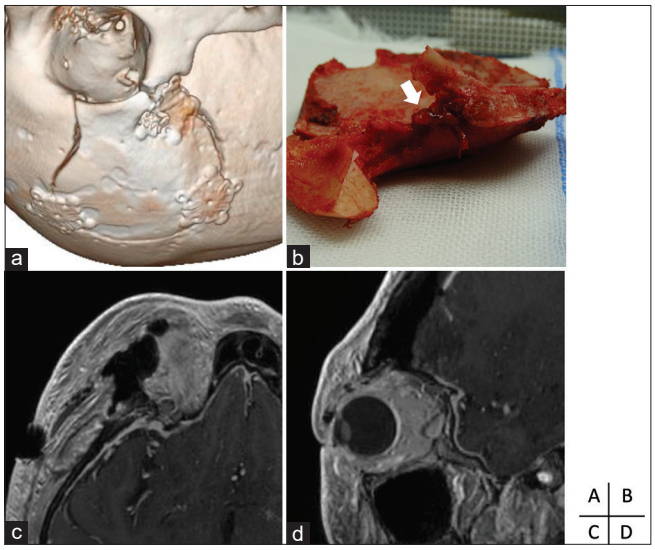

Figure 3: (a) Three-dimensional computed tomography showing right fronto-orbital craniotomy, (b) a photograph of the fronto-orbital bone flap with the aneurysm (white arrow), (c and d) T1-weighted axial (c) and sagittal (d) contrast-enhanced magnetic resonance imaging showing resection of the meningioma and aneurysm.

are associated with the ophthalmic artery. Only one case of aneurysm associated with the meningolacrimal artery has been reported previously; however, this report was of a pseudoaneurysm caused by trauma.[9] This is the first report of a meningolacrimal artery aneurysm associated with a meningioma.

The natural history of intraorbital aneurysms is unclear. There are few reports of spontaneous rupture, only two cases are reported.[5,6] One was a normal true aneurysm, and the other was an aneurysm related to a dural arteriovenous fistula; both patients had permanent blindness after the rupture, despite direct surgery and interventional radiology, respectively. Although the rupture rate of intraorbital aneurysms is unknown, it is reported that conservative management should be considered, particularly in asymptomatic cases.[1] In our case, the aneurysm was asymptomatic and located in the feeding artery of a meningioma. Tachikawa *et al*. reported a case of aneurysm associated with a meningioma, which disappeared after the removal of the tumor.[4] Therefore, we predicted that, even if the aneurysm is not treated, it would shrink after tumor resection because of a loss of blood flow. In this case, anastomoses between the meningolacrimal and ophthalmic arteries were not shown on angiography. However, considering that the arteries may have occult anastomosis, we decided to occlude the meningolacrimal artery before injecting NBCA into the MMA to prevent migration of NBCA into the ophthalmic artery. During the craniotomy, the aneurysm was removed with an orbitofrontal bone flap without massive bleeding. As a result, embolizing the meningolacrimal artery helped to reduce bleeding during the craniotomy.

The prevalence of the cooccurrence of a brain tumor and an aneurysm is about 0.3–1%.[7,8] However, the incidence of aneurysms with meningiomas was reported at 7.7%, and this rate was higher than that in controls.[2] There are various reasons why meningiomas have such high rates of aneurysms, such as changes in local blood flow due to demand for blood flow from the meningioma, the elevation of blood pressure and intracranial pressure, hormones, genetics, and direct infiltration by tumor cells. Especially in aneurysms of feeding arteries, increased blood flow was suggested as a source of hemodynamic stress on arterial walls.[2-4] In the present case, the meningolacrimal artery was the feeding artery of the meningioma, and the blood flow of the artery was increased. This could be the cause of aneurysm formation.

CONCLUSION

We report a case of a meningolacrimal artery aneurysm associated with a frontal convexity meningioma. The artery was occluded before tumor resection, and the aneurysm was removed through craniotomy. Embolizing the feeding artery with the aneurysm was helpful in safely resecting the meningioma.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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