DOI: 10.5137/1019-5149.JTN.21084-17.1
Received: 13.07.2017 / Accepted: 20.09.2017
Published Online: 30.10.2017

Case Report

Multiple Intracranial Aneurysms Concurrent with a Clinoid Meningioma: A Case Report

Xiangyang ZHOU, Zhengbin DIN, Hong LIU, Yimin LI

The First Affiliated Hospital of University of South China, Department of Neurosurgery, Hengyang, China

ABSTRACT

The coexistence of intracranial aneurysms and a meningioma is not a clinically common phenomenon. Here we present the case of a meningioma of the left anterior clinoid process concurrent with a right clinoid aneurysm and a ruptured aneurysm of the left posterior communicating artery (PcomA). Immediately after radiographically establishing a diagnosis of multiple aneurysms and to reduce the risk of rebleeding, we performed a microscopic surgery to clip the aneurysms using a left frontotemporal approach. During the surgery, an unexpected clinoid meningioma was detected and simultaneously resected. The patient tolerated the entire procedure well and reported no postoperative neurological deficits during the follow-up visit. The use of modern microsurgical techniques along with an appropriate approach ensured that the procedure remained both successful and safe.

KEYWORDS: Aneurysm, Meningioma, Subarachnoid haemorrhage

ABBREVIATIONS: PcomA: Posterior communicating artery, **SAH:** Subarachnoid haemorrhage, **aSAH:** Aneurysmal subarachnoid haemorrhage, **CT:** Computed tomography, **CTA:** Computed tomography angiography, **DSA:** Digital subtraction angiography.

INTRODUCTION

Intracranial aneurysms are primary causes of subarachnoid haemorrhage (SAH), and although they may be associated with tumor lesions, their association with an intracranial meningioma is rare. Further, the concurrent presence of multiple intracranial aneurysms and a meningioma is even more atypical, and management strategies for such complicated cases present a considerable challenge to clinicians. Here we report a case of bilateral multiple aneurysms concurrent with a clinoid meningioma. Using only a left-sided frontotemporal approach, we successfully managed to perform neck clipping of both aneurysms and achieved complete resection of the meningioma, with no postoperative neurological deficits.

CASE REPORT

A 53-year-old man was admitted to our department under emergent conditions because of a sudden onset of headache and vomiting. He had a 20-year history of hypertension, but presented with no other neurological symptom.

An immediate head computed tomography (CT) revealed an SAH, and a CT angiography (CTA) showed a posterior communicating artery (PcomA) aneurysm on the left side and a concurrent right clinoid aneurysm. Digital subtraction angiography (DSA) was used to obtain an accurate image of the aneurysms and their feeding arteries, but during the procedure, the catheter could not successfully enter the left carotid artery because of the presence of abnormal aortic arch anatomy. Therefore, angiography of the left carotid artery was cancelled to avoid cerebral vasospasm, and the right clinoid aneurysm could be clearly visualised by DSA (Figure 1A-D).

Radiographic imaging demonstrated that the left PcomA aneurysm was responsible for the SAH and that the right aneurysm remained unruptured. The CT scan also revealed high-density areas on the left side, around the suprasellar

qr code

Corresponding author: Xiangyang ZHOU
E-mail: 193767@qq.com

cistern and the Sylvian fissure. We also found bleb formation on the surface of the left-sided aneurysm, whereas the surface of the right-sided aneurysm was smooth.

To prevent rebleeding, an emergency surgery for an intracranial aneurysm was performed 6 hours after the patient was referred to our department. A left-sided frontotemporal approach was chosen to gain complete control over the ruptured aneurysm. Unexpectedly, we encountered a meningioma originating from the left medial sphenoid wing and the anterior clinoid process, approximately 1-2 cm in size, which completely covered the clinoid and PcomA segment of the left carotid artery while splitting the Sylvian fissure; this was misdiagnosed during presurgical examination. It must be noted here that the left carotid artery and the left optic nerve could be visualised only after the meningioma and the attached, coagulated dura were completely removed under the microscope. Microdissection techniques were used to expose the neck of the left PcomA aneurysm; subsequently, the neck of the aneurysm could be easily clipped, even though the aneurysm ruptured upon release of the clip. Next, the right clinoid aneurysm and its feeding carotid artery were clearly exposed through the space in front of the optic chiasm by splitting the arachnoid layer over the chiasm and the right optic nerve. Intraoperative indocyanine angiography showed no aneurysm development, and the feeding carotid artery remained clear after clipping of the right clinoid aneurysm (Figure 2A-F).

The patient tolerated the entire procedure well and reported no postoperative neurological deficits. His headaches also reduced after several days of intermittent lumbar drainage. He was discharged on postoperative day 9. Postoperative pathology clearly established the diagnosis of a concurrent meningioma (Figure 3A, B), and a follow-up CT and CTA revealed no aneurysm growth or obstruction of the feeding artery (Figure 4A-C).

■ DISCUSSION

Aneurysmal subarachnoid haemorrhage (aSAH) is clinically common, but its concurrence with a meningioma is rare. The radiological, intraoperative and pathological findings could not help in establishing a definitive etiology in this case. Some investigators have reported that the occurrence of an intracranial aneurysm is related to the presence of a brain tumor (3,5). The three main causes of aneurysms are middle layer defects, arteriosclerosis and hypertension, and in this case, both hypertension and arteriosclerosis were present. The presence of a meningioma adjacent to the left PcomA aneurysm, which had ruptured, may have increased local blood irrigation. Further, it was not clear whether the developing meningioma damaged the surface of the internal carotid artery lying next to it by applying direct mechanical pressure, by invading the vessel or by inflammatory stimulation. Clinically, aneurysms are usually ipsilateral to the meningioma and are

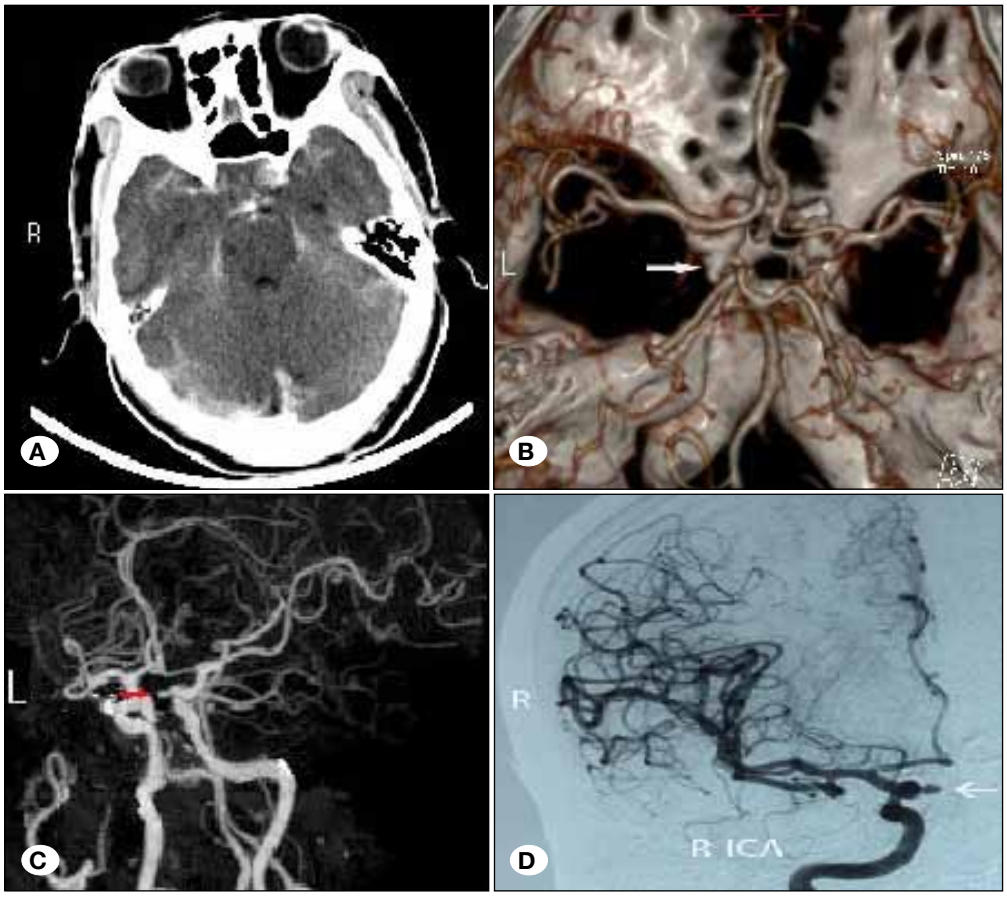

Figure 1: Axial computed tomography demonstrates an acute SAH **(A)**. Presurgical CTA revealed a left PcomA aneurysm (arrow) **(B)**; right clinoid aneurysm (arrow) **(C, D)**.

mostly adjacent or even slightly inside the tumor (2,4,8). In our case, we found that one aneurysm was adjacent to the meningioma, whereas the second was contralateral.

Presenting symptoms in patients with concurrent brain tumors and aneurysms are typically tumor-related in 69%–78% of patients, aneurysm-related in 22% and tumor- and aneurysm-related in 6% (5,7). In our case, aSAH was the only presenting symptom. Advances in neuroimaging techniques have facilitated diagnoses; however, in this case, we missed the presence of a left clinoid meningioma prior to surgery because of its tiny size (1-cm diameter) and the absence of relevant symptoms. A retrospective evaluation of the presurgical CT revealed an area of equal density in the left clinoid, which had been misread as a hematoma.

aSAH is associated with a high possibility of rebleeding, and mortality due to rebleeding of ruptured aneurysms occurs in the second instance in approximately 65% of cases and in the third instance in 85% of cases (1,6,9). Thus, earliest possible surgical intervention is recommended to prevent rebleeding. In complicated cases, such as the one described in this report, management strategies should be revaluated against the risks involved in surgery, such as the patient's ability to endure the

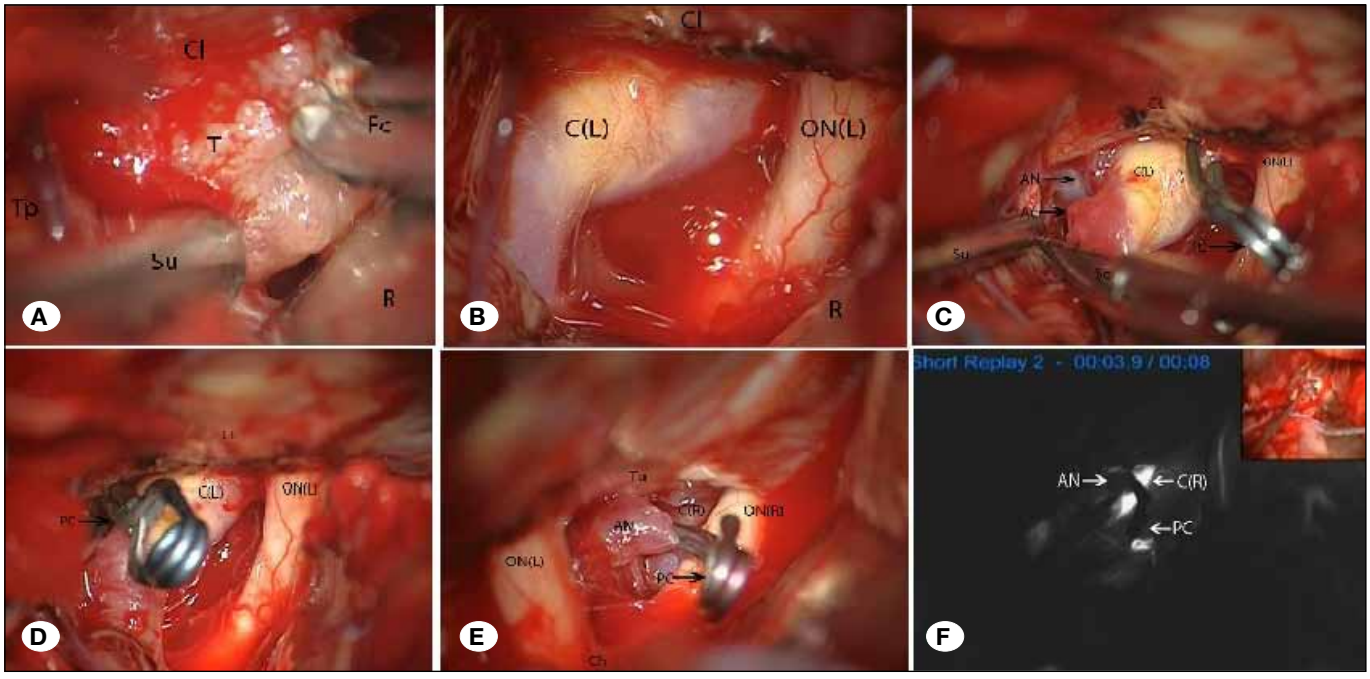

Figure 2: Intraoperative view **(A-F)**; **T:** tumor; **Cl:** clinoid; **TP:** temporal lobe; **Su:** suction; **Fc:** forceps; **R:** retractor; **C(L):** left internal carotid artery; **ON(L):** left optic nerve; **AN:** aneurysm; **Ac:** anterior choroidal artery; **TC:** temporary clip; **Sc:** scissors; **PC:** permanent clip; **Tu:** tubercle of Sella; **C(R):** right internal carotid artery; **ON(R):** right optic nerve; **Ch:** optic chiasm.

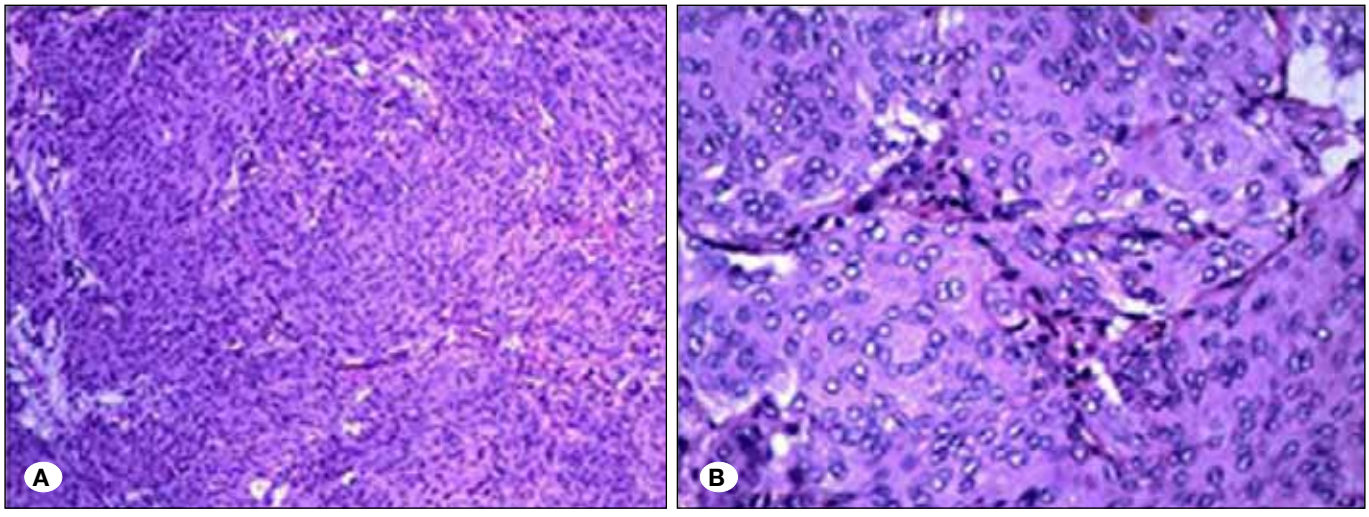

Figure 3: Specimen of the epithelioid meningioma with H&E stain. **A)** ×100 magnification; **B)** ×200 magnification.

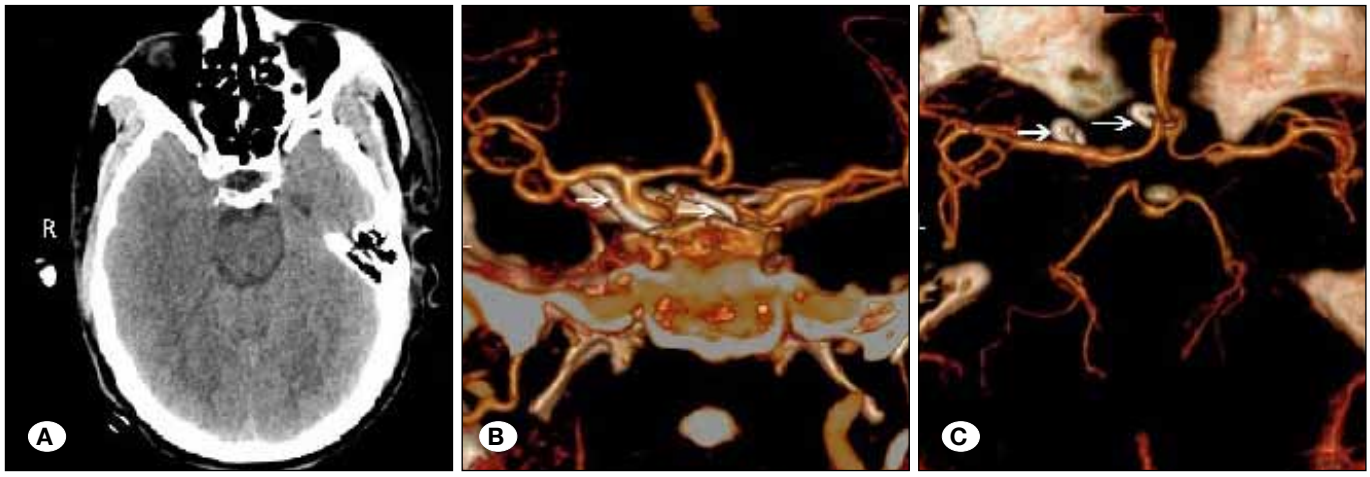

Figure 4: Postsurgical CT and CTA showed that both aneurysms had been completely obliterated; **(A, B, C)** arrow indicates the clip.

procedure and the anaesthetic, and the risks of rebleeding. Nonetheless, it is essential that ruptured aneurysms are urgently treated by surgical clipping or endovascular coiling to prevent rebleeding. When the aneurysm and meningioma are close or adjacent, they can possibly be managed together, without the need for additional surgical procedures and associated complications. However, if the aneurysm and meningioma are contralateral and cannot be managed in a single procedure, a second procedure to treat the unruptured aneurysm(s) or the meningioma is recommended, but only after the ruptured aneurysm has sufficiently healed. In our case, even though the ruptured aneurysm and the other unruptured aneurysm were contralateral, the unruptured clinoid aneurysm had protruded into the optic chiasm, as revealed by presurgical DSA, and the medial sphenoidal meningioma also happened to be on the left side. Therefore, we successfully managed all pathologies in a single procedure using a left frontotemporal approach.

CONCLUSION

Although unsuspected concurrent lesions in the brain are rare, it does warrant a high index of suspicion from the surgeon so that they are not missed during the presurgical assessment. Extensive neuroimaging should be performed to appropriately evaluate feeding arteries and aneurysms in all patients suspected of having aSAH. These measures are important not only for evaluation but also for facilitating detailed and accurate planning of surgical procedures. Modern microsurgical skills combined with an appropriate approach make the treatment of such complicated cases both successful and safe.

REFERENCES

1. Alvord EC Jr, Loeser JD, Bailey WL, Copass MK: Subarachnoid hemorrhage due to ruptured aneurysms: A simple method of estimating prognosis. Arch Neurol 27(4):273–284, 1972
2. Javadpour M, Khan AD, Jenkinson MD, Foy PM, Nahser HC: Cerebral aneurysm associated with an intracranial tumor: Staged endovascular and surgical treatment in two cases. Br J Neurosurg 18(3):280–284, 2004
3. Javalkar V, Guthikonda B, Vannemreddy P, Nanda A: Association of meningioma and intracranial aneurysm: Report of five cases and review of literature. Neurol India 57(6):772–776, 2009
4. Kandel E, Ludkovskaya I, Dobjansky N: Aneurysm inside meningioma. Case Report. Acta Neurochir (Wien) 81(1-2):72–76, 1986
5. Pia HW, Obrador S, Martin JG: Association of brain tumours and arterial intracranial aneurysms. Acta Neurochir (Wien) 27(3):189–204, 1972
6. Rosenorn J, Eskesen V, Schmidt K, Ronde F: The risk of rebleeding from ruptured intracranial aneurysms. J Neurosurg 67(3):329–332, 1987
7. Scamoni C, Dorizzi A, Dario A, Marra A, Pozzi M: Intracranial meningioma associated with cerebral artery aneurysm. Report of two cases and review of the literature. J Neurosurg Sci 41(3):273–281, 1997
8. Tancioni F, Egitto MG, Tartara F: Aneurysm occurring within a meningioma: Case report. Br J Neurosurg 12(6):588–591, 1998
9. Winn HR, Richardson AE, Jane JA: The long-term prognosis in untreated cerebral aneurysms: I. The incidence of late hemorrhage in cerebral aneurysm: A 10-year evaluation of 364 patients. Ann Neurol 1(4):358-370, 1977