Nepal Journal of Neurosciences 16:50-53, 2019

Clinoidal Meningioma associated with an Anterior communicating Artery Aneurysm : Case Report

Rajan Kumar Sharma
MS MCh Resident

Rajeev Jha
MBBS, MS, MCh Professor

Prakash Bista
MBBS, MS, MCh Professor

Address for correspondence:
Dr. Rajan Kumar Sharma, MS MCH resident
Department of Neurosurgery
National Academy of Medical Sciences
Kathmandu, Nepal.

Date submitted : 01 May 2019
Date accepted : 30 August 2019

Coexistence of primary brain neoplasms with intracranial aneurysms is rare but presents a diagnostic and therapeutic challenge to healthcare providers. We describe the case of a 46-year-old lady who had an anterior communicating aneurysm with a small left clinoidal meningioma. The meningioma was an unexpected finding encountered during the surgery for aneurysmal clipping. Both the lesions were dealt with simultaneously.

Key Words: Clinoidal Meningioma, Anterior Communicating Aneurysm (ACoM), Anterior Cerebral Artery (ACA).

Coexistence of primary brain neoplasm's with intracranial aneurysms is rare,[4] but is becoming increasingly recognised.[10] This presents a diagnostic and therapeutic challenge to the healthcare provider. This coexistence is mostly brought to attention when the patient presents with brain tumor as the primary issue, or as an incidental finding on brain scans [10]

Although aneurysm may coexist with different types of brain tumors as pituitary adenoma, glioma, lipoma or metastatic tumor, brain tumor which is most commonly associated with an aneurysm is meningioma.[5] This coexistence is a diagnostic challenge, but also a therapeutic one as no consensus has been reached.

Case Report

We present the case of a patient with subarachnoid hemorrhage secondary to Anterior communicating aneurysm (ACoM). During surgery for clipping the aneurysm, we encountered left clinoidal meningioma. We dealt with both pathologies in the same setting. No previously reported case of a clinoidal meningioma associated with an ACoM aneurysm was found on review of the literature. A 46-year-old lady visited the emergency room of the National Trauma Centre, Kathmandu with alleged history of fall from tree following which she sustained injury overhead. Patient had history of loss of

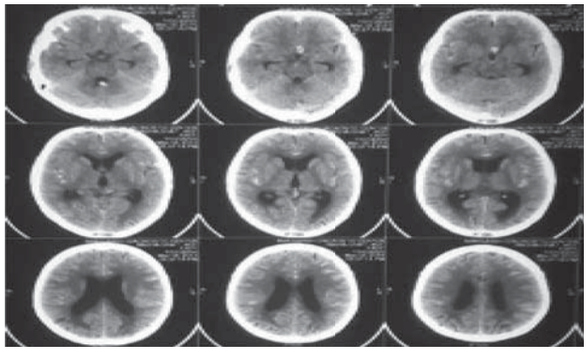

Figure 1: CT of the brain revealed subarachnoid haemorrhage in the bilateral sylvian fissures and sulci of bilateral fronto temporo parietal region.

consciousness for one hour and had severe headache and blurring of vision later. On examination, the patient was drowsy but reacted to verbal stimulus. No cranial nerve or motor deficit was found on neurological examination. Patient had mild nuchal rigidity. The patient was graded Hunt and Hess grade II and World Federation of Neurosurgical Societies grade II. CT of the brain revealed subarachnoid hemorrhage in the bilateral sylvian fissures and sulci of bilateral fronto temporo parietal region with Fischer grade II (Figure 1). CT angiography of brain was done which revealed anteriorly directed saccular aneurysm seen arising from ACoM measuring 6*5*6 mm and its neck measured 2.5mm (Figure 2). It also revealed hypoplastic right A1 and right fetal Posterior cerebral artery (PCA).

The patient was admitted in the high-dependency unit for neuromonitoring and was started on nimodipine. After explanation of risks and benefits, a craniotomy for clipping of aneurysm was planned. A left pterional approach was made. After performing a C-shape durotomy, the sylvian fissure was opened. Unexpectedly, a well circumscribed lesion was found, which was seen to be arising from the left anterior clinoid process and directed posteriorly and superiorly. The mass can be seen (Figure 3), which is an intraoperative finding of the unexpected lesion. A Grade II Simpson resection was performed for the lesion. After removal of the lesion, the ICA was identified and followed proximally. The ipsilateral anterior cerebral artery were identified. A saccular medium-sized aneurysm was seen originating from ACoM directed superiorly. A titanium clip was applied to secure the aneurysm. Post clipping distal and proximal flow was confirmed with the fluoroscopy. The post clipping shows the surgical clip in place. The patient was extubated and had postoperative management in a high-dependency unit.

Postoperatively, the patient did not develop any evidence of clinical vasospasm. Post-operative angiogram

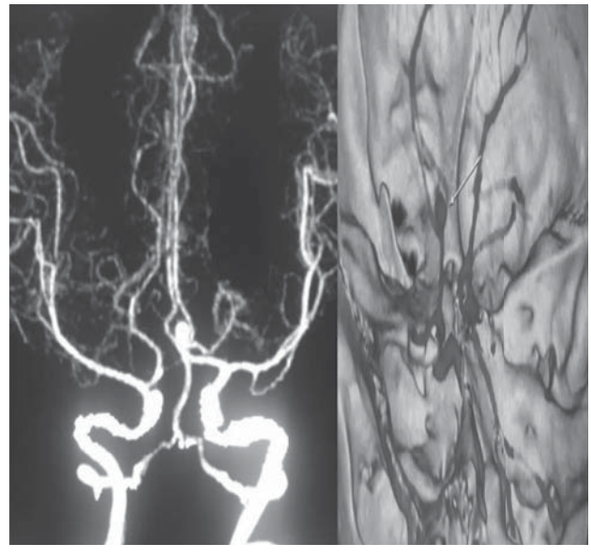

*Figure 2: CT ANGIOGRAPHY OF BRAIN: Anteriorly directed saccular aneurysm seen arising from ACoM measuring 6*5*6 mm and its neck measured 2.5mm. It also revealed hypoplastic right A1 and right fetal Posterior cerebral artery (PCA).*

showed complete occlusion of the aneurysm. No new neurological deficit was seen and the patient was discharged home after 1 week. Histopathology of the mass revealed transitional meningioma (WHO Grade I). At 3 months after discharge, the patient is doing well and remains symptom free.

DISCUSSION

The incidence of intracranial aneurysms coexisting with brain tumors has been estimated to be approximately 1%.[4,7] They are generally thought to occur more frequently in pituitary adenomas.[7] This is the first case describing the association of left-sided clinoidal meningioma with an ACoM aneurysm.

In their review on the coexistence of primary brain tumors with aneurysms, Zhong et al have reported 18 cases of ICA aneurysms associated with meningiomas. In all reported cases, the coexistence of these pathologies was brought to notice while dealing with the tumour or was found on brain scans.[10]

In our case, the patient had subarachnoid haemorrhage and aneurysm, and the presence of meningioma was only intraoperatively appreciated. Only one case presenting in this manner has been reported in the literature. That patient had a small clinoidal meningioma found intraoperatively while managing a ruptured ophthalmic artery aneurysm.[2]

Zhong et al have discussed a total of 108 cases of brain tumors coexisting with aneurysms in a recent review.[10]

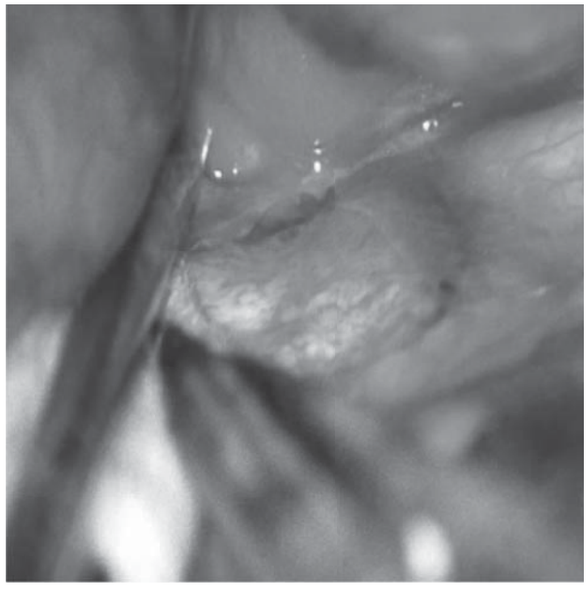

Figure 3: The mass can be seen which is an intraoperative finding of the unexpected lesion.

In 38% of cases, both the lesions were dealt with in the same setting. Out of a total of 18 cases of meningiomas and concurrent ICA aneurysms, both pathologies were addressed in the same setting on 5 occasions. Only the tumor was resected in six cases and aneurysm clipping/ embolisation was performed only in five cases. In one patient, the tumour was excised first and the aneurysm was addressed in a second procedure. No intervention was carried out in one patient. Proximal spatial relationship of the tumor and aneurysm is the most important factor in deciding the treatment strategy. If the tumor is primary and proximal to the aneurysm, then simultaneous resection and clipping has been proposed as the best management option.[10] Javalkar et a have described a similar case of a ruptured aneurysm and a proximal meningioma found intraoperatively.[4] They also performed simultaneous clipping and resection in the same setting. Pia et al proposed that increased blood flow to meningiomas leads to the formation of aneurysms.[5] Direct erosion of feeding arteries and a dysgenetic factor produced by the tumor promoting aneurysm formation have also been discussed as possible mechanisms to explain the incidence of meningiomas associated with aneurysms.[4,6]

The most frequent tumor associated with aneurysms is meningioma.[5] In most cases, the tumor was located at the skull base, and the majority of aneurysm was detected at the internal carotid artery (ICA) and the middle cerebral artery (MCA). There have been several speculative hypotheses that have tried to explain the relationship between tumors and aneurysms. As these aneurysms used to be related to the arteries that supplies the tumor and they were found in the same hemisphere, one if the etiological factors postulated is the increased in cerebral regional blood flow. This hypothesis is supported by Tachikawa et al. who reported a case of a concomitant aneurysms located on a tumor feeding artery which disappeared after tumor removal.[9] However, this theory cannot explain the occurrence in different hemispheres, which seems to be coincidence. A hormonal influence, like growth factors, has been suggested in association with pituitary adenomas. Also, the association between estrogen and both meningioma and aneurysms have been reported.[8] Inflammatory response and meningioma adhesions can also damage the arterial wall causing aneurysms.[1] Furthermore, some mutations were found for both pathologies which show that some gene expression could be involved in development of both aneurysms and meningioma. Treatment options of both pathologies have changed, and microsurgical and endovascular techniques has reduced patient's risk. [3] If the aneurysm occurs adjacent to the tumor, the first step is its occlusion and then tumor resection. If the aneurysm occurs in the other hemisphere, some authors recommend treating first the pathology that causes the symptoms.[3]

The meningioma in our case was small, lacked high vascularity and was upstream of the aneurysm. Thus, in cases such as this, the hypothesis that increased blood flow to meningiomas or direct erosion of vessels is the cause of ipsilateral intracranial aneurysms does not stand firm.

However, the number of cases is so small that definitive conclusions cannot be drawn. Any unexpected pathology while dealing with one of the more demanding surgeries is highly undesired. This case emphasizes the need of a high index of suspicion when reviewing preoperative scans, especially when dealing with an obvious pathology. While it has been suggested to obtain a preoperative MR angiography in patients with brain tumors, to rule out aneurysms,[7] the value of a close review of preoperative radiology cannot be underestimated to avoid unexpected lesions in patients presenting with haemorrhage and aneurysms, such as the case presented above.

REFERENCES:

1. Alnaami I. Meningioma with intra-tumoural haemorrhage secondary to ruptured distal anterior cerebral artery aneurysm. **Open Neuroimag J7:**32-34, 2013.
2. Bloomgarden G, Byrne T, Spencer D. Meningioma associated with aneurysm and subarachnoid hemorrhage: case report and review of the literature. **Neurosurgery20:**24–6, 1987.

3. Fischer BR, Palkovic S, Holling M, Niederstadt T, Jeibmann A, Wassmann H: Coexistence of cerebral aneurysm and meningioma-pure accident? **Clin Neurol Neurosurg 111(8):**647-654, 2009.
4. Javalkar V, Guthikonda B, Vannemreddy P. Association of meningioma and intracranial aneurysm: report of five cases and review of literature. **Neurol India 57:**772–6, 2009.
5. Paraskevopoulos D, Magras I, Balogiannis I, Polyzoidis K. Anterior clinoidal meningioma coincidental with bilateral intracranial aneurysms. **Hippokratia 15 (4):**353-355, 2011.
6. Pia H, Obrador S, Martin J. Association of brain tumors and arterial intracranial aneurysms. **Acta Neurochir (Wien) 27:**189–204, 1972.
7. Suslu H, Bozbuga M. Primary brain tumors associated with cerebral aneurysm: report of three cases. **Turk Neurosurg 21:**216–21, 2010.
8. Takai K, Nishihara T, Nemoto S, Ueki K, Miyauchi H, Mishima K, et al: Multilocular cystic lesion associated with a giant aneurysm. **J Neurosurg 95 (6):**1081, 2001.
9. Tachikawa T, Adachi J, Nishikawa R, Matsutani M. An anterior ethmoidal artery aneurysm associated with an olfactory groove meningioma. Case illustration. **J Neurosurg 97 (6):**1479, 2002.
10. Zhong Z, Sun Y, Lin D. Surgical treatment of brain tumor coexisted with intracranial aneurysm-case series and review of the literature. **Neurosurg Rev 36:**645–56, 2013.