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Clinoidal meningioma associated with an internal carotid artery aneurysm

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**Clinoidal Meningioma associated with an Internal Carotid Artery Aneurysm**

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| SUMMARY       | 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 60 year old female patient who had a left internal carotid artery aneurysm with a small ipsilateral clinoidal meningioma. The meningioma was an unexpected finding encountered during the surgery for aneurysmal clipping. Both the lesions were dealt with simultaneously. |

| BACKGROUND    | Coexistence of primary brain neoplasms with intracranial aneurysms is rare [1] but is becoming increasingly recognized.[2] This presents a diagnostic and therapeutic challenge to the healthcare provider. This coexistence is mostly brought to attention when the patient presents with the brain tumor as the primary issue, or as an incidental finding on brain scans.[2] We present the case of a patient with subarachnoid haemorrhage secondary to left sided internal carotid artery (ICA) aneurysm. During surgery for clipping the aneurysm we encountered an ipsilateral clinoidal meningioma. We dealt with both pathologies in the same setting. No previously reported case of a clinoidal meningioma associated with an ICA aneurysm was found on review of literature. |

| CASE PRESENTATION | A 60 year old lady visited the emergency room of the Aga Khan University Hospital Karachi. She was drowsy and was unable to open her left eye. She woke up with these symptoms 10 days before presenting in the emergency room. She had no comorbidities apart from controlled hypertension. Her family reported that the patient had not experienced any such symptoms in the past and had no history of seizures, fever or unresponsiveness. Her family history was unremarkable for any neurological issues. On examination, she was drowsy but was arousable to verbal stimulus. She was following commands and was oriented to time, place and person. Left oculomotor palsy with complete ptosis and fixed dilated pupil was noted on ophthalmic examination. Both direct and consensual pupillary reflexes were absent in the left eye. No other cranial nerve or motor deficit was found on neurological examination. She was graded Hunt and Hess grade II and WFNS grade II. CT scan brain revealed subarachnoid haemorrhage in the peri-mesencephalic region with Fischer grade II. |

| INVESTIGATIONS | |

| DIFFERENTIAL DIAGNOSIS | |

| TREATMENT | |
The patient was admitted in the high dependency unit for neuro monitoring and was started on Nimodipine. After explanation of risks and benefits, a craniotomy for clipping of aneurysm was planned. Left pterional approach was made. After performing a C shape durotomy, the sylvian fissure was opened, followed by frontal lobe retraction to localize the olfactory nerve. Unexpectedly, a well circumscribed lesion was found, which was seen to be arising from the anterior clinoid process and directed posteriorly and superiorly. The lesion was not involving the ICA. The mass can be seen in Fig-1, which is an intraoperative photograph of the unexpected lesion. A Grade II Simpson resection was done for the lesion. This helped in achieving proximal control, before proceeding to the aneurysm clipping. After removal of the lesion, the ICA was identified and followed distally. The posterior communicating artery and oculomotor nerve were identified. A bi-lobed medium size aneurysm was seen originating from ICA distal to Posterior communicating artery origin directed inferolaterally. A titanium clip was applied to secure the aneurysm. Post clipping distal and proximal flow was confirmed with the help of doppler ultrasound. The post clipping angiogram, [Fig-2] shows the surgical clip in place. She was ex-tubated and had post-operative management in a high dependency unit.

OUTCOME AND FOLLOW-UP

Post operatively, the patient did not develop any evidence of clinical vasospasm although angiographic vasospasm was identified in the ICA and its branches. CT scan showed complete excision of the lesion with no residual abnormalities. A closer review of the pre-operative scans showed a small lesion involving the left clinoid, most likely representing a meningioma. [Fig-3] A post-operative scan revealed absence of the same lesion, suggesting complete excision. [Fig-4] Postoperative angiogram showed complete occlusion of the aneurysm. No new neurological deficit was seen and she was discharged home after one week. At three 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%. [1,3] They are generally thought to occur more frequently in pituitary adenomas.[3]

This is the first case describing the association of left sided clinoidal meningioma with an ipsilateral ICA aneurysm. In their review on the coexistence of primary brain tumors with aneurysms, Zhong et al [2] 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 tumor or was found on brain scans. In our case, the patient had subarachnoid hemorrhage and aneurysm, and the presence of meningioma was only intraoperatively appreciated. Only one case presenting in this manner has been reported in literature. That patient had a small clinoidal meningioma found intra-operatively while managing a ruptured ophthalmic artery aneurysm.[4]

Zhong et al [2] have discussed a total of 108 cases of brain tumors coexisting with aneurysms in a recent review. 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 6 cases and aneurysm clipping/embolization only was done in 5 cases. In one patient, tumor was excised first and the aneurysm was addressed in a second procedure. No intervention was done 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. [2] Javalkar et al [1] have described a similar case of a ruptured aneurysm and a proximal meningioma found intraoperatively. They also performed simultaneous clipping and resection in the same setting.
Pia et al[5] proposed that increased blood flow to meningiomas leads to the formation of aneurysms. Direct erosion of feeding arteries [1] and a dysgenetic factor produced by the tumor promoting aneurysm formation [5] have also been discussed as possible mechanisms to explain the incidence of meningiomas associated with aneurysms. The meningioma in our case was small, lacked high vascularity and was upstream of the aneurysm. Thus, in cases like this one, 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. It is not uncommon that physicians tend to focus on the obvious pathology, and thus may miss the less obvious abnormalities on preoperative scans. We could have prevented this unwanted surprise by having a high clinical suspicion of a co-existing pathology before planning the surgery. While it has been suggested to obtain a preoperative magnetic resonance angiography in patients with brain tumors to rule out aneurysms[3], the value of a close review of preoperative radiology cannot be underestimated to avoid unexpected lesions in patients presenting with hemorrhage and aneurysms such as the case presented above.

**LEARNING POINTS/TAKE HOME MESSAGES**

- A detailed analysis of preoperative imaging can help in the detection of coexisting intracranial pathologies. Subtle and inconspicuous findings of coexisting pathologies are likely to be missed when dealing with an obvious lesion.
- Although the incidence of unsuspected coexisting lesions in the brain is rare, it does warrant a higher index of suspicion from the surgeon so that they are not missed preoperatively.
- The current hypothesis of increased vascularity and tumor erosion into arteries causing ipsilateral intracranial aneurysms fails to explain this coexistence in all cases.
- A patient and meticulous approach in such cases, with simultaneous clipping of the aneurysm and resection of the neoplasm can achieve optimal results for the patient.
REFERENCES


FIGURE/VIDEO CAPTIONS

Fig-1. Intraoperative photograph showing resection of a well-defined lesion adjacent to anterior clinoid.

Fig-2 Shows the post clipping angiogram. The arrow points out the surgical clip in place

Fig-3 Shows a small isodense to hypodense lesion involving middle region of left clinoid. CSF sleeve around lesion & demaracation between lesion and normal parenchyma are suggestive of an extra-axial lesion, most likely meningioma.

Fig-4 Shows postsurgical changes and absence of that left clinoid lesion showed in Fig-1, suggestive of complete excision of lesion.

PATIENT’S PERSPECTIVE Optional but encouraged

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Fig-1. Intraoperative photograph showing resection of a well-defined lesion adjacent to anterior clinoid.
90x50mm (300 x 300 DPI)
Fig-2 Shows the post clipping angiogram. The arrow points out the surgical clip in place.
Fig-3 Shows a small isodense to hypodense lesion involving middle region of left clinoid. CSF sleeve around lesion & demarcation between lesion and normal parenchyma are suggestive of an extra-axial lesion, most likely meningioma.

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Fig-4 Shows postsurgical changes and absence of that left clinoid lesion showed in Fig-1, suggestive of complete excision of lesion.
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