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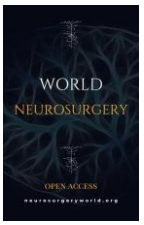

Case Report and Review of the Literature

Incidental Finding of an Intra-tumoral AcommA Aneurysm During Resection of a Suprasellar Extending Craniopharyngioma: Case Report and Literature Review

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ABSTRACT

The coexistence of intracranial tumors and aneurysms is very rare but possible. Several reports and case series have reported the presence of tumors such as meningiomas and adenomas in associated aneurysms next the primary lesion. Intra-tumoral aneurysm is an even rarer finding, with a reported incidence as low as 0.3-0.7% in association with meningiomas. Craniopharyngiomas are benign tumors originating from remnants of Rathke's pouch with a high "invasive" capacity to surrounding neurovascular structures. We present a 61-year-old female patient with a history of suprasellar craniopharyngioma (SAMI 3, extension to the lower half of the third ventricle) transcranial resection 20 years ago. During follow-up, she reported headache worsening and subjective decline in residual right eye visual function. In this case, the aneurysm was located within the craniopharyngioma, projecting superiorly from the AcommA complex. Careful microvascular dissection and clipping of the aneurysm was performed prior to further tumor resection to prevent potential rupture and associated complications. This case report remarks on the importance of considering the possible association between certain types of tumors and aneurysm presence to implement a correct surgical strategy and to be aware of the possible complications related to this pathology.

1. Introduction

The coexistence of intracranial tumors and aneurysms is very rare but possible. Several reports and case series have reported the presence of tumors such as meningiomas and adenomas in associated aneurysms next the primary lesion [1-4]. Although it is not known to date whether there is a causal relationship between both pathologies, it is hypothesized that local and regional inflammatory tumoral process and hemodynamic changes affect the regional vasculature leading to the aneurysm formation [5].

Intra-tumoral aneurysm is an even rarer finding, with a reported incidence as low as 0.3-0.7% in association with meningiomas [3].

Anterior communicating artery (AcommA) aneurysms represent the 15-40% of intracranial aneurysm and are probably the intracranial aneurysms more prone to rupture, finding them in only <15% as unruptured [6-9].

Craniopharyngiomas are benign tumors originating from remnants of Rathke's pouch with a high "invasive" capacity to surrounding neurovascular structures. Although these tumors are predominant in the pediatric population, their management represents a challenge due to the technical surgical difficulty and the associated pre- and postoperative morbidity in these patients [10].

This case report describes a patient with a suprasellar recurrent craniopharyngiomas and the incidental finding of an intra-tumoral AcommA aneurysm.

2. Case Presentation

We present a 61-year-old female patient with a history of suprasellar craniopharyngioma (SAMI 3, extension to the lower half of the third ventricle) transcranial resection 20 years ago. During follow-up, she reported headache worsening and subjective decline in residual right eye visual function.

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On examination, she was alert and oriented; of talmologic examination reported movement and light detection with right eye, preserving superior nasal quadrant during campimetry; left eye was reported with amaurosis. The rest of the neurological examination was unremarkable. The patient had hypopituitarism managed with hormone replacement therapy by neuroendocrinology department.

MRI with contrast confirmed tumor recurrence finding a predominantly suprasellar solid tumor significantly shifting upwards the third ventricle with anteriorly extension to the basal frontal gyrus in the anterior cranial fossa and a lateral cystic component (Figure 1). Surgical transcranial resection was decided.

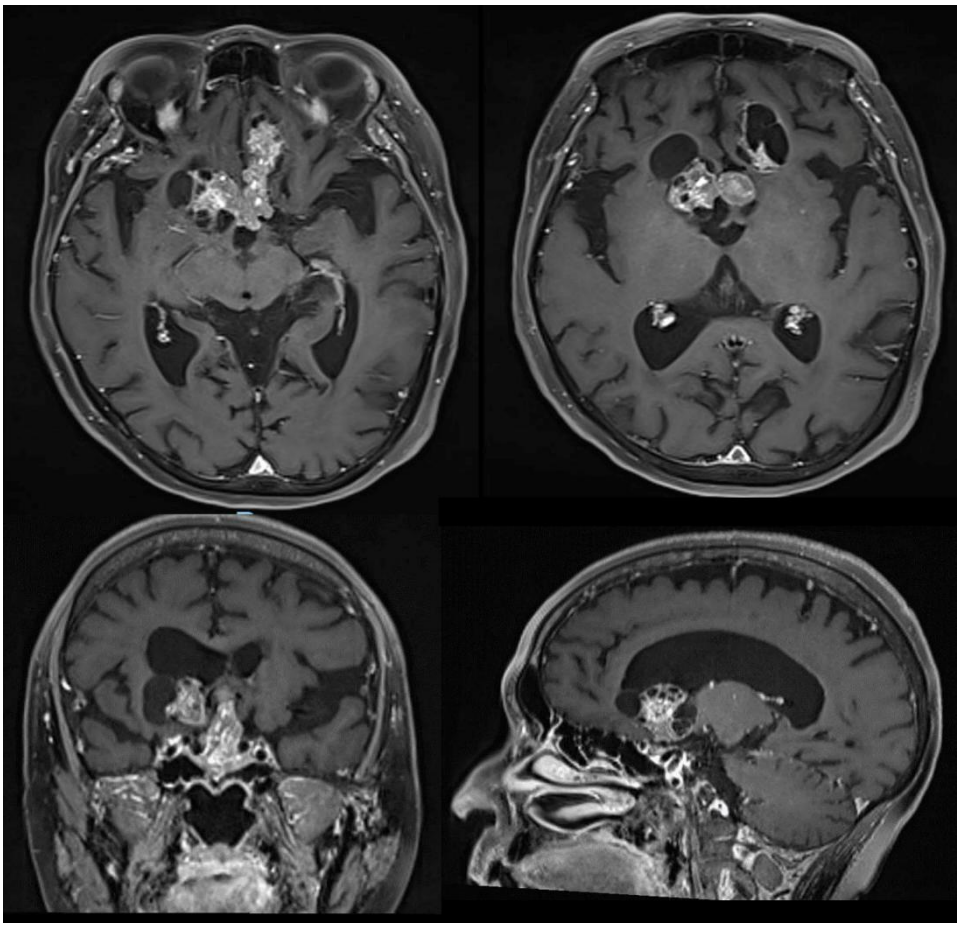

Fig. 1. MRI C+, representative axial, coronal and sagittal images. A suprasellar solid predominantly tumor is seen with anterior extension basal frontal gyrus and a right-lateral cystic component.

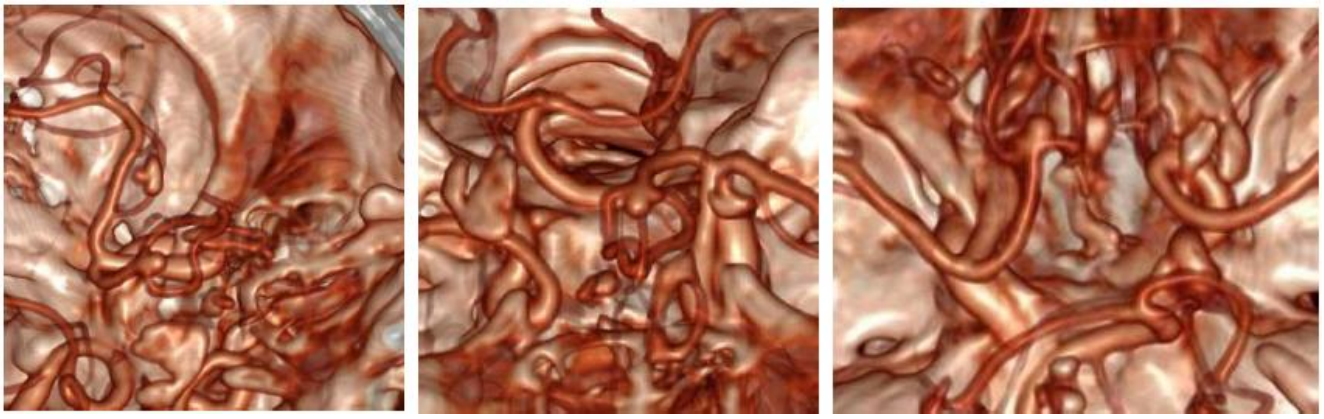

Fig. 2. Representative angioCT images showing a sacular 3 mm ventral anterior complex artery aneurism.

During surgery, the patient was placed in supine position with a neutral position of the head. A three-point fixation system and neuro-navigation system (BrainLab) were used. A bicoronal incision with bifrontal craniectomy were performed, using a subfrontal corridor for the tumor resection. Conventional microsurgery techniques were applied for initial tumor resection in its frontal extension; further dissection was carried out following anatomic landmarks until finding the arterial anterior communicating complex and the optic nerves surrounded by tumor. Careful dissection was then performed for the liberation of the optic apparatus continuing with the tumor resection between the quiasma and the AcommA (Figure 2). During this step a superior projection AcommA aneurysm was identified inside the solid central part of the tumor (video/imagen). After delimitation simultaneous tumor resection and dissection of the aneurysm was performed in order to clip it. After complete liberation of the aneurysm a 5 mm fenestrated clip was located in the neck of the lesion corroborating afterwards its complete occlusion using fluorescein. Haemostasis was confirmed, and closure was performed conventionally (Figure 3).

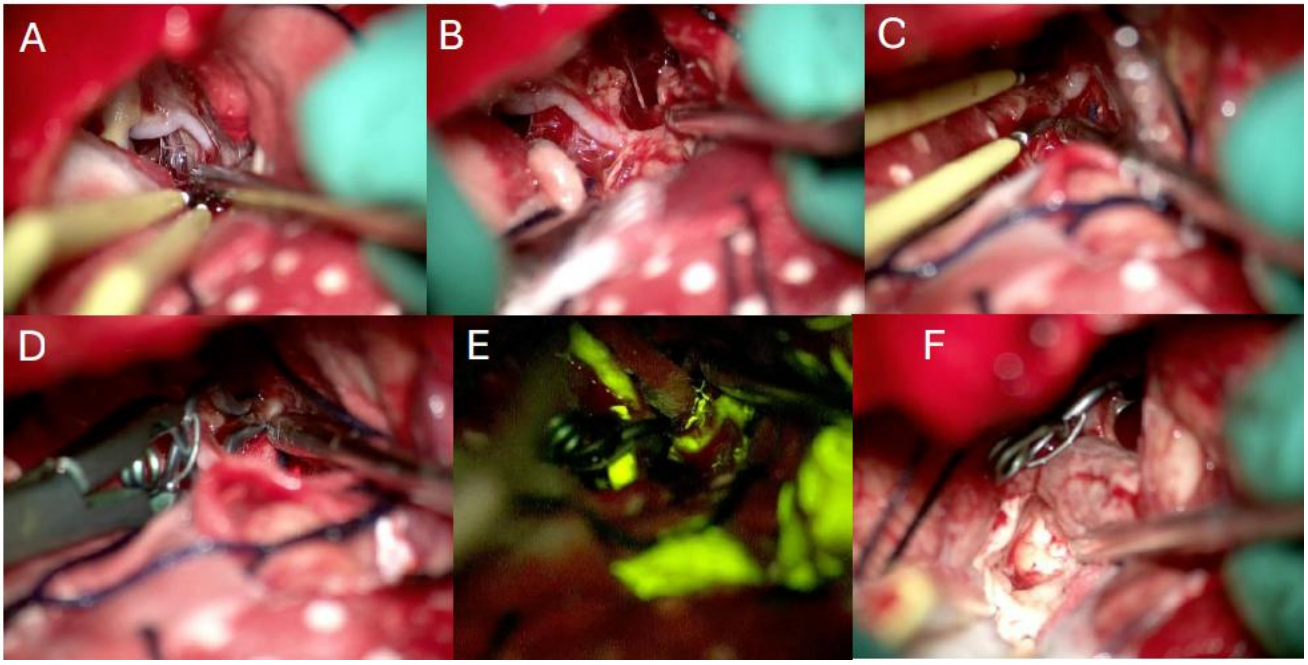

Fig. 3. A) Cisternal disection for vascular proximal control. **B)** Tumor wrapping the anterior cerebral artery. **C)** Aneurism bipolar electrocoagulation remodulation. **D)** 5 mm fenestrated clipping. **E)** Circulation permeability verification with fluorescein filter. **F)** Final resection and hemostasis.

3. Discussion and Literature Review

This case report describes an adult patient with a recurrent craniopharyngioma in which an incidental AcommA aneurysm was found during surgical resection. The development of intra-tumoral aneurysms has been reported in various neoplasms, including meningiomas, pituitary adenomas, and craniopharyngiomas [11]. However, their occurrence in craniopharyngiomas is relatively rare, with an incidence estimated between 0.3-0.7%, likely due to the tumor's necrotic and cystic characteristics [12].

The precise mechanism linking tumor growth to aneurysm formation remains unclear, but several hypotheses have been proposed. Inflammation and oxidative stress produced by tumor secretion of cytokines like IL-6 may weaken vessel walls and contribute to aneurysm development [13]. Additionally, the mass effect of the tumor and its vascular supply may induce hemodynamic changes leading to aneurysm formation.

Qian *et al.* reported a case of a 41-year-old male with a craniopharyngioma, in whom an incidental blister-like aneurysm was found in the anterior communicating artery. In that case, an "8" type suture technique was performed, achieving total obliteration. The authors highlighted the possibility of a synergistic effect between the tumor and aneurysm formation, where cystic fluid may have leaked into the subarachnoid space, precipitating an inflammatory process and resulting in vascular wall remodelling and weakening [5].

In this case, the aneurysm was identified and clipped without incident, allowing for successful gross total resection of the recurrent craniopharyngioma. The presence of an intra-tumoral aneurysm poses additional challenges during surgery, requiring careful dissection and manipulation to avoid intraoperative rupture [14]. Preoperative imaging and meticulous surgical planning are crucial to identify and address vascular anomalies in patients with sellar and suprasellar lesions.

In this case, the aneurysm was located within the craniopharyngioma, projecting superiorly from the AcommA complex. Careful microvascular dissection and clipping of the aneurysm was performed prior to further tumor resection to prevent potential rupture and associated complications. While intra-tumoral aneurysms are rare in craniopharyngiomas, their recognition is crucial, as they may carry

significant risk of rupture and hemorrhage during surgical manipulation. Meticulous microvascular techniques, including temporary clipping, may be necessary to safely resect the tumor and associated vascular pathology.

4. Conclusion

This case report remarks on the importance of considering the possible association between certain types of tumors and aneurysm presence to implement a correct surgical strategy and to be aware of the possible complications related to this pathology. Nowadays there is a lack of information about the pathophysiological association of these entities, therefore, future studies and reports are necessary to objectively establish this relation and to generate a deeper understanding of the vascular changes associated with the "tumor environment".

Conflicts of Interest

None.

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