Associated intracranial lesions: meningioma and anterior communicating aneurysm

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Abstract: Asymptomatic associated intracranial lesions are more frequently diagnosed with the utilization of high-resolution imaging. The occurrence of brain tumors together with intracranial aneurysms are a very rare situation. This coexistence is still a diagnostic and therapeutic challenge as no consensus concerning imaging that may cover both type of intracranial lesion was established. We report a case of a 62 years old patient with a meningioma and aneurysm treated in one session with good outcome.
Key words: associated intracranial lesions, aneurysm, meningioma

Introduction

The coexistence of brain tumors together with intracranial aneurysms is a relatively rarely condition but not considered as a new phenomenon. There are few case reports published in the literature documenting the association between brain tumors and aneurysms. Different types of brain tumors as pituitary adenoma, glioma, meningioma, lipoma or metastatic tumor were identified in association with intracranial aneurysm. The estimated incidence was reported between 0.3-0.7%. However, intracranial meningioma was found to be the most common tumor entity associated with intracranial aneurysm. The aim of this article is to present our treatment strategies in these particular cases and to identify possible explanations of this coexistence (1, 3, 5, 7).

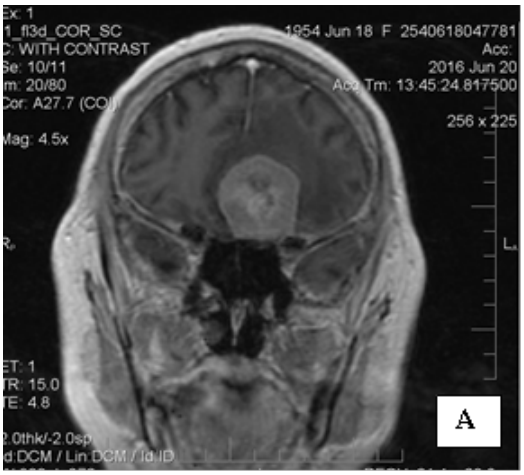
Case report

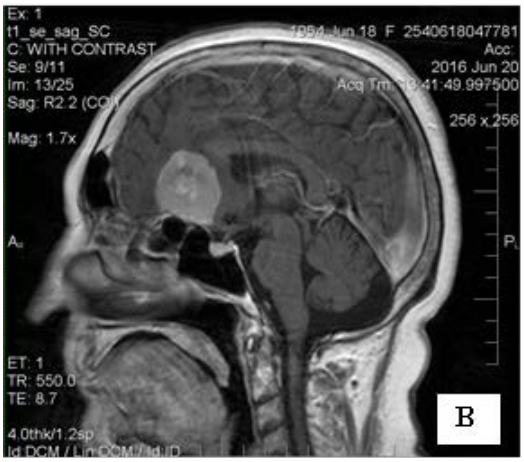
A 62-year-old female patient, with a history hypertension and noninsulin-dependent diabetes, was suffering from episodes of loss of consciousness and headache for several months. She was admitted to another hospital and a magnetic resonance (MR) revealed an extra-axial mass in left frontal lobe with planum sphenoidale implantation. Because the most likely imaging diagnosis was meningioma, she was admitted to our Department of Neurosurgery. A preoperative cerebral CT-angiography was performed for the purpose of analysis of the relationship with large vessels in the region and neoplastic vessels. Following this investigation an anterior communicating artery aneurysm was revealed. There were no significant tumor vessels and any involvement of large vessels in relation to tumor mass. (Figure 1A, B). On the next days, with the patient´s consent, a left fronto-pterional approach was performed with total tumor resection and aneurysm clipping. The CT scan control performed the next day after surgery shows complete tumor

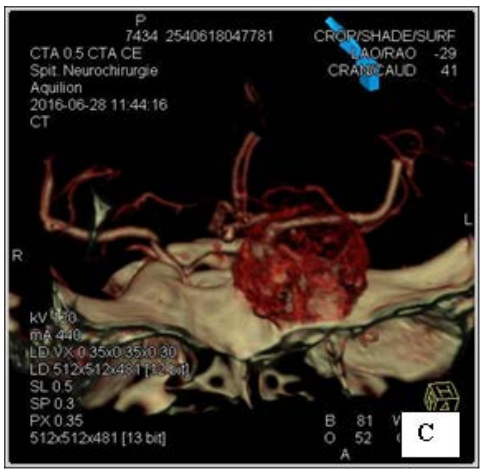
resection and the clip artifacts. The outcome of the patient was well and she was discharged home after seven days.

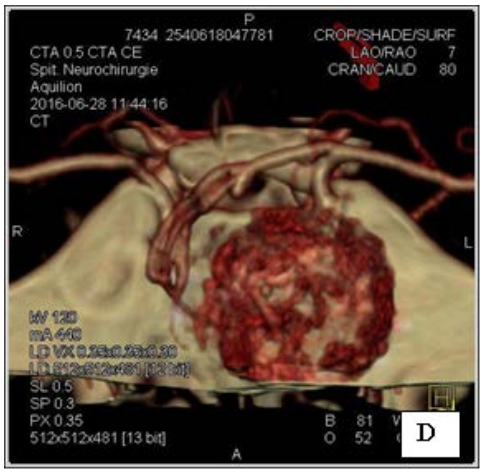
Discussions

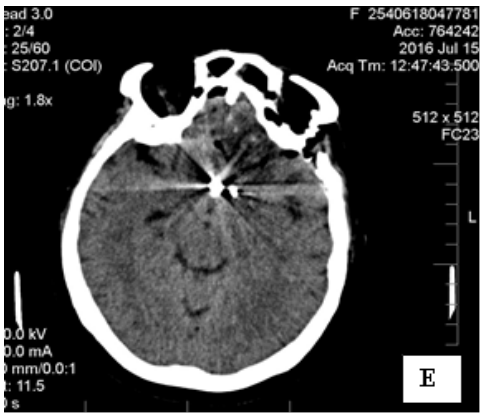
Association of meningioma and intracranial aneurysm is the most common situation that was first reported by Arieti and all in 1944. The reported incidence of meningioma and intracranial aneurysm varied from 0.3% to 0.7% (1, 3, 4, 9).











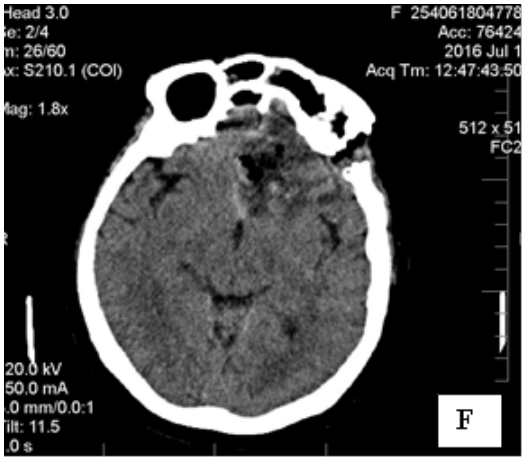


Figure 1: A, B – MRI images on sagital and coronal view showing a planum sphenoidale menigioma; **C, D** – CT – angiography showing an ACoA associated aneurysm; **E, F** – CT control showing complete resection of meningioma and aneurysm clip artifact

However, the real incidence is probably higher because an angiography investigation is not usually performed in patients with brain meningioma. Now, advanced imaging techniques like the noninvasive MRA method become increasingly available and applied for brain tumors investigation. Consequently, the reported prevalence of intracranial aneurysms has also increased to approximately 2%–5% in patients with brain tumors. (7, 8)

There have been several proposed possible mechanisms that have been published trying to explain the relationship between tumors and aneurysms. Thus, local hemodynamic factors, hormonal influence, genetic factors and direct invasion of tumor cells to the vessel wall were considered responsible for this clinical coexistence.

The first mechanism is due to the phenomenon of maintaining a constant cerebral perfusion pressure by an increased arterial blood pressure to equal the increased intracranial pressure caused by the tumor volume expansion. This chronic increase in arterial blood pressure could cause an increase in hemodynamic stress on cerebral arteries around slowly growing meningiomas or even in the entire brain. That may explain the degenerative changes to arterial walls leading to intracranial aneurysm formation.

Some scientific researches have reports a hormonal influence in association of brain tumors and intracranial aneurysm. Growth factors like estrogen have been suggested in association with both meningioma and aneurysms.

Pia et al. (3) had reported in the literature an association between a dysgenetic factor and the coexistence of brain tumors together with intracranial aneurysm. The Klippel-Trenaunay syndrome might explain a high incidence of meningiomas associated with aneurysms. Klippel-Trenaunay syndrome is a rare neurocutaneous disorder in which skeletal hypertrophy, vascular nevi and vessel anomalies coexist. The conclusion of Pia analysis showed an insufficient evidence of dysgenetic factor hypothesis.

Kandel et al. (5) had published a case of a typical MCA aneurysm associated with a fronto temporal meningioma. The authors explain the formation of the aneurysm by the damage that the meningioma caused to the wall of the artery based on tumor adhesion to the arterial adventitia.

The treatment options of this particular situation vary from conservative management to treating both pathologies simultaneously or sequentially. If the aneurysm is in close

proximity to the tumor both can be accessed simultaneously in the same sitting. If the aneurysm occurs in the other hemisphere, most of the specialists recommend treating first the pathology that causes the symptoms (1, 2, 3, 4, 5, 7).

Conclusions

The coexistence of intracranial aneurysms and menigiomas is not a new phenomenon and the association between the two lesions is still under debate. Even some of the assumptions underlying mechanisms of such an association were stated, their low incidence suggests a rather due to chance. Regarding the treatment, if both lesions are in a close proximity they can be managed simultaneously and if they are located contra lateral usually it will be approached in two steps starting with the symptomatic one.

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