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ANEURYSM GROWTH AFTER BRAIN TUMOR REMOVAL

Case report

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ABSTRACT - A rare case of rapid growth of an aneurysm after a posterior fossa meningioma removal in a 69-year-old lady is reported. Serial angiography, cerebral computed tomography and magnetic resonance imaging are presented. The patient harbored risk factors to both aneurysm formation and growth as current cigarette smoking, arterial hypertension, female sex and reduction of intracranial hypertension. One-year follow up after the first surgical procedure is presented.

KEY WORDS: aneurysm growth, aneurysm formation, aneurysm and brain tumor.

Aumento do volume de aneurisma após remoção de tumor cerebral: relato de caso

RESUMO - Um caso raro, em que ocorreu rápido aumento de volume de um aneurisma após a remoção de meningioma de fossa posterior em uma senhora de 69 anos de idade é relatado. Angiografias seriadas, tomografia computadorizada cerebral e ressonância magnética cerebral são apresentados. A paciente apresentava fatores de risco tanto para a formação como para o crescimento, de aneurismas cerebrais como hipertensão arterial, tabagismo, sexo feminino, aliados à redução da pressão intracraniana. É apresentada a evolução pós-operatória de um ano após a primeira cirurgia.

PALAVRAS-CHAVE: crescimento de aneurisma, formação de aneurisma, aneurisma e tumor cerebral.

Growth of aneuryms has been documented for long[1-6]. Current cigarette smoking and female sex seem to be risk factors to both aneurysm formation and growth[3,7-11] Endogenous factors like elevated arterial blood pressure, arteriosclerosis and secondary inflammatory reactions are thought to be elementary preconditions[3,6,7,12-14,]. Rapid aneurysm growth without rupture, apparently, is not so frequent.

We report a case of a rapid aneurysm growth after a posterior fossa meningioma removal in a patient who initially presented with symptoms of increased intracranial pressure due obstructive hydrocephalus.

CASE

This 69-year-old lady was admitted to another hospital with symptoms of increased intracranial pressure due to obstructive hydrocephalus caused by a posterior fossa tumor. An external ventricle-drainage was installed and two days later the patient was transferred to our hospital. She had a history of severe arterial hypertension and diabetes. The patient reported smoking 40 cigarettes a day over the last 40 years. Magnetic resonance imaging (MRI) demonstrated a tentorial meningioma extending to the occipito-temporal region and posterior fossa (Fig 1). There was the image of an aneurysm of the anterior territory measuring 18mm x 12mm (Fig 2). Angiography (Fig 3) demonstrated to be an aneurysm originating from A1 with a broad neck, not amenable to endovascular embolization. Occlusive circulatory test demonstrated good contralateral circulation (Fig 4).

First operation. *Removal of posterior fossa meningioma*. She had respiratory insufficiency in postoperatory period, which required tracheotomy. Her respiratory problems resolved in 30 days, when she had a sudden episode of left hemiplegia. Cerebral tomography demonstrated a small area of brain infarct surrounding the aneurysm that had increased in size; there were no images suggesting subarachnoid hemorrage (Fig 5). MRI con-

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firmed the aneurysm growth and allowed us to determine the aneurysm's size of 38mm x 27mm (Fig 6).

Second operation. *Ligature of the right internal carotid artery on the neck*. After two months, the hemiplegia had improved in about 70%. We decided to perform the third operation: *Removal of the supratentorial meningioma*.

Now, one year after the first operation, she has only a small neurologic deficit (about 95% of function recovery). She underwent a MRI exam which demonstrated complete tumor removal and that the aneurysm had not shown any change in its size (Fig 7).

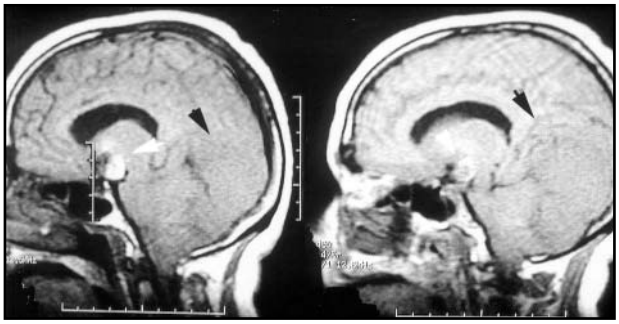

Fig 1. Magnetic resonance imaging demonstrating a tentorial meningioma extending to the occipito-temporal region and posterior fossa. Supratentorial aneurysm can be seen.

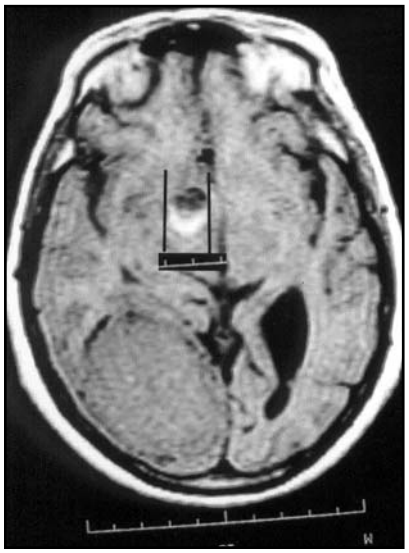

Fig 2. Magnetic resonance imaging. Aneurysm of the anterior territory measuring 18 mm x 12 mm.

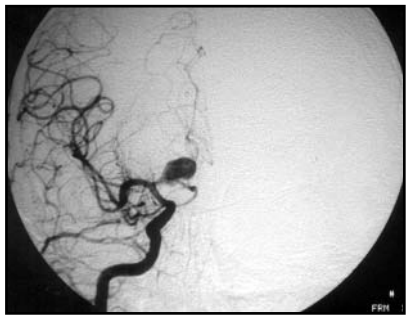

Fig 3. Carotid angiography. Aneurysm originating from A1.

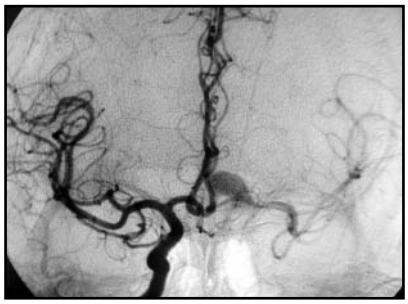

Fig 4. Carotid angiography. Occlusive circulatory test demonstrated good contralateral circulation.

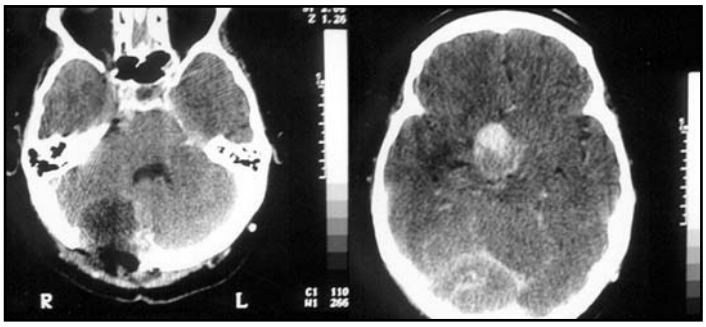

Fig 5. Cerebral tomography demonstrating a small area of brain infarct surrounding the aneurysm that had increased in size; there are no images suggesting subarachnoid hemorrage.

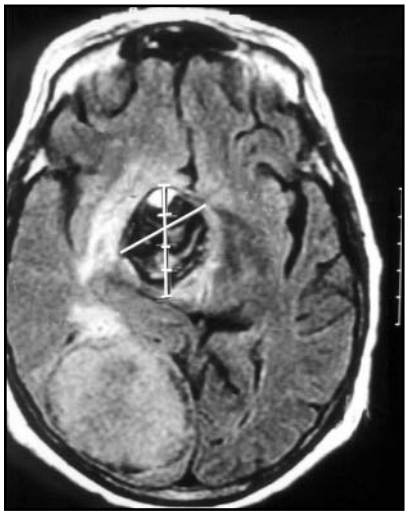

Fig 6. Magnetic resonance imaging confirming the aneurysm growth The aneurysm's size is 38 mm x 27 mm.

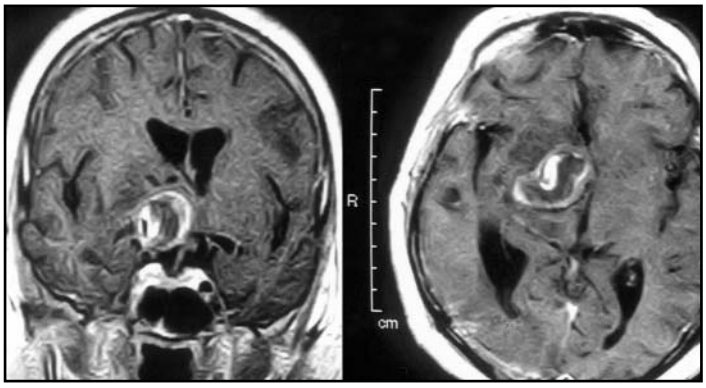

Fig 7. Magnetic resonance imaging (one year after the first surgery) demonstrating total removal of tumor. No change in aneurysm's size.

DISCUSSION

It is well known that aneurysms have a tendency to enlarge over the years[1,2,4,5,8,15,16] Barth and Tribolet[1] reported on three patients with a documented small aneurysms growing to a giant size over 11, 17 and 23 years. Yasui et al.[16] reported the evolution of incidentally-discovered fusiform aneurysms of the vertebrobasilar arterial system in four patients followed up for more than 3 years. Two lesions remained the same size and two lesions gradually grew. Miller et al. reported a rapid growth of intracranial aneurysm causing apparent retrobulbar neuritis[15]. Ortiz et al. reported a case of an enlarging carotid-cavernous aneurysm in a pregnant 15-year-old girl that decreased in size after the delivery[17]. Kim et al. reported two cases of obstructive hydrocephalus produced by giant basilar artery aneurysms that were managed by ventriculo peritoneal shunt. Both aneurysms increased in size after the shunt procedure[18]. Our patient presented, at first, increased intracranial pressure due to obstructive hydrocephalus, which was managed by external ventricle-drainage that has remained until two days after the removal of the posterior fossa tumor.

Although the pathogenesis of cerebral aneurysms has been studied intensively, it is poorly understood[6,7,10,14,17]. Current cigarette smoking, in particular, hastens aneurysm growth[3,7,8,9,10,11,14]. Our patient reported to be a heavy smoker, of more than 40 cigarettes a day over the last 40 years. Endogenous factors like elevated arterial blood pressure, arteriosclerosis and secondary inflammatory reactions are thought to be elementary preconditions[2,4,5-7,14,16].

Elastase may induce aneurysm formation and progressive enlargement[12]. Apoptosis of the medial smooth vessel cells of brain arteries seems to be directly involved in aneurysm formation[13]. In the pathogenesis of cerebral aneurysm, thinning of the medial smooth muscle layer is important as well as degeneration of the internal elastic lamina. In the thinned wall, fibrous connective tissue is abundant and has not the same resistance of the normal tissue against the arterial pressure[3,7,8,13]. Meyer et al. demonstrated with MR angiography that pulsatile increases according to the aneurysm growth[19]. Wardlaw et al.[20], with observations based on color "power" transcranial Doppler ultrasound, have demonstrated that aneurysms may vary in size inside the intact cranium, depending on the transmural pressure and the intracranial pressure. At low intracranial pressure, after ventricular drain insertion, for instance, aneurysms show increased size and pulsate less. In our patient, the reduction of the intracranial hipertension, after removal of the posterior fossa meningioma, may have been one important factor for the enlargement of the aneurysm. Although the association of aneurysm and brain tumor is not a rarity, we could not find a report of growth of aneurysm after tumor removal.

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