Surgical management in rerupture of internal carotid aneurysm after recanalization treated-coil: A case report

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Abstract

Introduction: Little is known about incidence, anatomical and clinical characteristics and results of endovascular treatment of the internal carotid artery (ICA) aneurysms. This type of the aneurysms can be approached by surgical with low morbidity and mortality. **Clinical presentation:** a 48-year-old woman submitted an endovascular embolization treatment in 2005, and in 2009 presents a new bleeding. The angiography shows that the same aneurysm was ruptured and a surgical repair was proposed. The surgical management shows detachable coils in the brain parenchyma. **Conclusion:** Some endovascular surgeons preferred the less invasive procedure (endovascular treatment) for intracranial aneurysms, but the surgical repair still remains the best choice for definitive treatment for intracranial aneurysms.

Keywords: Intracranial aneurysms, internal carotid bifurcation artery, surgical treatment.

Introduction

Internal carotid artery (ICA) bifurcation aneurysms are uncommon [1]. Aneurysms of the bifurcation of the ICA have a very low incidence in adults by accounting for only 5% of all intracranial aneurysms, and are less common even among aneurysms of the ICA [2]. Little is known about incidence, anatomical and clinical characteristics and results of endovascular treatment of this particular type of aneurysm [3].

The number of aneurysms treated with endovascular coiling has increased since the publication of the International Subarachnoid Aneurysm Trial [4], with the advancement of endovascular technology, and as minimally invasive techniques thrive in the medical marketplace. However, the expansion of endovascular therapy has been driven by short-term safety data rather than long- term efficacy data, which has demonstrated significant incidences of incomplete aneurysm obliteration, neck remnants, and recurrences. [3,4]

Coils can extrude into the subarachnoid space to complicate the dissection of the aneurysm or branch arteries. Coils induce intraluminal thrombus formation and organization that further hardens the aneurysm and sometimes requires removal before clipping. [5]

In this way, microneurosurgical clipping is the total occlusion of the aneurysms sac with preservation of flow in the main branches and the perforating arteries surrounding the aneurysm dome and lower rate of recanalization and rupture [6].

Methods:

Clinical picture:

A 48-year-old woman with medical past history of incidental ICA (Internal Carotid artery) bifurcation aneurysm, presumptively diagnosed with digital substraction angiography (figure 1), submitted to endovascular embolization treatment in 2005. Three year later, the patient complained of severe headache, dizzing, vomiting and had meningeal signs. A Computerized Tomography (CT) scan was realized showing a sub-acute hemorr-

hage (SAH). An angiography showed a new bleeding of the same aneurysm and a new aneurysm, a left incidental communicating posterior aneurysm.

In this time a left pterional standard craniotomy was done for surgical clipping treatment for this aneurysm (figure 2). The communicating posterior aneurysm was first clipped. When the bifurcation ICA aneurysm was approached, the coils were seen in the cerebral parenchyma. There was no difficult to clip the neck of this aneurysm in the procedure. (figure 3). The patient had no neurological deficits in the post-operative stage.

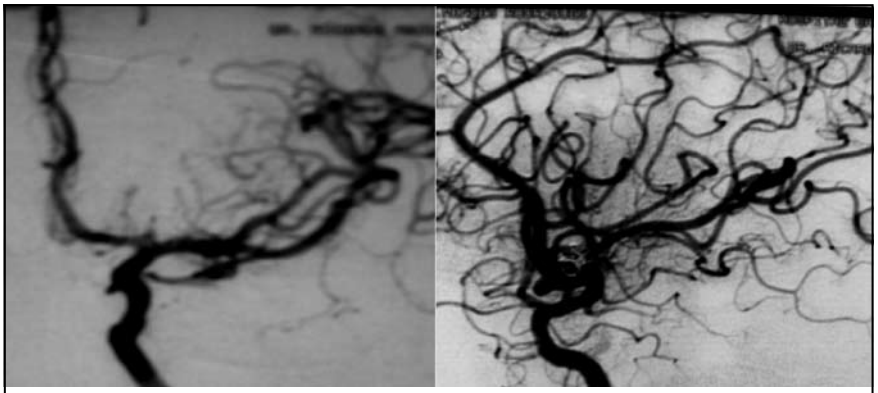

Figure 1: A, an oblique angiography showing an ICA bifurcation aneurysm; B, the ICA bifurcation partially treated. There is circulation inside the aneurysm.

Discussion

Actually the treatment of these aneurysms is very controversial. Aneurysm recurrence after coiling has generally been thought to proceed through two mechanisms: 1) recanalization (acute or delayed) of the coiled aneurysm fundus, resulting from an underlying instability of the intra-aneurysmal coil–thrombus complex; and/or 2) progressive absolute aneurysm growth from either an unsecured niche of an incompletely coiled aneurysm or an intrinsic (initially occult) deficiency in the wall of the perianeurysmal parent artery. [5, 6, 8]

In terms of the proximate postcoiling outcome, Kole et al. retrospectively analyzing results from 163 aneurysms in 160 consecutive patients treated between 1995 and 2003, found large remnants in 27% of aneurysms immediately postcoiling, suggesting an inherent technical limitation with the initial endosaccular coil treatment of certain complex aneurysm subtypes. The same authors additionally reported an increased remnant size in 19.1% out of 131 patients at a mean angiographic follow-up period of 18.2 months; 14.5% of these patients required aneurysm recoiling. This last statistic is of interest in that two deaths occurred among the 19 patients undergoing retreatment, illustrating an often-ignored source of risk to which patients with unresolved aneurysms are exposed. [8]

In the Cerebral Aneurysm Rerupture After Treatment (CARAT) [9] study of 1010 patients treated microsurgically or endovascularly, annual retreatment rates among coiled patients were 13.3%, 4.5%, and 1.1% during the first, second, or later years, respectively. In contrast, the retreatment rate among clipped patients was 2.6% during the first year and none in later years [3, 9].

Figure 2: the patient in a standard pterional approach position.

Annual re-rupture rates after the first year were low with both treatment modalities (0.11% and 0% for coiled and clipped aneurysms, respectively), but incomplete aneurysm obliteration predicted rerupture. Rerupture rates among all patients with aneurysms during a mean follow- up period of 4 years were 1.1% in patients with complete obliteration, 2.9% for patients with 91% to 99% obliteration, 5.9% for patients with 70% to 90% occlusion, and 17.6% for patients with less than 70% occlusion. [3,7]

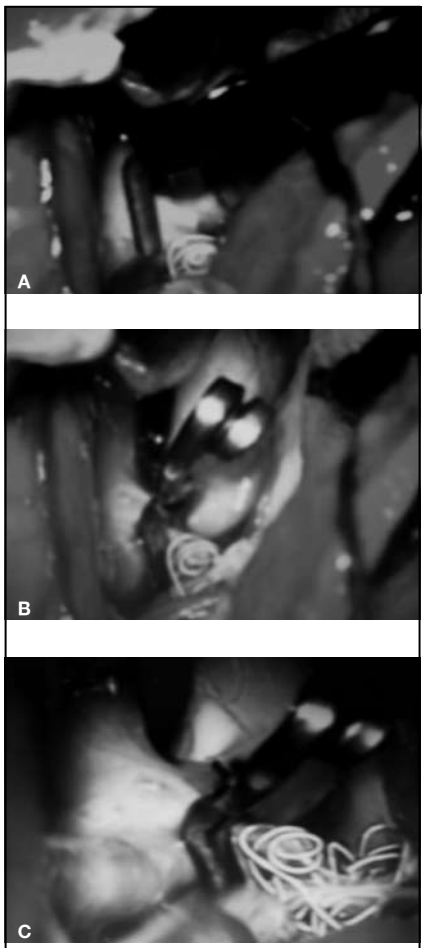

Figure 3: A, The GDC outside the aneurysm and Sugita curve clip; B, The Sugita clip positioned; C, the clip in the aneurysm and coils in the brain parenchyma.

Waltron et al in 2009 propused the high incidence of coil extrusion in recurrent aneurysms (12 of 22 aneurysms, 55%) in their follow up [10]. Other neurosurgeons have observed coil extrusion anecdotally, but without quantification **[5, 6, 8]**.

Angiography failed to identify coil extrusion in our recurrent aneurysms, with most reports simply describing compaction. Therefore, coil extrusion occurs more frequently than expected, is often misdiagnosed on angiography, and is a time dependent process not seen acutely in incompletely coiled aneurysm. However, mean times to aneurysm recurrence were similar in cases of extrusion and compaction (29 versus 26 months, respectively). [3]

Conclusión

Endovascular treatment of intracranial aneurysms is less invasive than surgical repair but poses a higher risk for aneurysm recurrence and complications associated to the retreatment. Thus, the surgical repair, in our opinion, still remains the best and definitive treatment choice for intracranial aneurysms.

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