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Revascularization techniques in chronic cerebral ischemia

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Resumen

Since the first surgical clipping of an aneurysm by the American neurosurgeon Walter Dandy in 1938, vascular neurosurgery has changed a lot, having developed several scientific and technological advances. But undoubtedly, the most significant change in vascular neurosurgery was the introduction of the endovascular treatment of cerebral aneurysms by the placement and release of platinum coils within the aneurysmal sac. In recent years, endovascular treatment has advanced notably with an ever increasing number of devices capable of treating a greater number of patients. This rapid development of endovascular techniques has evoked an important change in the profile of the neurosurgical patient. Currently, patients who end up in the neurosurgery operating room are fewer but more complex, and furthermore, endovascular surgery treatment has even created a new profile of patients with complex thrombotic aneurysm (partially coiled and also with stents applied), which forces us to perform frequently surgical bypasses to exclude the aneurysm. This technical effort made in vascular neurosurgery should also be utilized for other pathologies. Classically, vascular neurosurgery in our country has been preferentially dedicated to hemorrhagic stroke, which represents approximately 20% of cerebral vascular diseases. However, the role of neurosurgeons for ischemic stroke is increasingly important.

Firstly, because of the introduction of endovascular techniques for recanalization in the first few hours of the ischemic stroke, where more and more neurosurgeons are now involved. Secondly, by the indisputable role of decompressive craniectomy in the malignant infarction of the middle cerebral artery, and finally because of the current role of bypass surgery that is indisputable in Moyamoya disease, and possibly also in chronic cerebral ischemia for the prevention of ischemic stroke in carotid artery occlusion.

Carotid occlusion is a clinically important condition due to the high risk of recurrent stroke and a major cause of death and disability in industrialized societies. This aspect of recurrence, despite correct medical treatment, may be the most critical from the neurosurgical point of view, since it raises the possibility of implementing other treatments that improve the prognosis of these patients with cerebrovascular occlusive disease such as cerebral vascular anastomosis.

The Carotid Occlusion Surgery Study (COSS) confirmed that severe impairment of cerebral hemodynamics was a high risk factor for recurrent stroke due to poor collateral circulation in patients with symptomatic complete occlusion of the internal carotid artery. However, it is important to note that despite the great expectations created, this prospective, randomized, multicenter study

was stopped when the intermediate analysis did not show any difference between the surgical and medical groups.

Thus, we must recognize that current studies show a confusing and contradictory panorama of scientific evidence in the role of revascularization surgery for cerebral ischemia. While current evidence demonstrates that revascularization is a safe technique, with morbidity and mortality rates of less than 5% and anastomotic patency greater than 95%, they also demonstrate that a greater degree of selection is necessary to achieve beneficial outcomes in the revascularization surgery. Evidence shows that the benefit of bypass surgery may be low, but it is clear that a hemodynamic failure carries a poor prognosis. In addition, much of the scientific community believes that the conclusions of the COSS study should not be extrapolated until analysis has been performed of the long-term results.