Indications and Outcomes of Prophylactic and Therapeutic Extracranial-to-Intracranial Arterial Bypass for Cerebral Revascularization: A New Frontier for the Reconstructive Microsurgeon

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Abstract

Introduction: The purpose of extracranial to intracranial (EC/IC) bypass surgery is to treat cerebral ischemia or to divert the flow in complex lesions by augmenting cerebral blood flow. EC/IC bypass is a demanding procedure. By means of advanced microsurgical technique the procedure can be performed with high success rate. This study was to investigate outcome of the cerebral revascularization with EC/IC bypass.

Materials and Methods: Between January 2004 and December 2011, 28 patients underwent EC/IC bypass. Indications were intracranial aneurysms (six cases), vessel occlusion (nine cases), cranial base tumor (two cases), and Moyamoya disease (two cases). The outcome was reviewed in the rate of bypass patency, postoperative stroke, neurological deterioration, and surgical related death. A comprehensive follow up was available for a mean of 26.8 months.

Results: The bypass was performed in twenty-two cases between the superficial temporal artery (STA) and the middle cerebral artery (MCA), in five cases between the external carotid and the MCA and in one case between the occipital artery and the posterior inferior cerebral artery. In 42.9 percent of these cases the bypass was performed by interposing a reverse great saphenous vein graft (SVG). Postoperative cerebral angiography demonstrated complete patency rate of 96.4 percent. There was no incident of postoperative stroke, neurological deterioration and surgical related death respectively.

Discussion: The EC/IC bypass is able to augment cerebral blood flow. The STA is the preferred donor vessel alone or in conjunction with SVG providing excellent results in bypass patency and postoperative morbidity. By using microsurgical techniques a low complication rate can be achieved thus improving the outcomes in complex neurosurgical cases.