

Distal Pterygoid Maxillary Artery to Middle Cerebral Artery Bypass Using the Superficial Temporal Artery as an Interposition Graft– a Cadaveric Simulation Study

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Introduction

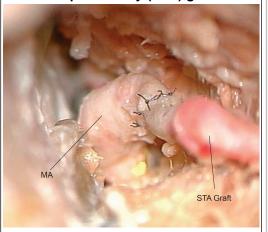
The role of maxillary artery (MA) as an extracranial donor for high-flow bypasses has been explored over the last decade. However, MA harvest is cumbersome with extensive bone resection and harboring significant neurovascular risk to adjacent structures. The objective of our study was to describe a minimally invasive technique for exposing the MA, assess the feasibility of using the MA as a donor for middle cerebral artery (MCA) using the superficial temporal artery (STA) as

an interposition.

Methods

Ten cadaveric specimens were used for surgical simulation of the MA-STA-MCA bypass (end-to-end/endto-side). The distal pterygoid MA was harvested at the infratemporal fossa following the infraorbital artery and a pterional craniotomy was performed. The STA graft was harvested in the cranial flap and trans-sylvian exposure of the inferior trunk M2 segment of the MCA was completed. The calibers of the donor and recipient arteries and the total required graft length were measured.

Results The MA-STA-M2 bypass was Anastomosis of the maxillary artery (MA) and the inferior branch of the second segment of the middle cerebral artery (MCA) using a superficial temporal artery (STA) graft

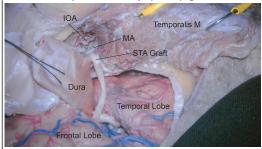


After locating the MA just prior to its entrance through the pterygomaxyllary fissure (PMF) and end-to-end anastomosis with the STA graft is performed

Conclusions

This study demonstrates the technical feasibility of an MA-to-MCA bypass using the STA for interposition graft. The advantages of this novel bypass model include the use of minimally invasive harvesting technique of MA obviating the need for zygomatic arch resection and the good caliber match noted between donor and recipient vessels. The use of STA as interposition eliminates the need for an additional skin incision as would be required for the radial artery or saphenous vein. This bypass can be potentially used for treating complex MCA aneurysms and giant skull base tumors with inadvertent compromise of the MCA.

Anastomosis of the maxillary artery (MA) and the inferior branch of the second segment of the middle cerebral artery (MCA) using a superficial temporal artery (STA) graft



The sylvian fissure is split and an end-toside anastomosis of the distal portion of STA graft and the inferior trunk of M2 is completed.

Learning Objectives

 To depict the anatomical landmarks to harvest the distal pterygoid segment of the

maxillary artery (MA) without a zygomatic arch osteotomy. 2. Morphometrical characteristics of a MA-to-MCA bypass using a superficial temporal artery graft. 3. To offer a new therapeutic strategy for the revascularization of the middle cerebral artery (MCA) territory, which could be used for complex MCA aneurysms or giant skull base tumors

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