

Middle Meningeal Artery to Anterior Inferior Cerebellar Artery Bypass Via Anterior Petrosectomy: An Anatomic Feasibility Study

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Introduction

Anterior-inferior cerebellar artery (AICA) aneurysms are rare with no optimal consensus on management strategy. These aneurysms are often wide-necked or fusiform in morphology requiring complete occlusion of parent artery either by trapping or embolization. This can lead to post-operative ischemic or neuropathic complications.

Premeatal AICA aneurysms can be microsurgically treated through the Kawase's approach. The objective of this study was to investigate the technical feasibility of premeatal revascularization of the AICA using the middle meningeal artery (MMA) as a donor to preserve distal flow distal flow preservation through an anterior petrosectomy window.

Methods

Five specimens were used for the surgical simulation of the MMA-AICA bypass. The MMA was harvested from the dura until foramen spinosum. Anterior petrosectomy was performed on each specimen using our novel extradural-intradural technique and the AICA was exposed until its origin from the basilar artery. The A2 segment was mobilized laterally to preserve all its branches. An end-to-end anastomosis from MMA to AICA was completed. The measurements of AICA length from its origin, total

Results

The MMA-AICA bypass was feasible in all the specimens. The mean length of AICA from its origin at the anastomotic site was 6.7 ± 1.4 mm, with the mean length of MMA from FS being 35.0 ± 5.5 mm. The mean calibers of the MMA were 2.2 ± 0.1 mm at FS and 1.8 ± 0.2 mm at the anastomosis. The A2 caliber was 1.7 ± 0.2 mm with an average lateral mobilization of 5.7 ± 0.6 mm.

Conclusions

Our study establishes the feasibility of an MMA-AICA bypass via a middle fossa approach using an end -to-end anastomosis. The donor MMA traverses intracranially and thus protecting it against external trauma. Additionally, there is a good caliber match of the MMA with A2 with a rather straight course of the final vascular graft.

Learning Objectives

1 Morphometric characteristics of the middle meningeal artery and the anterior inferior

cerebellar artery 2 Feasibility of a revascularization technique using an anterior petrosectomy approach 3 Description of an intracranialintracranial bypass to the second segment of AICA using the MMA as a donor

References

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A1: anterior pontine segment, A2: lateral pontine segment, AICA: anterior inferior cerebellar artery, CN VI: abducent nerve, GG: Gasserian ganglia, MMA: middle meningeal artery