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INTERNAL MAXILLARY ARTERY BYPASS FOR THE TREATMENT OF COMPLEX MIDDLE CEREBRAL ARTERY ANEURYSMS

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Objective The rapid innovation of the endovascular armamentarium results in a decreased number of indications for a classic surgical approach. However, a middle cerebral artery (MCA) aneurysm remains the best example of one for which results have favored microsurgery over endovascular intervention. In this study, the authors aimed to evaluate the experience and efficacy regarding surgical outcomes after applying internal maxillary artery (IMA) bypass for complex MCA aneurysms (CMCAAs).

Methods All IMA bypasses performed between January 2010 and July 2018 in a single-center, single-surgeon practice were screened.

Results In total, 12 patients (9 males, 3 females) with CMCAAs managed by high-flow IMA bypass were identified. The mean size of CMCAAs was 23.7 mm (range 10–37 mm), and the patients had a mean age of 31.7 years (range 14–56 years). The aneurysms were proximally occluded in 8 cases, completely trapped in 3 cases, and completely resected in 1 case. The radial artery was used as the graft vessel in all cases. At discharge, the graft patency rate was 83.3% (n=10), and all aneurysms were completely eliminated (83.3%, n=10) or greatly diminished (16.7%, n=2) from the circulation. Post-operative ischemia was detected in 2 patients as a result of graft occlusion, and 1 patient presenting with subarachnoid hemorrhage achieved improved modified Rankin Scale scores compared to the preoperative status but retained some neurological deficits. Therefore, neurological assessment at discharge showed that 9 of the 12 patients experienced unremarkable outcomes. The mean interval time from bypass to angiographic and clinical follow-up was 28.7 months (range 2–74 months) and 53.1 months (range 19–82 months), respectively. Although 2 grafts remained occluded, all aneurysms were isolated from the circulation, and no patient had an unfavorable outcome.

Conclusions The satisfactory result in the present study demonstrated that IMA bypass is a promising method for the treatment of CMCAAs and should be maintained in the neurosurgical armamentarium. However, cases with intra-operative radical resection or inappropriate bypass recipient selection such as aneurysmal wall should be meticulously chosen with respect to the subtype of MCA aneurysm.

Disclosures L. Wang: None.

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FLOW-DIVERSION FOR COMPLEX POSTERIOR COMMUNICATING ARTERY ANEURYSMS ASSOCIATED WITH A FETAL POSTERIOR CIRCULATION

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Introduction/Purpose Flow-diverting stents (FDS) are effective in treating complex intracranial aneurysms including posterior

communicating artery (PCoA) aneurysms. However, some studies have suggested a decrease in efficacy of FDS in treating PCoA aneurysms associated with a fetal PCoA (FPCoA), postulating that the increased flow through the FPCoA prevents endothelialization of the FDS required for aneurysm occlusion. Others have expressed concern that treating FPCoA aneurysms using FDS could result in posterior circulation ischemia from reducing blood flow through the FPCoA. We therefore reviewed our institutional experience using FDS as a stand-alone intervention to treat complex FPCoA aneurysms.

Material/Methods We performed a retrospective analysis of our endovascular database from 1/2012 to 12/2018 to identify patients with FPCoA aneurysms treated using a FDS as the standalone intervention. We identified aneurysms where the FPCoA vessel originated from the neck or dome of the aneurysm and who were therefore not appropriate candidates for standard coil embolization. We extracted demographic, clinical, treatment, and radiographic data. We considered a FPCoA as any PCoA with a caliber larger than the visualized P1 segment of the posterior cerebral artery.

Results We performed stand-alone, single-device, FDS treatments for 16 PCoA aneurysms associated with FPCoA vessels that originated from either the neck or dome of the aneurysm. Ten of these 16 aneurysms were previously treated (6 coiled, 3 clipped, and 2 multiple open/endovascular interventions) and the FDS was used to treat a recurrence/residual. Seven were previously ruptured. For all cases, we carefully sized the device to ensure excellent wall apposition and focused on device expansion into the neck of the aneurysm to optimize flow-diversion. Using this technique, we achieved an excellent angiographic result in 12 of the 16 cases (75%), with complete obliteration of the aneurysm in 10 cases (62.5%) and near complete obliteration with only trace filling of a neochannel at the aneurysm base in 2 (12.5%). In the remaining 4 (25%) cases, in whom follow-up is ongoing, we observed significant, progressive aneurysm occlusion with marked flow stagnation within the remaining aneurysm. No cases have necessitated additional treatment. We assessed FPCoA patency on follow-up angiography in all patients and observed complete patency in 9, present but decreased flow in 4, markedly diminished flow in 2, and FPCoA occlusion in 1 patient. In all 7 cases with decreased FPCoA flow, we noted co-incident increased P1 flow. No patient exhibited symptoms attributable to posterior circulation ischemia. No procedural complications were encountered and all patients remained neurologically stable following treatment. Mean clinical and angiographic follow-up was 19.9 months.

Conclusion FDS can be a safe and effective treatment option for PCoA aneurysms despite the presence of a FPCoA and can result in satisfactory occlusion rates without posterior circulation ischemia. The deployment technique of maximizing device expansion across the neck of the aneurysm may contribute to successful outcomes. Treatment using a FDS may be of particular utility for complex FPCoA aneurysms where – because of their morphology, relation to the FPCoA vessel, or prior treatments attempted – the ability for standard coiling or microsurgical treatment is limited.

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