Double-Barrel Bypass for Cerebral Revascularization: Lessons Learned from 43 Consecutive Cases
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Introduction
In select patients, EC-IC bypass remains an important tool for cerebral revascularization. As an attempt to augment flow and to direct flow to different ischemic areas of the brain, we have adopted the “double-barrel” technique in which both branches of the STA are used to revascularize distinct MCA territories.

Methods
A series of consecutive “double-barrel” STA-MCA bypasses performed between 2010 and 2016 at a single institution were reviewed. Each anastomosis was directed to augment flow to a territory most at risk. CT perfusion and CT angiography were routinely used to evaluate postoperative augmentation and graft patency. Patient perioperative outcomes, surgical complications, and mRS at last follow up were reported.

Results
Thirty-six patients successfully underwent double-barrel STA-MCA bypass on 43 cerebral hemispheres: 22 operations were for Moyamoya disease, 18 for atherosclerotic disease refractory to medical therapy, 2 for complex cerebral aneurysms, and 1 for carotid occlusion as a sequel of cavernous meningioma growth. All 7 patients who underwent multiple operations had Moyamoya disease, with the subsequent operation on the contralateral hemisphere. Average patient age at surgery was 47.3 years (20-73 years) with a mean follow-up time of 22.6 months. Intraoperative graft patency was confirmed in 100% of cases and 79 of 81 (97.5%) anastomoses with imaging follow-up was patent. Perfusion to the revascularized hemisphere was improved in 88.2% of cases. Symptomatic perioperative ischemic and hemorrhagic complications occurred in 7 procedures whereas remote ischemic and hemorrhagic events occurred in 7.0% of cases. There was no mortality in the series and the mean mRS of patients was 1.4 at presentation to 1.1 at last follow-up. A larger proportion of patients were asymptomatic following revascularization.

Learning Objectives
By the conclusion of this session, participants should be able to: 1) Describe the technique of "double-barrel" STA-MCA bypass, 2) Perform the workup to identify optimal candidates for direct revascularization, and 3) Discuss the outcomes of double-barrel STA-MCA bypass.

Conclusions
The high rate of intraoperative and postoperative patency supports the feasibility of dual-anastomoses STA-MCA bypass as a revascularization procedure. The complication rate does not appear to be significantly different to single anastomosis bypass. The low subsequent incidence of ipsilateral stroke and good functional outcomes support its efficacy as a treatment strategy in selective patients.

References