Collateral artery formation

- Complex Cerebral Artery Anomaly Rete-like Formation of the Terminal Carotid and Middle Cerebral Arteries with Bilateral A1 Segments Fenestrations
- Circulating T cell atlas in Moyamoya disease: insights into immunopathogenesis of cerebrovascular disorders
- Long-term follow-up of moyamoya disease in a patient with a duplicated middle cerebral artery: illustrative case
- Five aneurysms in the posterior circulation associated with moyamoya disease: illustrative case
- A Silent Threat: Internal Carotid Artery Hypoplasia and Its Role in Basilar Artery Aneurysm Formation-A Case Study
- Improvement in multiple cognitive domains via combined revascularization by 6 months' follow-up: a new potential surgical indication in moyamoya disease
- The Role of TCD in Assessing Postoperative Collateral Development and Long-Term Clinical Outcome in Moyamoya Disease
- Overlooked cerebral venous features associated with disease progression in moyamoya disease: insights from a single-center case-control study

Collateral artery formation refers to the development of new blood vessels in response to occlusion or stenosis (narrowing) of a major blood vessel. This compensatory mechanism helps to maintain blood flow to tissues that would otherwise be deprived of oxygen and nutrients, by providing alternative pathways for blood to reach those areas. Collateral artery formation occurs in response to various conditions such as ischemic heart disease, peripheral arterial disease, and stroke.

Collateral artery formation from the extracranial carotid artery to ischemic brain tissue determines the clinical success of Superficial temporal artery to middle cerebral artery bypass for moyamoya disease in adult patients, but postoperative collateral formation (PCF) after STA-MCA bypass surgery is unpredictable. Accurate preoperative prediction of acceptable PCF could improve patient selection. Sun et al. from the West China Hospital, aimed to develop a prediction nomogram model for PCF in this patient population.

Adult patients with moyamoya disease undergoing the STA-MCA bypass surgery between January 2013 and December 2020 at a single institution were retrospectively or prospectively enrolled in this observational study. Data including potential clinical and radiological predictors were obtained from hospital records. A nomogram was generated based on a multivariate logistic regression analysis, to identify potential predictors associated with good PCF. The performance of the nomogram was evaluated for discrimination, calibration, and clinical utility.

Data from 243 patients with moyamoya disease who underwent the STA-MCA bypass surgery were analyzed to build the nomogram. After 1-year follow-up, 162 (66.7%) hemispheres had good PCF and 81 (33.3%) had poor PCF. Good PCF is associated with 3 preoperative factors: age at operation, the diameter of the donor branch of STA, and the preinfarction period stage. Incorporating these 3 factors, the model achieved a concordance index of 0.88 (95% CI, 0.84-0.92) and had a well-fitted calibration curve and good clinical application value. A cutoff value of 100 was determined to predict good PCF via this nomogram.

The nomogram exhibits high accuracy in predicting good PCF after the STA-MCA bypass surgery in adult patients with moyamoya disease and may allow surgeons to better evaluate preoperatively

candidacy for successful bypass surgery [1].

1)
Sun H, Li Y, Xiao A, Li W, Xia C, You C, Ma L, Liu Y, Xia C. Nomogram to Predict Good Collateral Formation After the STA-MCA Bypass Surgery in Adult Patients With Moyamoya Disease. Stroke. 2023 Feb 7. doi: 10.1161/STROKEAHA.122.039975. Epub ahead of print. PMID: 36748463.