

# Long-Term Patency in Cerebral Revascularization Surgery: An Analysis of a Consecutive Series of 430 Bypasses

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## Introduction

Large patient cohort analysis on intracerebral bypass patency with long-term follow-up results is rarely reported in the literature. We analyzed the long-term patency of extracranial to intracranial (EC-IC) and intracranial to intracranial (IC-IC) bypass procedures.

## Learning Objectives

By the conclusion of this session, participants should be able to: describe the importance of intracranial reconstructive techniques and identify patient cohorts and bypass techniques with high long-term patency rates.

## Methods

- Inclusion criteria: all intracranial bypass procedures performed 1997-2017 with post-operative radiological imaging (CTA, MRA, or angiogram)
- Design: Retrospective cohort study of prospectively collected database
- Setting: Single-center, tertiary-referral academic center
- Analysis: Data on patient demographics, bypass type, interposition graft type, bypass indication, and radiological patency were collected and analyzed with univariate and multivariate (adjusted multiple regression) models.

## Results

- 430 consecutive bypass procedures were performed during the study period (FU time [mean±SD]: 0.9 ± 2.2 years, range: 0 -17 years).
- 12 cases were occluded at follow-up imaging, resulting in an overall cumulative patency rate of 97%. All bypass occlusions occurred within a week of revascularization.
- All patients in the short-term FU group (n=76, 0.3±0.3 years) and long-term FU group (n=89, 4.1±3.5 years) had patent bypasses at last follow-up.

### Univariate analysis of risk factors for bypass occlusion

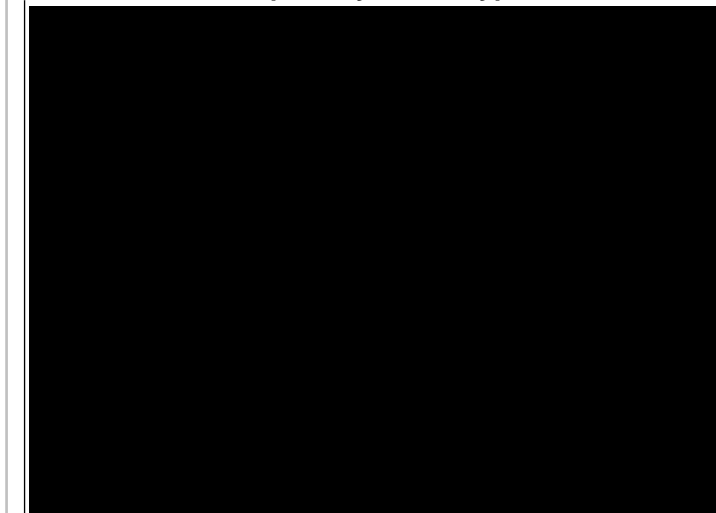
	Overall Patency	P-value
<b>Diagnosis</b>		<b>0.029*</b>
Aneurysm	95% (9/175)	
Moyamoya	98% (3/132)	
Occlusion	100% (0/120)	
<b>Number of Anastomosis Site</b>		<b>0.005*</b>
1	98% (6/349)	
2	93% (6/81)	
<b>Flow Speed</b>		<b>0.033*</b>
High	94% (5/78)	
Low	98% (7/350)	
<b>Bypass Type</b>		0.366
EC-IC	98% (9/361)	
IC-IC	96% (3/67)	
<b>Grafts</b>		0.885
Radial Artery	94% (2/36)	
Saphenous Vein	93% (3/44)	
IC-IC w/o interposition	95% (3/65)	
<b>Number of Bypasses</b>		0.176
Single	98% (9/377)	
Double	94% (3/53)	

Values are expressed as: % of patent bypasses (# of occluded bypasses / total # of bypasses)

## Results

- Patients who presented with aneurysms (vs. moyamoya disease or chronic vessel occlusion), high-flow bypasses (vs. low-flow), and two anastomosis sites (vs. one) had a lower rate of patency than those with moyamoya disease or chronic vessel occlusion (all P < 0.05).
- No differences were seen in the patency rate among different grafts, single vs. bilateral, or between EC-IC and IC-IC bypasses.

### Cumulative patency of 430 bypass cases



## Conclusions

The overall bypass patency of 97% indicates a high likelihood of success with microsurgical revascularization. Surgical indication (ischemia), low flow, and number of anastomosis (one site) were associated with higher patency rates. EC-IC and IC-IC bypasses have comparable patency rates, supporting the use of intracranial reconstructive techniques. Bypasses that remain patent 1-week postop and have the opportunity to mature have a high likelihood of remaining patent long-term.