Emergency neurosurgical bypass revascularization for acute ischemic stroke and ruptured complex aneurysms

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Introduction

To evaluate the safety and patient outcome of individualized bypass revascularization strategies applied in the emergency setting for the treatment of acute ischemic stroke (AIS) and ruptured complex aneurysm (rCA) in combination with aneurysm trapping.

Methods

We reviewed 12 consecutive patients (5 with AIS and 7 with rCA) undergoing emergency surgery with either low-flow EC-IC (n=7) including 5 STA-MCA, 1 PAA-MCA and 1 OA-PICA, low-flow side-to-side IC-IC (n=3), or high-flow excimer laser assisted non-occlusive anastomosis (ELANA) EC-IC (n=2) bypasses. Clinical status as well as neuroimaging examinations were evaluated pre- and postoperatively.

Results

The emergency bypass revascularization was performed with a mean time of 2.5 days (SD 1.1, range 1-4) after admission. There were no surgical complications such as anastomosis failure (early patency 12/12), postoperative hemorrhage or hyperperfusion syndrome. After emergency bypass all patients were discharged in good clinical condition with an improved mean NIHSS of 3.5 points (up to mean of 2.5) and regaining independence in all-day activities with an improved median mRS of 1 point (up to median of 2).

Conclusions

Microsurgical revascularization can be safely performed as one option in an emergency setting with good clinical outcome in patients with acute ischemic stroke or ruptured complex aneurysms.

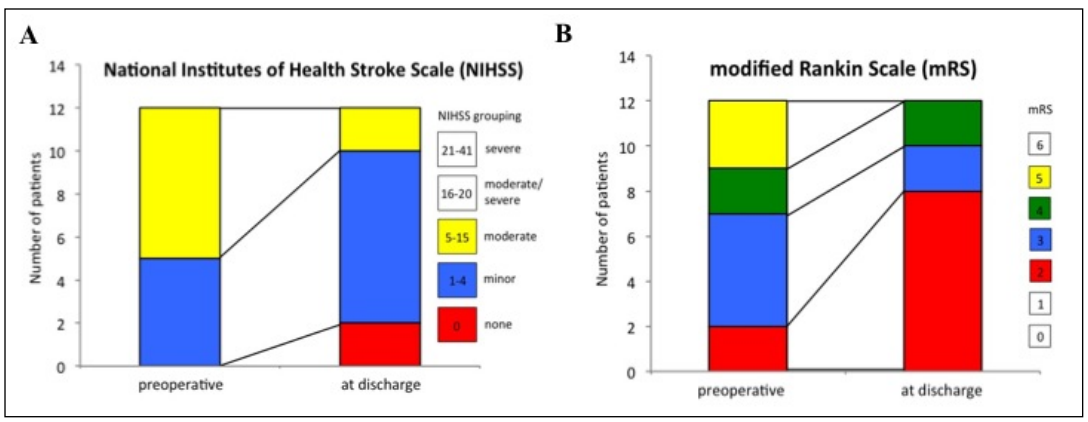

Figure 1: Graph comparing preoperative to postoperative NIHSS score (**A**) and mRS (**B**) in the 12 patients.

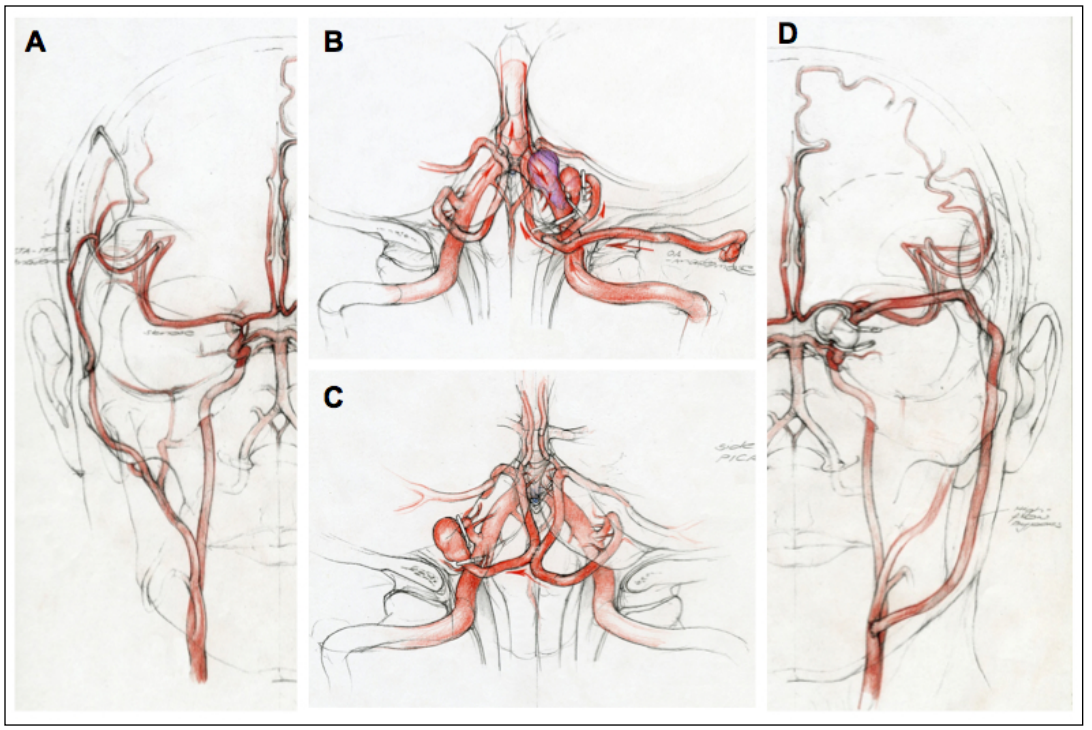

Figure 2: Sketch of different emergency anastomosis techniques used in this study. **A**: Classic low-flow EC-IC STA-MCA bypass to treat a patient with AIC and a ICA stenosis. **B**: Low-flow EC-IC OA-PICA bypass to treat a dissecting VA aneurysm with a small fusiform aneurysm at the origin of the PICA. **C**: Low-flow side-to-side IC-IC PICA-PICA bypass to treat a fusiform PICA aneurysm. **D**: high -flow EC-IC ELANA bypass. Both patients received a high-flow EC-IC Bypass with interposition of a saphenous vein graft between the external carotid artery and the terminal internal carotid artery followed by trapping of the aneurysm.

Learning Objectives

To evaluate the EC-iC and IC-IC bypass options after special kinds of strokes and complex aneurysms.

Acknowledgment

We are particularly grateful to Mr. Peter Roth for the illustration of Figure 2.