Risk Factors and Outcomes of Postoperative Complications in Adult Patients with Moyamoya Disease

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Introduction

The risk factors and clinical significance of postoperative complications in moyamoya disease are still unclear. The aim of this study is to investigate the predictors of postoperative complications in moyamoya disease and examine the impact of complications on outcomes.

Methods

We reviewed consecutive adult moyamoya disease patients who underwent either indirect, direct or combined bypass surgery in our hospital between 2009 to 2015. Preoperative clinical characteristics and radiographic features were recorded. Postoperative complications within 14 days after surgery were examined. We conducted multivariate logistic regression analyses to identify the risk factors for either postoperative ischemia or postoperative cerebral hyperperfusion. Outcomes including recurrent strokes and neurological status (modified Rankin scale, mRS) during follow-up were collected. We compared outcomes in patients who had complications with those without complications, using propensity score analysis to account for between-group differences in baseline characteristics.

Results

A total of 500 patients (610 hemispheres) were included in this study. Postoperative complications were observed in 74 (12.1%) operations, including 30 (4.9%) new postoperative ischemia, 27 (4.4%) hyperperfusion, 12 (2.0%) impaired wound healing, and 6 (1.0%) subdural effusion. We identified advanced Suzuki stage (OR 1.669, 95% CI 1.059-2.632, p=0.027) and preoperative ischemic presentation (OR 5.845, p=0.006) to be significantly associated with postoperative ischemia. Preoperative ischemic presentation (OR 5.73, p=0.023) and admission mRS (OR 1.81, 95%CI 1.06-3.10, p=0.031) were significantly associated with postoperative symptomatic hyperperfusion syndrome. Compared to patients without postoperative complication, patients who experienced any postoperative complications had longer hospital stay and worse mRS at discharge (both P<0.0001). At the final follow-up, no significant difference in functional disability (mRS 3-6, 11.9% vs. 4.5%, p=0.116) and future stroke events (P=0.513) between the 2 groups were detected.

Conclusions

Advanced Suzuki stage and preoperative ischemic presentation were independent risk factors for postoperative ischemia; the mRS on admission and preoperative ischemic presentation were independently associated with postoperative CHS. Although patients with postoperative complications had worse neurological status at discharge, postoperative complications had no associations with future stroke events or functional disability during follow-up.

Learning Objectives

1 Summarized the features and risk factors of complications in moyamoya disease in one of the largest cohorts in the literature.

References

1.Antonucci MU, Burns TC, Pulling TM, Rosenberg J, Marks MP, Steinberg GK, et al: Acute Preoperative Infarcts and Poor Cerebrovascular Reserve Are Independent Risk Factors for Severe Ischemic Complications following Direct Extracranial-Intracranial Bypass for Moyamoya Disease. AJNR Am J Neuroradiol 37:228-235, 2016

2.Cho WS, Kim JE, Kim CH, Ban SP, Kang HS, Son YJ, et al: Long-term outcomes after combined revascularization surgery in adult moyamoya disease. Stroke 45:3025-3031, 2014

3.Cho WS, Lee HY, Kang HS, Kim JE, Bang JS, Oh CW: Symptomatic cerebral hyperperfusion on SPECT after indirect revascularization surgery for Moyamoya disease. Clin Nucl Med 38:44-46, 2013

4.Deng X, Gao F, Zhang D, Zhang Y, Wang R, Wang S, et al: Effects of different surgical modalities on the clinical outcome of patients with moyamoya disease: a prospective cohort study. J Neurosurg:1-11, 2017

Figure 1

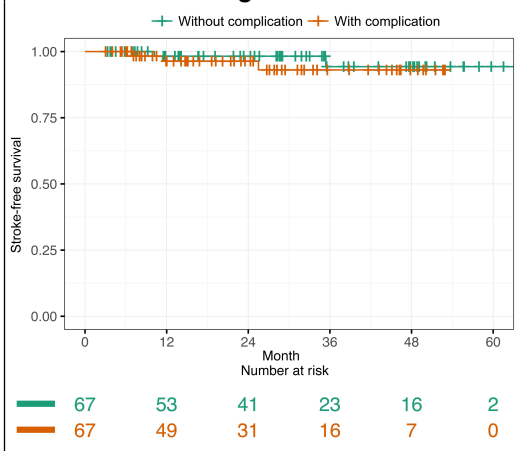

Figure 1. Kaplan-Meier plot showed freedom from stroke per hemisphere treated for the adult moyamoya patients with and without complications after propensity scoring matching. Tick marks indicate time points after which data were censored for a particular patient-hemisphere in the group (point of last follow-up. There was no significant difference in freedom from stroke between the 2 groups (P = 0.513, log-rank test).

figure 2

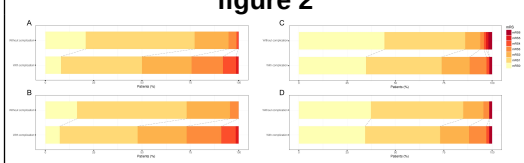

Figure 2. Modified Rankin Scale (mRS) scores of patients with and without complications. mRS of all patients on discharge (A), mRS of patients after propensity matching on discharge (B), mRS of all patients at last follow-up (C), mRS of patients after propensity matching at last follow-up (D).