



Introduction

Comparative outcomes following surgical and conservative management of moyamoya disease (MMD) in a non-Asian population are rarely reported. We aim to elucidate the role of revascularization surgery in preventing ipsilateral strokes in a North American cohort with MMD.

Methods

We performed a retrospective review of MMD patients at the Johns Hopkins Medical Institutions from 1990-2014. Patient information was analyzed on a per-hemisphere basis, and compared between surgically treated (group 1) and conservatively managed patients (group 2). Significant factors were included into a multivariate logistic regression analysis (MVA), with the outcome defined as stroke occurrence during follow-up.

Results

A total of 115 patients with 214 affected hemispheres were included. The average age of all patients was 24.4 ± 17.8 years, with 73.9% (n=85) being female. Race distribution was: White (n=46, 40.0%), Black (n=32, 27.8%), Asian (n=24, 20.9%) and Others (n=13, 11.3%). Ninety-five hemispheres presented with ipsilateral strokes (44.6%), and 65 with ipsilateral TIAs (30.5%). Most strokes were ischemic (n=81, 85.3%), 13 were hemorrhagic (6.1%) and 1 had both (0.5%). Management strategies were: conservative (n=73, 34.3%), direct bypass (n=14, 6.6%), indirect bypass (n=114, 53.5%), both (n=11, 5.2%) and burr-hole (n=1, 0.5%). There were more male ($p < 0.001$) and Down's syndrome patients in group 1 ($p = 0.036$); whereas there were more patients with neurofibromatosis type 1 in group 2 ($p = 0.026$). No significant differences in baseline TIA or stroke occurrences were observed between the two management groups. However, more patients in group 1 were symptomatic at baseline with speech disturbances ($p = 0.001$) and weakness ($p = 0.067$). During an average follow-up of 6.07 years, occurrence of ipsilateral TIA was similar across the two groups ($p = 0.987$). However, group 1 had fewer ipsilateral strokes ($p = 0.019$), headaches ($p = 0.026$), and sensory disturbances ($p = 0.024$).

In MVA, revascularization reduced the incidence of stroke by 67% (OR=0.33, CI=[0.11, 0.89], $p = 0.036$) compared to conservative management at follow-up, after adjusting for other confounding variables.

Conclusions

In our cohort of mostly non-Asian patients with MMD, despite more severe symptomatic presentation, patients who underwent surgical revascularization derived symptom relief and reduced stroke recurrence by 67%. Taken together, surgical treatment should be considered for symptomatic MMD patients with an acceptable surgical risk profile.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Understand the race distribution of a North American Moyamoya cohort
- 2) Understand the baseline characteristics of Moyamoya presentation in this population
- 3) Understand that surgery, with mostly indirect bypasses, is still effective in preventing the occurrence of follow-up strokes.

