

## Long Term Outcome of Moyamoya Patients Post Revascularization Surgery

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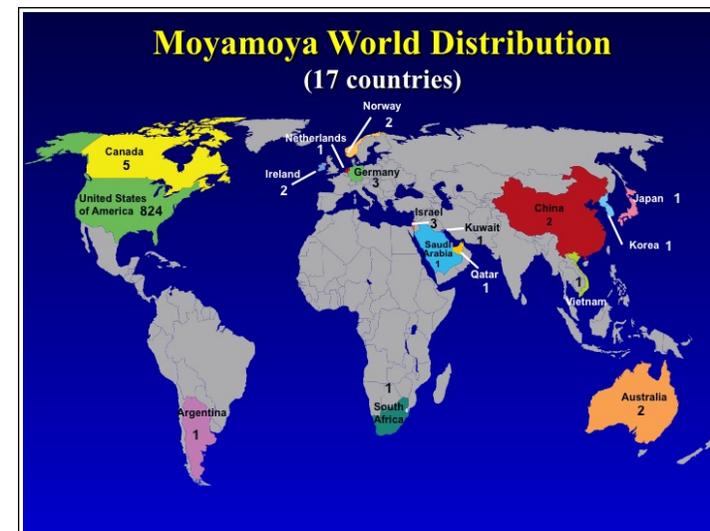
### Introduction

Long-term outcomes of moyamoya disease (MMD) patients post revascularization are not well documented. With one of the largest cohorts of treated MMD patients, we investigated their long-term physical, functional, and social well-being.

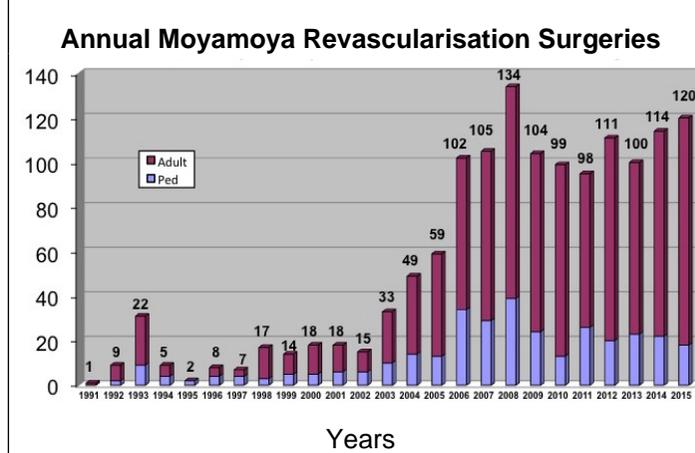
### Methods

Single institution, combined MMD database and questionnaire study.

From 1991–2014, 1307 revascularization procedures (1170 direct bypass, 137 indirect bypass) were performed in 772 patients. We received and analyzed 316 completed patient questionnaires.



Moyamoya patients referral mostly from USA, also from the rest of the world.



### Results

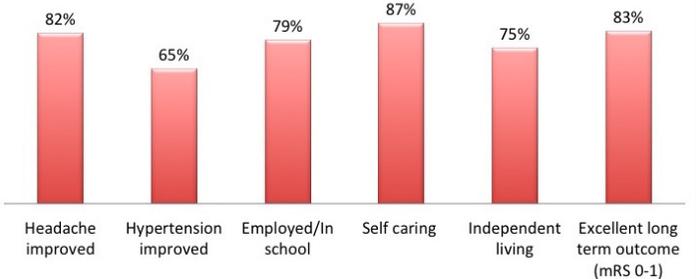
548 females and 224 males, mean age 32 years (range 1–68). We performed 344 revascularizations in 197 pediatric patients (73% direct bypasses), and 963 revascularizations in 572 adults (96% direct bypasses).

With a mean follow-up of 7 years (0–25 years), there were 23 deaths, 5 within 30 days postoperatively, and 4 who had died from stroke at long term follow-up. The other 14 deaths were non-MMD related.

Of the returned questionnaires, 222 patients reported preoperative headache and 182 (82%) of these experienced post-revascularization improvement in their headaches. 101 patients had preoperative hypertension, and postoperatively anti-hypertensives were either discontinued (18) or the dosage reduced (47).

79% (251/316) of patients remained employed or in school at long-term follow up. Excluding children and adults with learning difficulties, 87% (237/273) are self-caring and 75% (204/273) are living independently. Overall, 83% of patients had excellent outcomes (mRS 0–1) at long-term follow up. A limitation of this study is that only 41% of the patients responded to the questionnaire, and it's possible this may affect the data. Further telephone or clinic visit followup is being performed on the additional patients.

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Analysis of the moyamoya patients cohort with returned questionnaires

### Conclusions

Headache and hypertension could be the presenting symptoms in some MMD patients, as subgroups experienced improvement postoperatively.

About 80% of MMD patients have had excellent long-term physical, social, and functional outcomes post revascularization, with up to 25 years of follow up.

### Learning Objectives

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

- 1) Describe the long term physical, functional and social outcome of moyamoya patients post revascularization surgery.
- 2) Discuss the outcome of headache and hypertension post extra cranial-intracranial bypass for moyamoya patients.

### References

- Guzman et al. JNS 2009; 111(5): 927-35.  
Liu XJ et al. JNS 2015; 122(2): 392-9.  
Mesiwala AH et al. Neurosurg Focus 2008; 24(2): E15.