A patient-oriented approach to stroke prevention with improved cognitive benefits: An MRI monitoring study

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Objectives

- In this patient-oriented study, we engage with patient partners and relevant stakeholders to understand how Carotid Artery Stenting (CAS) can benefit overall patient health and wellness

Project Overview

- Narrowed carotid arteries increases risks of stroke, heart disease and cognitive impairments. [1-3]
- CAS is a surgery that widens narrowed carotid arteries supplying blood to the brain. [1-3]
- The benefits of CAS will be studied using Magnetic Resonance Imaging (MRI), a method to capture pictures of the brain. [4]

Research Methodology

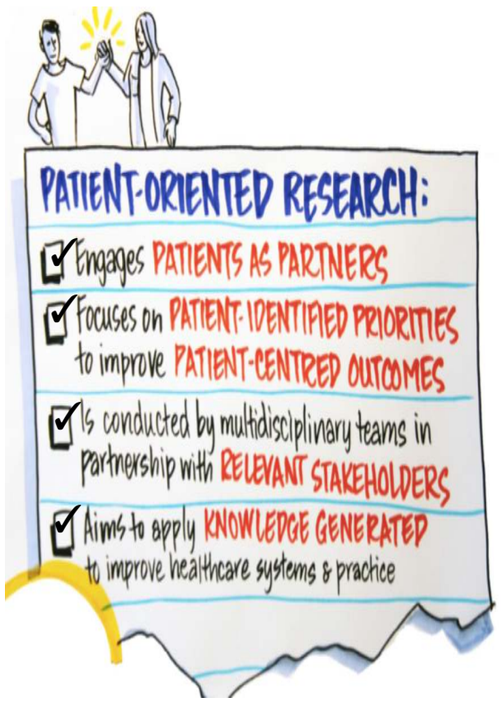
For each of the Patients enrolled

Inclusion: Patients with diagnosis of severe flow limiting carotid artery stenosis scheduled for treatment by carotid stenting

Patient Assessments & Follow-up

- **Baseline pre-stent; MRI Scan + computerized neuropsychological testing**
- **2 months post-stent; MRI Scan + computerized neuropsychological testing**
- **4 months post-stent; MRI Scan + computerized neuropsychological testing**

Patient Oriented Design



- 2 distinct stroke perspectives from a patient and caregiver
- 2 physicians – a radiologist and neurologist from RCH
- 1 experienced MRI research scientist
- 2 student trainees
- Medical directors + access to relevant stakeholders
- Patient-centered outcomes with potential to influence clinical decision making
- Patient comfort and safety in MRI is prioritized via the ethics framework

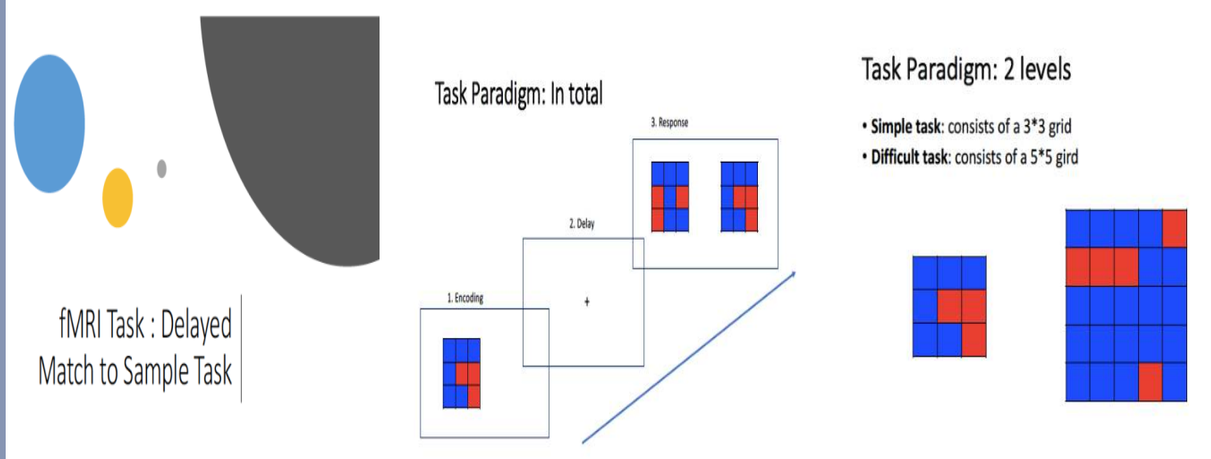
Discussion/Conclusion

- Patient partners have been engaged in many aspects of the research based on their expertise.
- This has resulted in improved, patient-friendly research documentation, safety, research experience and knowledge translation.
- Future efforts will work towards study completion and development of knowledge translation plans.

Results

Figure 1: Patient-engaged research documentation production

Panel 1 - some pages of research documentation without patient partners input



Panel 2 - same documentation but with patient partners input. Notice the improvements in simplicity and clarity.

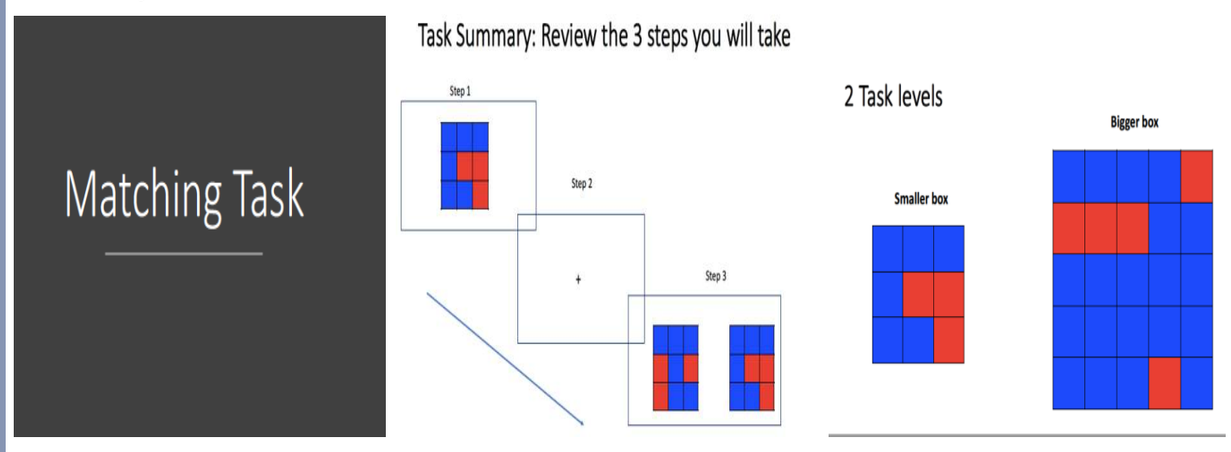
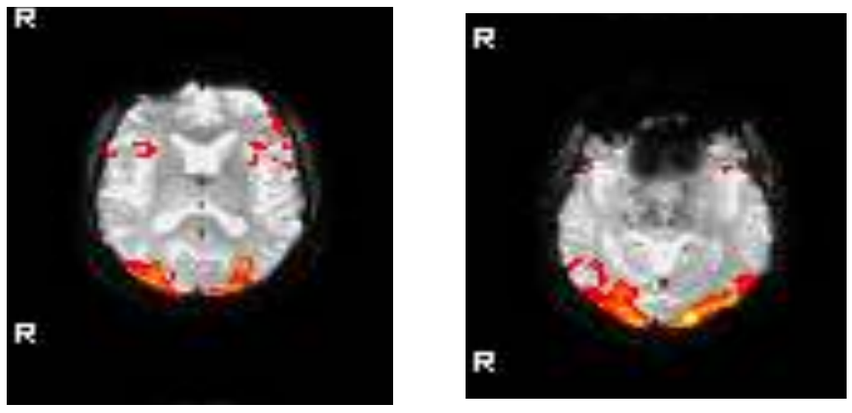


Figure 2: Patient MRI scan showing sample brain activity



Pictures show activation in the expected brain areas. Post-stent, we expect more activation

Testimonials

- "*I was pleased to be involved in this study. My experience with two strokes and my knowledge from other stroke-related studies have been accepted by the team. Strengths in writing to assist the team and the study have been acknowledged. The subjects of the study, myself, and other stakeholders in our health system are bound to each have a better understanding of the benefits of the aims and goals of the project.* " – Patient Partner (October 2019)
- *"My research scan was a pleasant experience"* – Research Participant after 1st MRI scan (October 2019)

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References

1. Inzitari, D., Eliasziw, M., Gates, P., et al. (2000). The causes and risk of stroke in patients with asymptomatic internal-carotid-artery stenosis. *New England Journal of Medicine, 342*(23), 1693-1701. doi: 10.1056/nejm200006083422302
2. Flaherty, M., Kissela, B., Khoury, J., et al. (2012). Carotid artery stenosis as a cause of stroke. *Neuroepidemiology, 40(*1), 36-41. doi: 10.1159/000341410
3. Saw, J. (2014). Carotid artery stenting for stroke prevention. *Canadian Journal of Cardiology, 30*(1), 22-34.
4. McDonald, A. P., D'Arcy, R. C., & Song, X. (2018). Functional MRI on executive functioning in aging and dementia: A scoping review of cognitive tasks. *Aging Medicine, 1*(2), 209-219