

STROKE

P.054

Bone marrow transplant restores Cerebrovascular Reactivity (CVR) in Sickle Cell Disease (SCD): a case presentation

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Background: A diagnosis of SCD in childhood confers a 200-fold increase in the risk of arterial ischemic stroke. Blood flow velocity measures provide better identification of ischemic risk compared to angiography. This indicates that steno-occlusive arteriopathy is not the singular causative factor. Cerebrovascular reactivity allows for augmentation of cerebral blood flow when needed. Kosinski et al in 2016 demonstrated a direct correlation between CVR and hematocrit levels in SCD. We report a case where CVR persistently normalized in an SCD patient following bone marrow transplant therapy (BMT). **Methods:** A nine-month-old SCD patient presented with right AIS. Angiography revealed a bilateral Moya-Moya like arteriopathy. A TCD study was normal while a CVR-MRI study revealed markedly impaired reactivity in the entire anterior circulation. Haemoglobin-S at that time was 20.2 %. BMT was performed at age four due to frequent sickle cell crises. **Results:** One year post-transplant, CVR had dramatically improved in areas previously shown to have impairment (haemoglobin-S 0%). Neuroimaging five years post-transplant showed no further arteriopathy and persistently normalized CVR. **Conclusions:** BMT therapy resulted in the arrest of progressive intracranial arteriopathy and persistently restored vascular reserve. SCD might not only produce global hematological effects but also triggers local processes such as endothelial dysfunction and vascular inflammation that impair cerebrovascular function.

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Intracranial hemorrhage as initial presentation of sagittal sinus thrombosis: review of 3 cases

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Background: Intracranial hemorrhage due to sagittal sinus thrombosis is an unusual initial clinical presentation and a series of 3 cases is presented. **Methods:** A retrospective study of stroke patients seen at the William Osler Health System between 2014 -2016. **Results:** 1: 43 y.o. female presented with headaches and right hemiparesis. CT and MRI/MRV showed L. parietal intra-cerebral hemorrhage and sagittal and transverse sinus thrombosis. She was treated with IV heparin and subsequent oral Warfarin but developed symptomatic left subdural hematoma which was successfully evacuated. Hypercoagulable workup was negative. Subsequent MRI/MRV showed resolution of her sinus thrombosis and received aspirin only since. 2: 45 y.o. male presented with generalized seizure 10 days following a motor vehicle accident. Initial CT showed focal right frontal subarachnoid hemorrhage and subsequent MRI/MRV confirmed extensive sagittal sinus thrombosis. He was treated with IV heparin and subsequent Warfarin without any complications. 3: 32 y.o. male presented with generalized seizure. CT and MRI/MRV confirmed a large right temporal

lobe intra-cerebral hemorrhage and extensive right transverse sinus and straight sinus thrombosis. He was successfully treated with IV heparin followed by oral Warfarin. **Conclusions:** Despite intracranial hemorrhage in patients with cerebral sinus venous thrombosis, they could be managed successfully with anticoagulation therapy and with careful clinical and neuro-imaging monitoring.

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Next-generation sequencing to determine a genetic cause of familial intracranial aneurysms

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Background: Approximately 12-15% of patients with intracranial aneurysms (IA) have affected first-degree relatives, and are considered to have familial intracranial aneurysms (FIA). Individuals with FIA are at higher risk for aneurysm formation and subarachnoid hemorrhage. *THSD1* is the only gene to be associated with nonsyndromic FIA at this time. Our study aims to find rare DNA variants that are major risk factors for FIA in our cohort of patients. **Methods:** To date we have enrolled 37 affected and 31 unaffected people from 16 families. We have done exome or genome sequencing on at least 1 person from each of 12 families. **Results:** A rare p.(R686W) variant in *THSD1* was found in 1/12 families, but did not cosegregate fully with disease. While less attractive as the primary cause of FIA, we cannot rule out the potential modifying effects of *THSD1* p.(R686W) in this family. A second candidate, an extracellular matrix gene within a chromosomal region previously implicated by familial mapping studies, contains rare variants in 4/12 of our families. All four variants are predicted to be damaging. **Conclusions:** Alongside environmental risk factors, individual FIA families may also have complex rare variant contributions to their disease, such as digenic and multi-locus contributions.

P.058

Software algorithms for atrial fibrillation screening with wearable devices: a systematic review

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Background: Atrial fibrillation (AF) is an important risk factor for ischemic stroke but has no recognized screening method. Wearable devices have the potential to provide near continuous monitoring to detect AF. This systematic review evaluates the current state of software capable of detecting AF using wearable devices. **Methods:** We conducted a systematic search using PRISMA method of Medline, CENTRAL, PubMed and trial registries up to January 15, 2017. Abstracts and titles were screened, and relevant articles reviewed fully. English articles were selected if reporting on (1) software for AF detection (2) using heart rhythm signal, (3) theoretically applicable to wearable technology. Quality was evaluated with Cochrane GRADE. **Results:** Of 269 unique abstracts, 54 were identified for full review. 20 studies met inclusion criteria for algorithm accuracy analysis. Sensitivity and specificity ranged from 87.0 - 97.6% and 89.0 - 99.6%, respectively. 4 studies analyzed signal acquired using

mobile devices with similar accuracy. Algorithms were potentially portable to wearable devices. Qualitative observations on the state and applicability of technology were made. *Conclusions:* Software analysing heart rhythm may be accurate for AF screening, but has not been tested on wearable devices. Such technology is promising but may be limited by hardware accuracy and high false positive rates.

P.059

Predictors of gastrostomy tube placement in patients with dysphagia after acute stroke

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Background: In patients with acute stroke, nasogastric (NG) tubes are commonly inserted for feeding when dysphagia is identified, and percutaneous endoscopic gastrostomy (PEG) tubes are placed for severe or persistent dysphagia. However, little is known regarding predictors of PEG insertion. *Methods:* We used the Ontario stroke registry from 2003-2013 to identify baseline characteristics of all patients with NG or PEG tube insertion after stroke. We used multiple logistic regression with backwards selection to determine variables that were independent predictors of PEG tube insertion during admission. *Results:* 4002 patients with NG and 1903 patients with PEG were included in the analysis. Independent predictors of PEG were: Age (80+ vs. <60; odds ratio [OR] 1.70), past history of stroke (OR 1.17), higher stroke severity (severe vs. mild stroke; OR 1.37), stroke unit admission (OR 1.46), and dysphagia screening (OR 1.52). Factors associated with reduced odds of PEG insertion were: Prior history of peptic ulcer disease (OR 0.70), prior independence (OR 0.78), dementia (OR 0.76), palliative status (OR 0.49), and thrombolysis (OR 0.66). *All $p < 0.01$ *Conclusions:* The strongest predictors of PEG were older age, higher stroke severity, stroke unit admission and dysphagia screening. Patients with dementia had reduced odds of PEG. Thrombolysis also reduced odds of PEG and may be protective.

P.060

Altered oculomotor learning in thalamic stroke patients

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Background: Visuomotor learning can be elicited experimentally by displacing the target of a saccade during the ongoing eye movement. In healthy subjects, the resulting mismatch between expected and experienced visual error after saccade completion elicits a gradual adaptation of saccade amplitude. The goal of this project was to explore the role of cerebro-thalamo-cerebellar circuits in the dynamics of visuomotor learning. *Methods:* Patient RK is a 38-year-old right hand dominant male who suffered a focal thalamic stroke of the right thalamus, confined to ventral lateral posterior and ventral medial nuclei. We employed a standard saccadic adaptation paradigm and assessed dynamics of visuomotor learning by fitting a simple state-equation to saccade amplitudes towards the ipsi- and contralesional hemifield. *Results:* While RK was able to adapt saccade amplitudes in both directions, adaptation dynamics were different for leftward versus rightward saccades. Rightward, ipsilesional saccades exhibited a lower learning rate but similar retention of al-

tered saccade metrics, compared to leftward, contralesional saccades. *Conclusions:* The present study assessed a patient with a focal lesion to the right cerebellar thalamus on a saccade adaptation paradigm. Results demonstrated slower visuomotor learning for saccades into the ipsilesional hemifield, suggesting an important contribution of cerebello-cortical projections mediated by thalamic relays for visuomotor learning.

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An outcome study of ischemic stroke patients admitted to a rehabilitation unit

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Background: Earlier studies suggest that age and stroke severity are the main determinants in stroke patient disposition after rehabilitation. We examined these and other variables to determine those that correlated with returning home vs. long-term care (LTC). *Methods:* Chart review of ischemic stroke patients with initial alpha-FIM scores between 40 and 80 admitted to our Rehabilitation Unit from January 1, 2005 to December 31, 2014. Univariate and multivariate analyses were performed. *Results:* There were 162 suitable patients. 130 went home and 32 went to LTC. The multivariable analysis showed the following variables favored LTC disposition: age (1.2x increased risk with increased age, $P < 0.01$), residence (17.5x increased risk if not starting at home, $P < 0.01$), right vs. left hemisphere (5.4x greater risk with right hemisphere, $p = 0.01$), bowel continence (10.6x greater risk if not continent, $p < 0.01$), and caregiver (0.05x decreased risk if a caregiver is present, $p < 0.01$). No differences were found for sex, diabetes mellitus, atrial fibrillation, previous stroke, congestive heart failure, COPD, obesity, hemianopsia or financial status. *Conclusions:* Numerous variables probably affect patient disposition after rehabilitation for acute ischemic stroke.

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Fun for the brain: activities promoting stroke recovery in the acute phase

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Background: Canadian Stroke Best Practices recommend early mobilization and engagement in activities after stroke to enhance recovery. StrokeEngine reports the use of music can further promote recovery by harnessing neuroplasticity. Using music to enhance participation in activities after stroke may impact favorably on outcome after stroke. *Methods:* This descriptive study will be offered to patients admitted on the stroke unit. Based on the music preferences of willing participants and guided by the physiotherapy assessment, music, singing or dance movements will be incorporated into extra-therapeutic activities using specific musical instruments matched to patient ability. The music-enhanced activity program includes at least 3 sessions per week with a trained volunteer and additional sessions with family members for the duration of the hospital stay. Each session will last between 20 and 30 mins. The program will run for six weeks. *Results:* Data on patient participation in daily therapy and activities on the stroke unit will be presented and compared to a