Thirteen term newborns with CHD underwent pre-operative MR imaging and continuous EEG recordings (cEEG). The proportion of cEEG with discontinuous vs. continuous background activity was quantified by visual analysis. During continuous epochs, we differentiated between two states: wakefulness/active sleep vs. quiet/transitional sleep, and applied algorithms to measure spectral power and EEG complexity. *Results:* Three patients had multifocal WMI which was associated with greater EEG background discontinuity ($P<0.05$). Moreover, lower white matter diffusivity was associated with higher power of fast activity ($P<0.05$ for wakefulness/active sleep EEG pattern), while higher white matter FA showed a trend toward being associated with increased EEG complexity ($P<0.1$ for quiet/transitional sleep pattern). *Conclusions:* In this series of term neonates with CHD, structural and microstructural white matter abnormalities are associated with impaired maturation of brain function.

D.05

[18F]-sodium fluoride PET/CT is an imaging-derived biomarker of hydroxyapatite expression in carotid plaque: sub-study of the Canadian Atherosclerosis Imaging Network (CAIN-2)

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doi: 10.1017/cjn.2015.86

Background: It has been hypothesized that [18F]-sodium fluoride (NaF) uptake imaged with positron emission tomography (PET) binds to hydroxyapatite molecules expressed in regions with active calcification. Therefore, we aimed to validate NaF as a marker of hydroxyapatite expression in high-risk carotid plaque. *Methods:* Eleven patients (69 ± 5 years, 3 female) scheduled for carotid endarterectomy were prospectively recruited for NaF PET/CT. One patient received a second contralateral endarterectomy; two patients were excluded (intolerance to contrast media and PET/CT misalignment). The bifurcation of the common carotid was used as the reference point; NaF uptake (tissue to blood ratio - TBR) was measured at every PET slice extending 2 cm above and below the bifurcation. Excised plaque was immunostained with Goldner's Trichrome and whole-slide digitized images were used to quantify hydroxyapatite expression. Pathology was co-registered with PET. *Results:* NaF uptake was related to the extent of hydroxyapatite expression ($r=0.45$, $p<0.001$). Upon classifying bilateral plaque for symptomatology, symptomatic plaque was associated with cerebrovascular events (3.75 ± 1.1 TBR, $n=9$) and had greater NaF uptake than clinically silent asymptomatic plaque (2.79 ± 0.6 TBR, $n=11$) ($p=0.04$). *Conclusion:* NaF uptake is related to hydroxyapatite expression and is increased in plaque associated with cerebrovascular events. NaF may serve as a novel biomarker of active calcification and plaque vulnerability.

D.06

The diverse manifestations of tuberous sclerosis complex: the experience of a provincial TSC clinic

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doi: 10.1017/cjn.2015.87

Background: Recent consensus recommendations for Tuberous Sclerosis Complex (TSC) stress the importance of multidisciplinary follow-up for these patients. The objective of our study was to review the manifestations of TSC seen in our hospital to determine the care needs of this population. *Methods:* This was a systematic, retrospective chart review of children with TSC treated at our institution. Patients were identified through epilepsy and clinical neurophysiology databases. *Results:* The study population comprised 81 patients, born between 1987-2014, who were a median 10 (Range 0.2-23.2) years of age at last follow-up. 88% of patients had epilepsy, including 30% with a history of infantile spasms. Developmental delay was reported in 65%, while 40% had intellectual disability. Psychiatric co-morbidities occurred in 49%. The most common psychiatric diagnoses were autism (25%), ADHD (19%), and anxiety (16%). Cardiac rhabdomyomas occurred in 35% of patients and renal angiomyolipomas in 42%, while only 4% had polycystic kidneys. Subependymal giant cell astrocytomas were observed in 14% of patients. 86% had skin manifestations. *Conclusions:* This study reaffirms the multi-system manifestations of TSC and the need to provide comprehensive, multidisciplinary care. As many children are still very young, the prevalence of autism and intellectual disability is likely underestimated.

D.07

Epilepsy surgery in tuberous sclerosis complex: the BC Children's Hospital experience

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doi: 10.1017/cjn.2015.88

Background: Epilepsy occurs in up to 90% of patients with Tuberous Sclerosis Complex (TSC) and is often refractory to medications. Our objective was to assess the safety and outcome of epilepsy surgery in children with TSC at our institution. *Methods:* We performed a systematic, retrospective chart review of children with TSC who underwent epilepsy surgery at our institution. Patients were identified through epilepsy and clinical neurophysiology databases. *Results:* 19 patients (out of 81 with TSC) underwent surgery between 1995-2014. Median age at surgery was 4.2 (Range 1.1-15.6) years, with patients having failed a median 4 (Range 0-10) anti-seizure medications. Surgery comprised corpus callosotomy in 2 and resection of one or more tubers in 17. 2 patients had a subsequent second resection. Minor neurologic deficits occurred after 14% of surgeries. Median follow-up was 2.4 years (Range 0.3 -13.8 years) following surgery . At last follow-up, 47% were seizure free, including 2 patients off anti-seizure medication. *Conclusions:* Epilepsy surgery is safe and effective in carefully selected TSC patients, with the majority having a good seizure outcome. Children with epilepsy secondary to TSC should be referred for epilepsy surgery assessment.