psychiatric diagnosis and more self-reported alcohol consumption in the "worried well" group. The "worried well" and "Alzheimer's Disease" comparison had the same significant differences as the "worried well" and "other" comparison. *Conclusions:* We observed a pattern of differences between the "worried well" patients and those with cognitive disease. Taking multiple factors into account when evaluating a patient may help with clinical decision making.

B.07

Differences between Indigenous and non-Indigenous patients referred to a rural and remote memory clinic

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Background: Jacklin et al. (2013) described a rising incidence and a younger onset of dementia in Albertan First Nations compared to non-First Nations patients. Canadian research is limited in Indigenous patients with dementia, leaving it difficult to understand factors contributing to the differences in incidence and prevalence. *Methods:* 375 patients (41 Indigenous) was seen at the clinic. The questionnaire given during initial assessments were reviewed and differences between groups (non-Indigenous patients versus Indigenous) were assessed. *Results:* Compared to the non-Indigenous patient, Indigenous patients were younger ($p=0.007$), were more likely to be female ($p=0.033$) and had less education ($p=0.055$). They were less likely to live solely with a partner ($p<0.001$) and more likely to have a daughter as caregiver ($p=0.004$). The Indigenous patients were more likely to smoke ($p<0.001$). Although no differences in diagnosis of mental health disorders were seen ($p=0.735$), the Indigenous patients scored significantly higher on the CES-D ($p<0.0001$). *Conclusions:* This comparison highlights differences potentially affecting the health of Indigenous patients. Acknowledging these differences is critical to individualized patient care. Further research is required to explore how these factors affect dementia disease course and treatment, and how these factors play a role in the differences in incidence and prevalence demonstrated in previous studies.

CNSS Chair's Select Abstracts

C.01

Cystic Vestibular Schwannomas respond best to radiosurgery

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Background: Vestibular Schwannomas (VS) have a well-documented response to Gamma Knife® Stereotactic radiosurgery (SRS). However, there is limited data available regarding the volumetric response of cystic tumors. This report correlates the radiographic appearance of VS before radiosurgery with the delayed volumetric response. *Methods:* This study reviewed 219 VS patients between 2003 and 2013. Patients were treatment naïve and had a significant extracanalicular tumor volume. MRI at SRS identified; 42 contrast enhancing macrocystic tumors, 45 contrast enhancing microcystic tumors, and 132 homogeneously enhancing tumors with no intra-tumoral cyst formation. The median follow-up was 49.1 months. The median tumor volume was $2.6cm^3$ (0.70-$16.1cm^3$) and the median dose was 12.5Gy (11-13Gy). *Results:* The actuarial tumor control rate was 99.4% at 2-years and 96.4% at 5-years. A volumetric reduction of >20% occurred in 85.4% of macrocystic tumors, 76.1% of microcystic tumors and 62.8% of homogeneously enhancing VS. The median volume decrease per year for macrocystic, microcystic and homogenous tumors was 17.2%, 7.5% and 7.9% per year respectively ($p<0.001$). Serviceable hearing was maintained in 61.5% of patients that had Gardner-Robertson grade I-II hearing. *Conclusions:* SRS provided VS tumor control in >95% of patients, regardless of radiographic characteristics. Tumor volume regression was most evident in patients with cystic tumors.

C.02

Delayed new-onset hormone dysfunction following complete and incomplete resection of nonfunctioning pituitary adenomas

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Background: Post-operative delayed hormone dysfunction (DHD) in patients with nonfunctioning pituitary adenomas (NFPA) is highly variable and is predicted based on limited evidence. This study was undertaken to assess the likelihood of developing new DHD and its relation to the extent of tumor resection and recurrence. *Methods:* Four hundred fifty-five prospectively collected patient files were reviewed from our Program's database. Inclusion criteria: NFPA; underwent surgery; and minimum follow-up of two years. Tumor recurrence was correlated with DHD (starting one year post-operatively) based on standardized annual imaging and hormone testing. *Results:* Eighty-nine patients met our inclusion criteria: 39 males and 50 females; mean follow-up was 4.3yrs (ranging from 2 to 11yrs). With no post-op residual tumor, the probability of developing DHD was only 7% by six years; no patient in this group developed DHD after three years of follow-up. In contrast, by six years, the probability of DHD was 33% in patients with residual stable tumor, and 54% in those with tumor recurrence/growth. *Conclusions:* By six years, approximately one third of patients with incomplete resection, and over half with tumor regrowth, will likely develop DHD. In contrast, the risk of DHD with complete tumor resection is <10% and, when seen, occurs within three years of surgery.

C.03

Surgical clipping or endovascular coiling for unruptured intracranial aneurysms: a pragmatic randomized trial

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Background: Unruptured intracranial aneurysms (UIAs) are treated using endovascular treatment or microsurgical clipping. The safety and efficacy of treatments have not been compared in a randomized trial. *Methods:* We randomly allocated clipping or coiling to patients with 3-25mm UIAs judged treatable both ways. The primary

outcome was treatment failure, defined as: initial failure of aneurysm treatment, intracranial hemorrhage or residual aneurysm on one year imaging. Secondary outcomes included neurological deficits following treatment, hospitalization >5 days, overall morbidity and mortality and angiographic results at one year. *Results:* 136 patients were enrolled from 2010 through 2016 and 134 patients were treated. The one-year primary outcome, available for 104 patients, was reached in 5/48 (10.4% (4.5%-22.2%)) patients allocated surgical clipping, and 10/56 (17.9% (10.0%-29.8%)) patients allocated endovascular coiling (OR: 0.54 (0.13, 1.90), P=0.40). Morbidity and mortality (mRS>2) at one year occurred in 2/48 (4.2% (1.2%-14.0%)) and 2/56 (3.6% (1.0%-12.1%)) patients allocated clipping and coiling respectively. New neurological deficits (15/65 vs 6/69; OR: 3.12 (1.05, 10.57), P=0.031), and hospitalizations beyond 5 days (30/65 vs 6/69; OR: 8.85 (3.22,28.59), P=0.0001) were more frequent after clipping. *Conclusions:* Surgical clipping led to greater initial treatment-related morbidity than endovascular coiling. At one year, the superior efficacy of clipping remains unproven and in need of randomized evidence.

C.04

Dynamic MRI in the evaluation of the craniocervical junction of pediatric down syndrome patients

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Background: Down syndrome is the most common inherited disorder. Some patients develop craniocervical instability. Existing screening guidelines were developed prior to direct imaging of the neuraxis. We present parameters for potential instability using dynamic MRI of the craniocervical junction. *Methods:* A retrospective review from 2001 – 2015 was carried out. Patients were symptomatic if they had myelopathy or signal changes at the craniocervical junction. Radiographic measurements were taken. Data analysis was performed with SPSS. *Results:* 36 patients were included. Symptomatic patients had smaller CCD (9.4 mm vs 13.8 mm; p = 0.003) and greater ADI (4.4mm vs 3.0 mm; p = 0.01) on resting MRI . During dynamic imaging, symptomatic patients had greater changes in CCD (5.2 vs 2.7 mm; p <0.001) and ADI (2.8 vs 1.3 mm; p = 0.04). These patients were also more likely to have a bony anomaly (0.5 vs 0.13; p = 0.03). *Conclusions:* This study identifies parameters that can be used to distinguish unstable patients. A CCD of less than 5 mm or ADI greater than 4.4 mm on static MRI; change greater than 3mm in ADI or 5mm on CCD during dynamic MRI; or any bony abnormality warrants further investigation. Asymptomatic patients should be followed although most do not progress.

C.05

Is neurosurgical resident training safe?

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Background: With the emergence of competency-based residency education (CBME) in Europe and North America, supervised operative experience is essential for residents to demonstrate competency in requisite neurosurgical procedures prior to board certification. This study explores the implications of such operative exposure to patient safety. *Methods:* Using a pro- and retrospectively maintained databank at two Swiss teaching hospitals, we compared complications, revision surgery rates, and outcome of consecutive patients undergoing lumbar microdiscectomy (n=102), lumbar decompression (n=471), anterior cervical discectomy and fusion (n=281), cranioplasty (n=240), shunt implantation (n=200), and epidural steroid injections (n=354) by a supervised resident versus a board-certified faculty neurosurgeon as primary surgeon using logistic regression. *Results:* Intra- (OR 0.68, 95%CI 0.33–1.41, p=0.305) and postoperative complications (OR 1.14, 95%CI 0.78–1.65, p=0.49), revision surgeries (OR 1.23, 95%CI 0.78–1.93, p=0.36), operating time (p=0.87), blood loss (p=0.57) and the likelihood to be considered treatment responder (OR 0.91, 95%CI 0.65–1.28, p=0.62) was similar for both groups. Specifics of European and Canadian neurosurgery training are compared and discussed. *Conclusions:* Hands-on surgical education within the framework of a structured residency-training program is safe in cervical and lumbar spine surgery and for standard cranial procedures. The summarized results in conjunction with the literature suggest that CBME in Europe and Northern America would not compromise patient safety.

C.06

Retraction of scientific publications in neurosurgery

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Background: Despite increasing awareness of scientific fraud, no attempt has been made to assess its prevalence in neurosurgery. The aim of our review was to assess the chronological trend and reasons for the retraction of neurosurgical publications. *Methods:* We searched the EMBASE and MEDLINE databases using a comprehensive search strategy for retracted articles from January 1995 to December 2016. Archives of retracted articles on www.retractionwatch.com and the independent websites of neurosurgical journals were also searched. Data including the journal name and its impact factor, reason for retraction, country of origin, and citations were extracted. *Results:* A total of 72 studies were included for data extraction. Journal impact factor ranged from 0.24 to 14.4. Most studies(76%) were retracted within the last 5 years. The most common reason for retraction was because of a duplicated publication found elsewhere(25%), followed closely by plagiarism(21%), or falsifying data(17%). Other reasons included scientific errors/mistakes, author misattribution, and fraudulent peer review. Articles originated from several different countries and some were widely cited. *Conclusions:* Retractions of neurosurgical publications are increasing globally, mostly due to issues of academic integrity. Implementation of more transparent data sharing and screening as well as additional education for new researchers may help mitigate these issues moving forward.