invasive tubular retractor is a useful tool, providing the surgeon with enhanced visualization of the operative field, while reducing potential damage to tissue, and optimizing surgical outcomes.

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Functional status in neurosurgery and out of hospital outcomes: insights from a 12 year, 2300 patient retrospective cohort study

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Background: Limited information exists in neurosurgery regarding the association between functional status at hospital discharge and adverse events following discharge. **Methods:** A retrospective cohort study included all adults in one Boston teaching hospital who underwent neurosurgery between 2000-2012, survived hospitalization and had a Physical Therapist functional status assessment within 48-hours of discharge. 90-day post-discharge all-cause mortality was obtained from the US Social Security Administration Death Master File. Logistic regression analysis was used. **Results:** 2,369 patients were included, comprising 65% cranial and 35% spinal. Malignancy and trauma was 47% and 13%, respectively. 238 patients had independent functional status. 90-day mortality and readmission was 8.3% and 28%, respectively. Second, third and lowest quartile of functional status was associated with a 3.16 (95%CI 1.08-9.24), 6.00 (2.11-17.04) and 6.26 (2.16-18.16) respective increased odds of 90-day post-discharge mortality compared to patients with independent functional status, adjusting for age, gender, race, length of stay, presence of malignancy and Deyo-Charlson comorbidity. Good discrimination (AUC 0.82) and calibration (Hosmer-Lemeshow $\chi 2$ P = 0.23) were demonstrated. Adjusted odds of 90-day readmission in patients with the lowest quartile of functional status was 1.89 (1.28-2.80) higher than patients with independent functional status. **Conclusions:** Lower functional status at hospital discharge following neurosurgery is associated with increased post-discharge mortality and hospital readmission.

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Is idiopathic normal pressure hydrocephalus familial—what do we know thus far? Case report and critique of the literature

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Background: One aspect of idiopathic normal pressure hydrocephalus (iNPH) that has garnered interest is whether it can be familial. Thus far, the literature consists of several case reports, and two larger pedigree cohorts. Our objective is to highlight key deficiencies in such studies so far, illustrating them through a family case study of our own, and to propose a set of criteria that studies on familial iNPH should incorporate. **Methods:** Our case study is a retrospective chart review of three siblings, two male and one female, who were diagnosed with iNPH after the age of 60, and whose symptoms improved with cerebrospinal fluid (CSF) shunting. An interview with them revealed that their mother also exhibited symptoms of iNPH, but was never treated with a shunt. **Results:** Our family case is reflective of several deficiencies of familial iNPH research as a whole—unconfirmed diagnosis, especially confirmation with shunt responsiveness, and lack of measures of symptom improvement. **Conclusions:** Research on familial iNPH should focus on patients whose diagnosis is confirmed by shunt responsiveness, and should involve a system to objectively measure signs of NPH. Studies should also compare the prevalence of iNPH among first degree relatives of NPH patients to that in the general population.

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A nation-wide prospective multi-centre study of external ventricular drainage accuracy, safety, and related complications: Interim analysis

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Background: External ventricular drain (EVD) insertion is a common neurosurgical procedure performed in patients with life-threatening conditions, but can be associated with complications. The objectives of this study are to evaluate data on national practice patterns and complications rates in order to optimize clinical care **Methods:** The Canadian Neurosurgery Research Collaborative conducted a prospective multi-centre registry of patients undergoing EVD insertions at Canadian residency programs **Results:** In this interim analysis, 4 sites had recruited 46 patients (mean age: 53.9 years, male:female 2:1). Most EVD insertions occurred outside of the operating theatre, using free-hand technique, and performed by junior neurosurgery residents (R1-R3). The catheter tip was in the ipsilateral frontal horn or body of the lateral ventricle in 76% of cases. Suboptimally placed catheters did not have higher rates of short-term occlusion. EVD-related hemorrhage occurred in 6.5% (3/45) with only 1 symptomatic patient. EVD-related infection occurred in 13% (6/46) at a mean of 6 days and was associated with longer duration of CSF drainage (P=0.039; OR: 1.13) **Conclusions:** Interim results indicate rates of EVD-related complications may be higher than previously thought. This study will continue to recruit patients to confirm these findings and determine specific risk factors associated with them

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Single centre review of lumboperitoneal shunt outcomes

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Background: Ventriculoperitoneal (VP) shunts are an established treatment modality for CSF diversion. An alternative to VP shunting is lumboperitoneal (LP) shunting. There is a paucity of evidence on LP shunt use in the literature, but available studies demonstrate that it is a safer and similarly efficacious method for conditions such as normal pressure hydrocephalies (NPH) and idiopathic

intracranial hypertension (IIH). **Methods:** Ventriculoperitoneal (VP) shunts are an established treatment modality for CSF diversion. An alternative to VP shunting is lumboperitoneal (LP) shunting. There is a paucity of evidence on LP shunt use, but available studies demonstrate that it is a safer and similarly efficacious method for conditions such as normal pressure hydrocephalies (NPH) and idiopathic intracranial hypertension (IIH). **Results:** 95 patients were treated with lumboperitoneal shunt, 71 of which were for hydrocephalus and 24 for IIH. 39 male and 58 female patients were included with mean age 55 (range from 20 to 96 years old). 26 patients had laparoscopic placement of the peritoneal catheter. Mechanical issues with distal end was less with laparoscopic approach. **Conclusions:** We will review disease-specific scores for NPH and IIH, and compare laparoscopic with non-laparoscopic placement of peritoneal catheter. We will also compare outcomes and complications with rates for VP shunting.

Other Pediatric Neurology

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Episodic ataxia and encephalitis: A novel presentation of RESLES in a 3-year-old girl

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Background: Reversible splenial lesion syndrome (RESLES) is a rare clinico-radiological entity associated with multiple etiologies including infection, metabolic, and epileptic disorders. We describe the case of a child with a reversible splenial lesion who presented with encephalopathy and prior history of episodic ataxia. **Methods:** A 3-year-old girl presented to the Stollery Children's hospital with three days of respiratory symptoms followed by acute onset ataxia and encephalopathy. Blood, respiratory samples, and cerebral spinal fluid (CSF) were drawn to investigate for infectious, autoimmune, and metabolic causes. Magnetic resonance imaging (MRI) brain was done and repeated. **Results:** A respiratory panel tested positive for respiratory syncytial virus (RSV), enterovirus, and rhinovirus. CSF analysis revealed elevated white blood cell count (283). MRI brain demonstrated diffusion restriction involving the posterior body and splenium of the corpus callosum and bilateral middle cerebral peduncles, which resolved nine days later. The patient received high-dose steroids with gradual improvement in the encephalopathy and ataxia. **Conclusions:** This report contributes to the complexities in clinical understanding of RESLES, as it highlights a novel presentation with ataxia and encephalopathy. The patient's diagnosis was complicated by previous ataxic episodes of unknown etiology, which allows further consideration of a metabolic or genetic ataxic syndrome and its relationship to encephalopathy.

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Worster-Drought syndrome caused by LINS mutations

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Background: Worster-Drought syndrome (WDS) is a congenital, pseudobulbar paresis. Patients show oromotor apraxia causing impaired speech, drooling, dysphagia and varying degrees of cognitive impairment. Familial cases are reported although causative genes have not been identified. *LINS* mutations have recently been reported in patients with severe cognitive and language impairment. **Methods:** The proband was diagnosed with WDS at 8 years old because of longstanding drooling, dysphagia and impaired tongue movement. At 14 years old, he remains aphonic, using sign language and typing on a smart-tablet to communicate. Neurological examination including facial and extraocular movement was otherwise unremarkable. MRI brain revealed no heterotopia or atrophy. **Results:** An expanded intellectual disability panel at GeneDx identified nonsense mutations in LINS alleles: c.1096; p.Glu366X and c.1178 T>G, p.Lys393X. Neuropsychological testing at 14 years old noted nonverbal reasoning skills at 5 year old level with relative sparing of his receptive vocabulary and visual attention. Compared to prior testing at 9 years his receptive language improved from a 6 year old to an 8.5 year old level. **Conclusions:** Nonsense mutations of *LINS* have been identified in a patient with WDS. Despite his severe and persistent aphonia, improvements in receptive language were observed with global intellectual functioning better than expected.

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Canadian physician attitudes towards long term EEG monitoring in the neonatal intensive care unit

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Background: Long-term EEG monitoring (LTEM), including amplitude-integrated (aEEG) or conventional EEG (cEEG), is increasingly being used in critically ill neonates. Despite an abundance of studies regarding the clinical utility of LTEM, much is unknown regarding provider attitudes toward this tool. We aimed to evaluate neurologist and neonatologist opinions regarding LTEM in the NICU and describe current Canadian practices. **Methods:** A 15-item questionnaire was developed with input from neonatologists and pediatric neurologists at two Canadian centres. The questionnaire was piloted at our hospital and subsequently distributed to Canadian neonatologists and pediatric neurologists. **Results:** All 16 local respondents use LTEM in the NICU. Neonatologists were more likely to combine aEEG and cEEG, and monitor for longer durations than pediatric neurologists. However, most pediatric neurologists would like to monitor more (71%), compared to neonatologists who were more likely to say that current monitoring practices are sufficient. High rates of neonatologists (88%) and neurologists (85%) are interested in attending an education session on LTEM. **Conclusions:** Preliminary data suggests neonatologists and pediatric neurologists differ in their approach to LTEM. Results from our national questionnaire will be analyzed shortly, and may inform the development of educational materials as well as future studies that involve multi-centre efforts.