ABSTRACT SUBMISSIONS

2nd Annual Carlos S. Kase BU Neurology Research Symposium

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Presentation Title: A Case of Hemichorea-hemiballism (HH) in the setting of hyperglycemia with correlative imaging findings, literature review and therapeutic approach

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Abstract: Chorea is defined as involuntary irregular and non-rhythmic movements. Ballism is characterized as repetitive, stereotyped, large-amplitude involuntary movements of the extremities.

Pathogenesis of choreo-ballistic movements with hyperglycemia patients is not fully understood. It is speculated that cerebral dysregulation including hyperosmolar damage on cortical cells, increased metabolism of gamma-aminobutyric acid (GABA) and/or increased dopaminergic activity results in disruption of basal ganglia network.

Here, we illustrate a case of 54 year-old female with uncontrolled Diabetes Mellitus who presented with two days duration of repetitive non-rhythmic involuntary movements of the left hemibody.

Magnetic resonance imaging of the brain (MRI) confirmed T1 hyperintensity within right basal ganglia, which is a classic location for hyperglycemia induced hemichorea-hemiballism.

Patient was initiated on Clonazepam in addition to strict glycemic control with mild improvement in her symptoms. At six months follow up, there was resolution of hemichorea-hemiballism on same dose of clonazepam. Repeat MRI showed unchanged T1 hyperintensity which raises questions regarding the permanent metabolic induced breakdown of the blood brain barrier.

Early diagnosis is essential to target treatment and improve quality of life in individuals who present with hyperglycemia and hemichorea-hemiballism.

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Abstract: Autism is a complex neurodevelopmental disorder characterized by (1) persistent deficits in social communication and social interactions; (2) Restrictive, repetitive patterns of behavior, interests or activities (DSM-5). While some genetic disorders have been associated with autism, a specific cause remains unknown in the large majority of cases and therefore the treatment is not specific. Currently, the most common interventions include behavioral therapy (Applied Behavioral Analysis), speech therapy, occupational therapy and educational or academic support. These services however, are not available for most autistic children because they are expensive, resources are limited and even at best, they can only be offered as a part of special educational programs. Recent research provides supporting evidence that physical activity interventions may be a helpful therapeutic adjunct for treating children with autism. We have studied the effectiveness of a 6-week, community-based, adaptive soccer program for 18 children with autism spectrum disorder. Pre and post soccer skill outcomes were measured and a parent satisfaction survey was used as a parameter of the effectiveness of this intervention. The physical intensity of the soccer program was moderate. Children averaged 5546 steps (SD = 2817) per 1 ½ hour session. Improvements in soccer ball kicking accuracy ($p=0.048$) and 15-yard sprinting time ($p<0.001$) were documented. The parents were very pleased with the program. This research supported the feasibility and effectiveness of an adaptive soccer program in improving soccer related skills, social interactions, and peer group cohesiveness for children with autism spectrum disorder.
Presentation Title: Adapting the Neurology Handoff System to I-PASS: A Quality Improvement Project for Safer Transitions of Care

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Abstract: Background: The Institute of Medicine reports that the majority of serious medical errors involve miscommunication between medical providers when patients are being handed-off. Errors occur because handoffs lack standardization, lack active communication between providers, or have incomplete information. In 2014, a multicenter, prospective study of the I-PASS (Illness severity, Patient summary, Action list, Situational awareness, and Synthesis by receiver) handoff protocol showed that I-PASS was associated with a significant reduction in medical errors. The goal of our project is to adapt Boston Medical Center’s Neurology handoff system to the I-PASS model.

Methods: Residents were given a verbal and video introduction to I-PASS. A Neurology-specific standardized quick-text was designed for written handoffs. Senior housestaff and attendings observed I-PASS handouts, completed audit forms, and provided feedback. Assigned medical students completed comparative audit forms. Residents gave feedback through a Neurology-specific survey.

Results: Resident surveys showed that a majority agreed that I-PASS improved the standardization of handoff and communication of information needed for overnight coverage. A majority agreed that receiver synthesis improved remembrance of information, and that the time needed to complete written handoff was reasonable. Surveys suggested mixed opinions about the time needed to complete verbal handoff, and a majority felt neutral or disagreed that I-PASS improved communication of information needed for weekend coverage. Audit-form results suggest need for improved adherence to the standardized I-PASS format.

Conclusions: Residents find areas of improvement in the handoff system by using the I-PASS model, but there is a need for continued adjustments and improved adherence.
Presentation  A Life-Course Assessment of Treatment Patterns and Healthcare Costs of Lennox-Gastaut Syndrome

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Abstract: Objective: To quantify clinical and economic burdens over the natural course of LGS.

Background: LGS is a severe pediatric epilepsy disorder with low prevalence that persists into adulthood. Using a recently developed LGS claims-based classifier, LGS treatments, outcomes, and costs were examined.

Methods: Health insurance claims for epilepsy patients (≥2 claims for ICD-9 345.xx) of all ages were obtained from 6 state Medicaid programs. LGS patients were identified using a claims-based classifier with random forest methodology and categorized into age cohorts based on observation periods. Patients were assessed for etiologies, syndromal conditions, medication use, and mean healthcare costs by service type. Results were plotted against time-series panels.

Results: The proportion of epilepsy patients with LGS increased prior to age 10, then declined gradually (range: 1.0[percent]-8.4[percent]). Most common etiologies were brain malformations, encephalopathy, and West syndrome, all peaking in childhood and declining in adulthood. The rate of delayed development reached 79.6[percent] before age 5 and declined after age 20; the rate of mental retardation reached 44.5[percent] then stabilized. The majority of LGS patients received ≥1 antiepileptic drug (AED) (range: 62.6[percent]-82.3[percent]), although the use of LGS-specific AEDs (clobazam and rufinamide) was uncommon; their greatest use peaked at ages 0-5 years (maximum rate: 17.5[percent] [clobazam], 7.4[percent] [rufinamide]), and declined to ~5.5[percent] at 18, and <1.0[percent] at 60. Mean total healthcare costs for LGS patients were $32,460-$49,078 per patient per year (PPPY); costs were $9,273-$28,798 PPPY for all epilepsy patients. For LGS patients, medical costs were the main contributors ($28,830-$44,435 PPPY); pharmacy costs were proportionally small ($1,704-$5,672 PPPY).

Conclusions: LGS has a lifelong impact on patients, amassing greater total healthcare and medical costs from childhood through adulthood than all epilepsy patients. LGS-specific AEDs are underutilized in LGS patients. Increased clinical attention to LGS beyond pediatric years is warranted. Funding: Lundbeck, LLC.
Title: Bringing Undergraduate Students a Comprehensive Instruction and Experience in Neuroanatomy through Clinical Education (BU SCIENCE)

Authors: Jason L Weller, MD, MS; James A D Otis, MD, MPH; Cho, Joseph; O'Donnell, Grace; Whelan, Lillian

Abstract: Introduction: Early assimilation of medical students into a clinical environment leads to future success at both the professional and academic levels. While recent studies suggest an overall increase in productivity in graduate students with early exposure, there remains a paucity of evidence showing involvement of students at the undergraduate level.

Objective: The undergraduate clinical neuroanatomy course attempts to identify those students with aspirations for careers in medicine, and assist them in constructing productive relationships with faculty and future mentors in the neurological sciences. We also promote interest through independent research and oral presentation on topics in neurology of the students’ choosing.

Methods: We developed an undergraduate clinical neuroanatomy course focused on major systems and pathways, using a widely accepted text for reference. Students are required to participate in didactic discussion using clinical cases to illustrate neuroanatomical relationships. An inpatient and/or outpatient clinical experience with one of the neurosciences faculty is also mandatory, from which the students will select a topic for research and presentation. To measure student interest in neurology and confidence with clinical concepts, we administered a short survey at the commencement and close of the course.

Results: The inaugural cohort demonstrated an increase in both interest in clinical neuroscience and comfort level with patient encounters, as reported by the course survey.

Conclusions: With this introductory course, students are prepared to examine scientific anatomic structural relationships using clinical scenarios as guidance. They are provided with a unique education in conducting a neurological examination and taught to interpret these results in the diagnosis of disease conditions. The goal is to enhance critical thinking and ensure a smoother transition from the classroom to the clinic as students of medicine, and secondarily to encourage more understanding of clinical neuroanatomy.

REF: Zuzuarregui JRP, and Hohler AD. Comprehensive Opportunities for Research and Teaching Experience (CORTEX); A mentorship program. Neurology June 9, 2015; 84 (23): 2372-6.
Cefepime is a broad-spectrum bactericidal antibiotic. Neurotoxicity has been reported most commonly in patients with acute renal failure. The most frequently reported signs include: myoclonus, seizures, hallucinations and confusion.

We present 3 cases of cefepime induced neurotoxicity in whom diagnosis were made after excluding other common etiologies of altered mental status.

In one patient, neurotoxicity manifested by new onset of progressive expressive aphasia which was seen within four days of initiating treatment and was not reported at the time of initial presentation. Two patients demonstrated asynchronous myoclonic activity of the limbs. The symptoms were seen within four days of initiating the treatment. The symptoms resolved completely within three days of discontinuation of cefepime. Acute structural abnormalities were excluded by CT and MRI of the head. EEG showed diffuse slowing activity with triphasic waves consistent with encephalopathy. In one patient renal function was within normal limits, whereas it was abnormal in other two patients.

Neurotoxicity is a known but probably an underreported side effect of cefepime especially in patients with normal renal function. To our knowledge, this is the first report of cefepime induced asynchronous myoclonus and expressive aphasia in a patient with normal kidney function. We should maintain a heightened index of suspicion in patients with renal and hepatic impairments, even when cefepime is dosed appropriately. Cefepime neurotoxicity is almost always reversible after discontinuation of the medicine.
Central Sleep Apnea in the Acute and Stable Phases of Stroke

Tatiana Filina, MD, Helena W. Lau, MsPH, Saleh Abbas, Judith Clark, RN, Julie Grimes, MD, MD, Sanford H. Auerbach, MD, Yelena G. Pyatkevich, MD, Hugo J. Aparicio, MD

Abstract: Introduction: Sleep apnea is underdiagnosed in the stroke population, despite high prevalence and the association of sleep apnea with poor cardiovascular outcomes. The objective of this study was to evaluate stroke patients for sleep-disordered breathing in the acute and stable phases of stroke.

Methods: Between October 2014 and October 2015, 153 patients admitted to the stroke service were screened by portable sleep test (PST, ApneaLink Air, Resmed USA). Sleep apnea was defined as apnea-hypopnea index (AHI) ≥ 5. A subset of patients was evaluated with overnight polysomnography (PSG) as outpatients. PST and PSG results were compared.

Results: 30 patients (mean age 59.9 ± 12.9 years, 53% male) underwent both an inpatient PST and an outpatient PSG. Mean post-stroke day of PST was day 1.7 (±2 days, range: 0 to 10 days). Mean post-stroke day of PSG was day 64 (±36 days, range: 9 to 160 days). Mean AHI on PST and PSG were 17.6 (±18.2) and 25.5 (±23.6), respectively (p-value=0.034). Pearson correlation between AHI on PST and AHI on PSG was 0.600. PST diagnosed obstructive sleep apnea (OSA) in 25 patients (83.3%) and central sleep apnea (CSA) in 9 (30%). Cheyne-Stokes pattern breathing (CSB) was observed in 6 patients (20%). PSG diagnosed OSA in 29 (96.7%), CSA in 7 (23.3 %), and CSB in 3 (10 %). Cerebral infarction localized to the anterior circulation territory in 5 out of 9 patients (55%) who were diagnosed with CSA on PST.

Conclusions: CSA was common in acute stroke and tended to improve over time. While PST was an adequate screening tool in the acute stroke phase, a follow up PSG study was important for confirmation of sleep disordered breathing subtypes and initiation of appropriate treatment. Further studies are necessary to correlate CSA, stroke location, stroke severity, and change of CSA during stroke recovery.
Presentation Title: Cerebellar Ataxia secondary to Hypothyroidism and Hypomagnesemia

Authors: Amanda Macone, MD, Boston University School of Medicine, Department of Neurology

Abstract: 71 year old male with Hashimoto’s Thyroiditis and baseline low magnesium who initially presented to the emergency room for one month of progressive gait instability and difficulty with tasks requiring coordination. It was discovered that patient missed two months of thyroid replacement therapy, with a markedly elevated TSH and almost undetectable Free T4 level. Patient was discharged home on thyroid replacement therapy. However, over the next week his gait and tremor continued to worsen, with new facial twitching. Patient returned to the emergency room, and while his thyroid function was found to be slowly improving, his magnesium was checked and was found to be markedly low. Patient was continued on thyroid replacement therapy, and was admitted for aggressive magnesium repletion therapy. Over the course of 24 hours his examination markedly improved with normalization of his magnesium level. Patient’s gait continued to improve over the course of the hospitalization, and by one month follow up, all symptoms had resolved.

This case describes an interesting presentation of neurological manifestations secondary to concomitant subacute hypothyroidism and hypomagnesemia. While both conditions are known to cause reversible cerebellar ataxia, there have been no case studies to date with a patient presenting with both conditions simultaneously. Furthermore, while the mechanism behind reversible ataxia in the setting of hypomagnesemia has been postulated, the pathophysiology behind reversible cerebellar ataxia in the setting of hypothyroidism is still unknown.
**Presentation Title:** Comprehensive Opportunities for Research and Teaching Experience (CORTEX): A Mentorship Program

**Authors:** José Rafael P. Zuzuárregui, MD1, Panagiotis Kassavetis, MD, PhD1, Daniel Wallman, MD1 and Anna D. Hohler, MD1

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**Abstract:**

**Objective:** We developed a program to promote medical student interest in pursuing a career in Neurology. This program focuses on medical student mentorship. It also provides opportunities in teaching and clinical research in order to provide students with marketable skills for an academic career in Neurology.

**Methods:** Through this program, students are provided with guidance in developing a fourth year clerkship schedule and an application package for residency programs. Students are involved and mentored in clinical research. Opportunities are also provided for students to teach their peers, with sessions focusing on examination preparation.

**Results:** Since the implementation of this program in 2010, the number of students entering into the field of Neurology from our institution significantly increased from fourteen students between 2006 and 2010, to fifty-one students between 2011 and 2016 (p < 0.05). Medical student research productivity increased from seven publications during 2006 to 2010, to thirty-four publications, thirty poster presentations and a book chapter after implementation of this program in 2010 (p < 0.05).

**Conclusions:** In this mentoring program, students are prepared for residency application and provided with research and teaching opportunities. Students develop a highly desirable academic skill set for residency and have matched at top ranked institutions. This program has been successful in improving student productivity in clinical research and garnering student interest in Neurology.
Abstract: OBJECTIVE: In conjunction with St. Luke Foundation in Haiti, we were able to provide neurological care and education in Port-Au-Prince. During two trips, over 100 patients were seen with the majority of diagnoses being seizures and stroke. Given that there were 10,000 deaths from stroke in 2012; accounting for more than 200,000 Disability Adjusted Life-Years (DALYs) it is crucial that this health crisis is addressed.

METHODS: In order to analyze the stroke epidemic in Haiti we used a case study of a 44-year-old woman presenting with a right thalamic hemorrhage with intraventricular extension. This case is exemplary of the common difficulties patients suffering from lifelong illnesses face in Haiti and the adversities seen in a low-resource healthcare setting.

RESULTS: Of 103 patients, 28 were diagnosed with stroke and two died in the acute phase. Some repeating patterns in patients were lack of health education and noncompliance. Within the clinic, scarce resources and healthcare workers’ limited knowledge on issues like BP and fluid management were also a detrimental to outcomes.

CONCLUSION: We propose target areas to reduce stroke risk factors, one of these being increasing healthcare literacy in Haiti. Through educational programs we hope to provide the necessary skills for Haitian health care providers to recognize and manage basic neurologic diseases. Additionally, we will be hosting Haitian physicians for neurology training in our own facilities. Through collaborative ventures in education and clinical care we hope to make an impact on the lives of the Haitian people.
Title: Distribution of amyloid-beta deposition in chronic traumatic encephalopathy

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Abstract: Exposure to repetitive head impacts (RHI) in contact sports or military service is associated with development of the neurodegenerative disease chronic traumatic encephalopathy (CTE). CTE is primarily defined as a distinct tauopathy however other pathogenic proteins, such as amyloid beta (Aβ), frequently occur. The exact role or nature of Aβ in the pathophysiology of CTE is not yet known. We set out to test the hypothesis that Aβ deposition is altered in subjects with RHI exposure by comparing a heterogeneous cohort of deceased athletes and military veterans with RHI exposure to a community-based study population with minimal history of RHI from the Framingham Heart Study (FHS) and to a cohort from Boston University’s Alzheimer’s Disease Center (ADC).

Subjects were assessed for the presence or absence of diffuse amyloid plaques across different brain regions using immunohistochemistry. We found that the distribution of Aβ frequency by age was significantly different in subjects with a history of RHI compared to a community-based population (FHS) ($\chi^2 = 114.0, p < 0.001$) such that subjects with RHI exposure had a greater frequency of Aβ deposition in their 60’s ($p = 0.012$) and 80’s ($p = 0.004$) than subjects with less exposure (FHS). We further showed that Aβ was altered in CTE compared to subjects with neuropathological changes of AD (NPcAD), including significantly greater frequency in the temporal cortex and CA4 region of the hippocampus and significantly less deposition in the inferior parietal lobule and occipital cortex.

This work was supported with funding by VA (I01 CX001038); Alz Assoc (NIRG-305779); NINDS (U01NS086659-01); NIA (P30AG13846).
Presentation Title: Enriching medical education through gardening: examining the current state of nutrition in medical school.

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Abstract: Objective: This study aims to evaluate the current state of gardening and nutritional knowledge of medical students and subsequently improve upon that state by facilitating and promoting the use of a community garden.

Methods: A 5-point Likert survey on gardening experience and nutritional knowledge was conducted on first and second year medical students at Boston University School of Medicine. Responses ranged from “strongly agree” to “strongly disagree”. To simplify the data, a binary analysis was conducted, assigning “strongly agree” and “agree” options as affirmative responses and “neutral”, “disagree” and “strongly disagree” as negative responses.

Results: 61 students completed the survey. 24.6% of respondents are knowledgeable in gardening, 37.7% can confidently identify basic garden-variety plants and herbs and 52.5% are comfortable harvesting from a garden. 78.7% of respondents are comfortable cooking with ingredients obtained from a garden, 95.1% feel nutrition and eating healthy is important to them, 32.8% think gardening helps them relax and distress and 49.2% of respondents are confident in educating patients about sources of nutritional food.

Conclusion: Medical students are ill-equipped to competently offer nutrition counseling. We describe a self-sustaining community gardening initiative run by medical students. Gardening has the potential to increase nutritional knowledge and provide a wellness activity to counteract the negative physiological effects of medical school.
**Presentation Title:** Evaluation of the effect of a neurology specific heparin protocol on time to goal PTT range: a pre and post protocol implementation study

**Authors:** Prachi Bhatt, PharmD, Virginia Roberts, MD, Lindsay Arnold, PharmD, Anna Cervantes-Arslanian, MD

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**Abstract:**

**Purpose:** Literature on heparin infusion titrations as well as target PTT ranges in ischemic stroke is sparse, though research suggests PTT ranges above twice baseline value are associated with increased risk of hemorrhage. This study evaluated use of a neurology-specific protocol with more frequent PTT monitoring and a narrower goal PTT.

**Methods:** This is a retrospective cohort study evaluating patients before and after implementation of a neurology specific heparin protocol. Outcomes are compared in patients who received heparin prior to (October 2011-September 2013) and after protocol (October 2013-September 2014) implementation. The primary objectives are time to first therapeutic PTT and time to therapeutic PTT range. Secondary objectives include, hemorrhagic conversion, ischemic expansion, protocol compliance, number of sub-therapeutic and supra-therapeutic PTT values, time to initiation of oral anticoagulation, duration of heparin infusion, and number of heparin infusion titrations. All patients >18 years of age, receiving intravenous heparin and admitted with a primary or secondary diagnosis of ischemic stroke will be evaluated for inclusion.

**Results:** Time to first PTT was 4.4 hours in the pre-protocol group (n=4) and 4 hours in the post-protocol group (n=16). The time to first therapeutic PTT was 16.7 hours and 10 hours, respectively. The time to therapeutic PTT range was 27 hours and 18 hours (p=0.404). Protocol compliance was 38.4% (±26.7%) in the post-protocol group and 94.8% (±10.1%) of heparin infusion actions were appropriate. The percentage of PTT values in therapeutic range was 60% in the pre-protocol group and 55.1% in the post-protocol group.

**Conclusion:** Preliminary analysis shows the institution of a neurology specific heparin protocol led to improved time to therapeutic PTT, though given a limited sample size, this difference was not statistically significant. Closer PTT monitoring occurred after implementation of the protocol. Assessment for secondary outcomes is ongoing.
Exploring Gender-Associated Socioeconomic Differences in Parkinson’s Disease

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Abstract: **Objective:** To identify differences in Parkinson’s disease (PD) presentation in men and women, and identify socioeconomic factors that may confound such differences.

**Background:** Research on gender in Parkinson’s disease (PD) frequently focuses on clinical differences between men and women. Socioeconomic factors such as a race, ethnicity, insurance type, and level of educational attainment, have not been extensively examined in relation to gender differences in PD.

**Methods:** A movement disorder patient database containing 445 patients with idiopathic PD was analyzed for gender differences in motor symptoms and disease complications using linear or logistic regression. Socioeconomic variables were then evaluated as possible confounders.

**Results:** A greater proportion of women were non-white (p < 0.05). Univariate analysis of gender, and multivariate analysis controlling for age at diagnosis and socioeconomic factors were concordant in demonstrating increased frequency of motor fluctuations and dyskinesia in women (p < 0.05). Controlled, multivariate analysis, when compared to univariate analysis, uniquely demonstrated that women were less likely to experience dementia and autonomic dysfunction, relative to men (p < 0.05).

**Conclusion:** Women with PD are susceptible to motor fluctuations and dyskinesia, but may be relatively protected against dementia and autonomic dysfunction. Women and men with PD in our population had different socioeconomic profiles, which may have confounded some gender-associated differences.
Hospital Readmissions Following Stroke: a Retrospective Study

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Background: Hospital readmissions after discharge are an important measure of the quality of health care services for several clinical conditions because readmissions indicate unresolved problems from the index admission, inadequate post-hospitalization care, a more chronically ill population, or a mixture of these factors. Additionally, hospital readmissions are associated with a substantial economic burden on the health care system. The purpose of this study is to identify predictors of stroke-related readmissions at 30 days on a hospital level and suggest interventions to reduce the number of readmissions.

Methods: We conducted a single-center retrospective study of patients admitted to Boston Medical Center and diagnosed with ischemic and hemorrhagic stroke. Our goal was to assess if specific patient demographic factors, stroke presentation factors, and/or discharge planning factors serve as predictors for subsequent hospital readmission at 30 days. Statistical analysis with unadjusted logistic regression and multivariable logistic regression was performed to evaluate the data.

Results: Of the 352 patients with a diagnosis of ischemic or hemorrhagic stroke at BMC during the study period, 44 (12.5\%) patients had 44 readmissions within 30 days to BMC. Analysis revealed a significant association (p<0.05) with alcohol abuse and homelessness and hospital readmission at 30 days.

Conclusions: These results suggest that early inpatient and post-hospitalization interventions to address alcohol abuse and homelessness during the index hospital admission may reduce the rate of hospital readmission within 30 days.
Huntington’s, Parkinson’s, and the pan neurodegenerative disease transcriptional response

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Abstract: Huntington’s and Parkinson’s Diseases (HD and PD) are neurodegenerative disorders that share some pathological features but are disparate in others. For example, while both diseases are marked by aberrant protein aggregation in the brain, the specific proteins that aggregate and types of neurons affected differ. A better understanding of the molecular similarities and differences between these two diseases may lead to a more complete mechanistic picture of both the individual diseases and the neurodegenerative process in general. We sought to characterize the common transcriptional signature of HD and PD as well as genes uniquely implicated in each of these diseases using mRNASeq data from post mortem human brains in comparison to neuropathologically normal controls. There is remarkable consistency between the enriched biological pathways in the HD and PD differentially expressed (DE) genes, implicating common biological processes including neuro inflammation, apoptosis, transcriptional dysregulation, and neuron associated functions. Comparison of the DE genes highlights a set of consistently altered genes that span both diseases. In particular, processes involving nuclear factor kappa light chain enhancer of activated B cells (NFkB) and transcription factor cAMP response element binding protein (CREB) are the most prominent among the genes common to HD and PD. When the combined HD and PD data are compared to controls, relatively few additional biological processes emerge as significantly enriched. Despite showing comparable numbers of DE genes, HD specific genes are enriched in far more coherent biological processes than the PD specific genes.
Hypoglycemia Induced Cortical Laminar Necrosis: A Case Report

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Background: Cortical laminar necrosis is permanent brain injury visualized as high intensity cortical lesions on T1-weighted magnetic resonance imaging (MRI). Studies have shown that cerebral cortical laminar necrosis on MRI can be the result of hypoxic-ischemic encephalopathy, immunosuppressive treatment, and prolonged focal status epilepticus. Here we report a patient who developed cortical laminar necrosis after prolonged hypoglycemia.

Methods: This is a single case report of a patient with diffuse cerebral cortical laminar necrosis on diffusion weighted MRI due to profound hypoglycemic encephalopathy secondary to medication misuse.

Results: T1-weighted MRI of the brain showed diffuse cortical enhancement throughout the frontal and parietal lobes, as well as the temporal lobes bilaterally. Additionally, there was evidence of associated diffuse cortical bright signal. These findings are consistent with cortical laminar necrosis.

Conclusions: The areas of the brain most susceptible to injury after a hypoglycemic insult vary. However, the degree of the lesion can assist in prognosis. Cerebral cortical laminar necrosis may be used to aid in predicting poor prognosis of a patient after a hypoglycemic insult.
Implementation of Stroke Patient Education at Boston Medical center: QI Pilot Project

N Dudha, V Janakiraman, J Clark, H Lau, A Hohler, CS Kase

Background- Return visit rate to the hospital in a 4-month period at BMC was 21%, and 0.03% directly to the stroke service. Our estimated “no show” rate for first post-stroke clinic visit was 40%. Our clinical experience as neurology residents is that our patients lack knowledge about stroke and risk factors, and are non-compliant.

Objectives- To provide supplemental patient education regarding stroke to increase awareness for risk factors, early signs and symptoms, and the need to seek immediate medical attention.

Methods- Twenty-five patients were surveyed and provided stroke education over 12 weeks on the stroke unit at BMC. ‘Teaching’ included verbal and visual inputs (diagrams, pictures). Pre and post-tests included 6-categories (stroke symptoms, what to do when a stroke happens, immediate intervention (i.e. IV-tPA), when to get stroke care, risk factors for stroke, and stroke follow up). Patients provided with 3-page education resource. Surveys and teaching conducted by a Neurology resident, medical student, RN or NP. T-test for dependent means to compare each education categories

Results- The mean post-test scores were significantly higher than the mean pre-test scores in all 6 categories: stroke symptoms (5.08 vs 3.16, p=0.00001), stroke to-do (4.72 vs 2.84, p=0.00001), stroke treatments (4.60 vs 2.04, p=0.00001), stroke care (4.60 vs 2.72, p=0.00001), stroke risks (6.16 vs 3.76, p=0.00001), and stroke follow-up (3.76 vs 1.84, p=0.00001).

Conclusion- All categories of the survey showed significant improvement in the patients’ understanding of stroke care after ‘teaching’.
Presentation Title: Improving Acute Stroke Management Through The Use of Simulation Based Training

Authors: Benjamin Saunders MD\textsuperscript{1}, Ting Wu MD\textsuperscript{1}, Guannan Ge MD\textsuperscript{1}, Amanda Macone MD\textsuperscript{1}, Judith Clark RN BSN\textsuperscript{1} and Hugo Aparicio MD\textsuperscript{1}

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Abstract: American Stroke Association advocates for reducing door to needle times (DTN) for the administration of IV t-PA to under 60 minutes, as this improves outcomes. Additionally, the “Get With the Guidelines®” (GWTG) program is an in-hospital program which promotes adherence to treatment guidelines for stroke care with the ultimate goal of improving patient outcomes. We set out to improve GWTG compliance and improve DTN times through the use of simulation based training. This training was shown to improve resident knowledge and confidence with regards to management of acute strokes and administration of t-PA. However, there are many external factors that influence DTN times. A systematic case review of t-PA cases over the past 2 years and several areas were identified for improvement of DTN times, these include but are not limited to determining inclusion criteria, early mixing of t-PA, and quickly identifying last known well time. Future training will incorporate these areas for improvement as well as further residents knowledge of stroke management.
**Title:** Improving Discharge Efficiency

**Authors:** David Hammer and Judith Clark, Boston University Medical Center

**Abstract:**

*Introduction:* As Boston Medical Center prepares to downsize by closing the East Newton Campus, there has been a renewed emphasis placed on timely discharge of hospitalized patients. In order to improve discharge efficiency for patient’s on the stroke service, physicians were encouraged to discharge patients before noon and the data was analyzed to evaluate for improvement.

*Methods:* Data from patients admitted from the stroke service in November (prior to initiation of the intervention) was compared to data following the initiation of interventions. Interventions included weekly emails to residents on service with discharge times for the last week, encouragement of residents’ efforts to discharge patients on time, and encouragement of early discussions between attendings and residents to anticipate likely discharges.

*Results:* Average time of discharge order placement improved from 2:53 pm for stroke patients admitted in November to 12:50 pm in December, 1:23 pm in January, and 12:44 pm through the first two weeks of February with p values of .002, .022, and .005 respectively. Corresponding improvements in the time of patient discharge from the hospital were noted.

*Conclusion:* The above interventions have showed a significant effect in improving discharge times. However, the department has not yet met the hospital’s goals for improving time of discharge.
Intraventricular bleed or foreign body?

Nilofar Dudha, MD, Brian McGeeney, MD, MPH

Introduction: Intraventricular migration of silicone oil after intraocular tamponade for retinal detachment is a rare complication. We describe a case of migration of silicone oil into the lateral ventricles six years after this procedure.

Case: A 60 year old female with history of left eye retinal detachment status post silicone oil placement in 2010 presented with headache for 3 weeks. CT brain revealed hyperdense material within the frontal horns of both lateral ventricles and hyperdensities within the skull, suggestive of silicone oil migration to diploic veins. MRI brain confirmed these findings. Ophthalmological exam did not reveal elevated intraocular pressures. Removal of silicone oil was not considered.

Discussion: It is unclear how silicone oil penetrates the nervous system. One theory suggests that silicone migrates from the retina to the optic nerve, into the subarachnoid space via the dural sheath then into the ventricular system. Another theory suggests that silicone oil is absorbed through the orbital venous system, into the subarachnoid space and ultra-filtered with the CSF into the ventricles. The timing for migration ranges from 6 months to 10 years. The clinical features are mainly headache and dizziness. Rare cases can present with ocular pain, reduced visual acuity, and new onset seizure. There are no case reports to date showing benefit of removal of intraventricular silicone oil.

Conclusion: It is very important for the neurologist to recognize this entity, as other etiologies with similar imaging findings requires emergent attention.
Larger Size Cryptogenic Ischemic Strokes Associated with Patent Foramen Ovale and Bi-directional Shunt

Authors: Rodica E Petrea, Michael Del Core, Dennis Esterbrooks, Creighton University Medical School, Omaha, NE

Abstract:

Objective: To report two cases of larger size cryptogenic ischemic strokes in association with patent foramen ovale (PFO) and concomitant bi-directional shunt on TEE (transesophageal echocardiography) with bubble and definity contrast study.

Background: Recent literature reports on size of ischemic strokes and PFO using RoPE (risk of paradoxical embolism) score associated larger strokes with PFO. Data on PFO with concomitant bi-directional shunt and cryptogenic strokes is unknown.

Design: Case 1. A 41-year-old female with left sided stroke symptoms was diagnosed with a large (>20 mm) acute right fronto-parietal ischemic stroke on brain magnetic resonance imaging (MRI). Case 2. A 64-year-old man with 1 week confusion, fall and right frontal intracerebral hemorrhage on noncontrast head computed tomography (CT) was diagnosed with associated large subacute right frontal ischemic stroke (>15 mm) and few subacute small, bilateral subcortical ischemic strokes on brain MRI. Both patients were found to have PFO with bi-directional shunt on TEE with bubble and definity contrast study.

Conclusions/Relevance: The novelty of our case reports is the concomitant bi-directional shunt on TEE with bubble and definity contrast study, previously not reported in association with PFO and stroke. The significance of this association as a risk factor for stroke remains to be further studied.
Presentation Title: Prevalence and characteristics of seizures and epilepsy in the first 10 years of life in children born before 28 weeks gestation (extremely low gestational age newborns - ELGANs)

Authors: Douglass, L ; Kuban, K; Heeren, T; Allred, EA; DeBassio, W; Stafstrom, C; O’Shea, M; Hirtz, D, Rollins, J, Leviton, A

Abstract: Objective To evaluate whether the prevalence of seizures and epilepsy in the first decade of life among ELGANs exceeds the general population prevalence.

Method- In a prospective, multicenter observational study of 966 eligible survivors, 895 (92%) were followed at age 10, and 838 were evaluated for occurrence of post-neonatal seizures using a 2-stage structured interview by a pediatric epileptologist. A 2nd pediatric epileptologist established an independent diagnosis based on the recorded responses of the structured interview. When the first 2 evaluators disagreed, a third independent epileptologist (3% of cases) determined the final diagnosis.

Results- 271 of the cohort were positive on an 11-item screen, and 223 of these underwent the full 42-item structured interview. 87 (10.4% of the evaluated cohort, 95% CI 8.3–12.4%) of those screened were diagnosed to have had at least one seizure. Among these, 55 (6.6%, 95% CI 4.9, 8.2) were diagnosed as having had epilepsy, 23 (2.7%) had ≥ 1 febrile seizures, and 12 (1.6%) had a single, unprovoked seizure (3 had febrile seizures also). Seizures occurred in 14% of those born at 23-24 weeks gestational age (GA), 11% born at 25-26 weeks, and 8% born at 27 weeks. Seizures were not associated with small for GA status, and males and females had comparable numbers of seizures. Our evaluation diagnosed epilepsy for the first time in one-third of those with epilepsy.

Conclusion- The prevalence of epilepsy in ELGANs is approximately 6-12-fold higher than .5 -1% reported in the pediatric population.

The ELGAN Study is supported by the National Institute of Neurological Disorders and Stroke (NS040069)
Presentation Title: Racial Disparities in Parkinson’s disease

Authors: Chantale O. Branson, MD, Luke Quehl, BS Janice Weinberg, ScD, Anna Hohler, MD
Marie-Helene Saint-Hilaire, MD

Abstract: Background: Determining contributing factors in the prevalence of Parkinson’s disease (PD) based on race may improve health disparities in the United States. According to the largest study analyzing prevalence and incidence of African-Americans (AA) compared to Caucasians the prevalence ratio was .58 with approximately 8% AA and 86.6% Caucasians (9% race ratio) among national Medicare beneficiaries [1].

Objective: To understand the prevalence of Parkinson’s disease (PD) among non-Whites compared to non-Hispanic Whites in a tertiary urban Movement disorders center. Boston Medical Center is the largest safety net hospital in New England and is distinguished for providing health care to over half (59%) of patients from underserved populations. The population demographics at Boston Medical Center among AA and Caucasians are 33.6% and 29.1% respectively.

Methods: We performed a retrospective analysis of AA patients with PD in a movement disorders database. The database included 489 patients with Parkinsonism. Of the 489 patients 411 were Caucasians and 82 were of AA

Results: The expected PD case ratio among AA compared to Caucasians was approximately 63%. The actual case ratio within the database is 8%, which is substantially lower than expected. The demographics of the movement disorders clinic does not reflect the population at Boston Medical Center. This discrepancy may be accounted for by referral bias with fewer Caucasians being referred by practitioners.

Recovery from Brain Injury after Prolonged Disorders of Consciousness: Outcome of Patients Admitted to Rehabilitation with 1-8 Year Follow-up

Authors: Douglas Katz1,2, Brigid Dwyer1,2, Meg Polyak2, Daniel Coughlan2, Emily Goff2, Meline Nichols2, Alexis Roche2

1Neurology Boston University School of Medicine Boston MA
2HealthSouth Braintree Rehab Hospital Braintree MA

Abstract: OBJECTIVE: To characterize the recovery of brain injured patients with prolonged disorders of consciousness (DOC). BACKGROUND: Information on long-term recovery is limited in this group.

DESIGN/METHODS: Retrospective review. Setting: brain injury program, inpatient rehabilitation. Consecutive series, 64 patients with traumatic (TBI) and non-traumatic brain injury admitted in a vegetative state (VS) or minimally conscious state (MCS). Intervention: weekly Coma Recovery Scale - Revised (CRS-R), Galveston Orientation Amnesia Test and FIM scores 1-8 years post-injury. Main Outcomes: % and timing of improvement in level of consciousness (LOC); Disability Rating scores (DRS), household independence, return to school/work.

RESULTS: 72% emerged from MCS and ½ resolved a confusional state (CS/PTA). 42% achieved daytime household independence, 25% were employable and 17% returned to work/school. DRS scores improved through year 5. Predictors of better outcome: >CRS-R change first 3 weeks; shorter lag to admission; admission LOC (MCS >VS), >discharge FIM, TBI modality. Patients with slower MCS (>80 days) or CS/PTA (>100 days) resolution had poorer outcomes.

CONCLUSIONS: Substantial proportions of brain injured patients with prolonged DOC return to household independence and productive pursuits. DRS improvements occur for up to 5 years. Injury etiology (TBI) and early achievement of higher LOC are important predictors favorable outcome.
Presentation Title: **Restless Legs Syndrome in an Atypical Parkinson’s Disease Patient Population**

Authors: José Rafael P. Zuzuárrregui, MD¹, Katherine Werbaneth, MD², Jing Qin, MD², Chantale Murray, MD¹, Sok Lee, MD¹, Janice Weinberg, SciD³, Marie-Helene Saint-Hilaire, MD¹, Anna D. Hohler, MD¹

¹ Department of Neurology, Boston University School of Medicine, Boston, MA
² Boston University School of Medicine, Boston, MA
³ Department of Biostatistics, Boston University School of Public Health, Boston, MA

Abstract: **Objective:** Determine the prevalence of Restless Legs Syndrome (RLS) in patients with Atypical Parkinson’s Disease (APD).

**Background:** A prevalence of RLS has been established in Parkinson’s disease (PD), up to 22% in some studies. However, prevalence of RLS in APD is not well documented.

**Methods:** Three study groups were assessed for prevalence and severity of RLS. Patients with one of the APD disorders were compared to patients with PD and a control group. A survey was administered to determine the presence and severity of symptoms consistent with RLS.

**Results:** Of 143 patients surveyed in movement disorder clinic, the PD group had a higher prevalence of RLS (0.27) than either controls (0.21) or the APD group (0.22), but this difference was not statistically significant (p=0.49). The APD group had a higher RLS severity score (21.8) than either the control group (20.6) or the PD group (18.5), but the difference between all groups was not statistically significant.

**Conclusions:** There was no significant difference in the prevalence of restless leg syndrome in patients with PD compared to those with APD.
Safety and efficacy of IV-tPA use in patients 80 years and older- a retrospective review

Authors: HW Lau, JR Romero, SA Kwan, CS Kase, VL Babikian

Abstract: **Background and Purpose**—Studies on the safety and efficacy of intravenous thrombolysis (IV-tPA) in acute ischemic stroke (AIS) patients 80 and older remain scarce. This is one of the fastest growing segment of the American population with 1 in every 9 baby boomers living to 90. Standard functional outcome (mRS<=2) used to evaluate those <80 may not be appropriate for this older group.

**Methods**—We reviewed all AIS patients treated with IV-tPA in a single center from March 2006 through May 2015. Symptomatic intracranial hemorrhage (sICH) and cerebral microhemorrhage (CMBs) data were extracted from CT and MRI reports. Functional outcome (mRS) at 3 months was extrapolated from the clinic exam if not noted in the medical records. Student t-test and fisher chi-square test were used to analyze the data.

**Results**—Of the 156 IV-tPA treated patients, 33 (21%) were 80+. There was no difference between the 80+ and <80 groups for sICH (9% vs 5%, p=0.40) or CMBs (6% vs 3%, p=0.61). Pre-admission disability (24% vs 1%, p=0.0001), admission NIHSS (16 vs 12, p= 0.002), and mortality (30% vs 7%, p=0.0007) were higher in the 80+ group. A sub-analysis the 80+ patients (n=33) showed that poor outcome (mRS 5-6) was related to prior history of stroke/TIA (42% vs 10%, p=0.07); higher admission NIHSS (19 vs 15, p=0.08); sICH post IV-tPA (3% vs 0%, p=0.04); and higher diastolic blood pressure (98 vs 83, p=0.03).

**Conclusion**—We observed no increase in sICH post IV-tPA in patients 80+ when compared to those younger. Higher mortality in those 80+ likely due to baseline disabilities. Within the 80+ group, predictors of mortality and poor outcomes included disabilities prior to hospitalization, prior stroke/TIA, higher NIHSS at admission, sICH post treatment and higher diastolic blood pressure.
Title: Simulation training in preparation for ultrasound-guided lumbar puncture

Authors: Anthony Savino MD, Pantelis Pavlakis MD, Venkatesh Janakiraman MD, Megan Leo MD, Allisa Genthon MD, Anna Hohler MD

Abstract: Objective: To assess trainee ability in learning the ultrasound techniques necessary to complete an ultrasound-guided lumbar puncture and determine whether this had impact on trainee comfort level in performing lumbar puncture and ability to identify spinal landmarks.

Methods: Two days of ultrasound training were completed with groups of resident, fellow and attending physicians from varying disciplines. Questionnaires were completed using Likert scale along with pre and post-tests focused on basic ultrasound technique. Participants were asked to identify lumbar interspaces along with spinal midline using landmark technique followed by ultrasound guidance. Results were measured against predetermined anatomical points.

Results: Of the 23 participants only 60% (13) had performed more than 10 lumbar punctures with a 74% comfort rating across trainees. Less than half the participants had used ultrasound in any way before training and among those only 35% were comfortable using ultrasound and 4% (1) in using ultrasound to identify spinal anatomy. These ratings improved to 91% and 96% respectively. Average score on ultrasound knowledge testing increased from 52% to 82%. Largest time difference between landmark and ultrasound identification was 357 seconds with a mean of 117. (One participant performed ultrasound 5 seconds faster). Overall, 96% of participants have interest in further ultrasound training and 91% believe ultrasound-guided lumbar puncture would be beneficial for patient care. All participants felt prepared to use ultrasound for lumbar puncture after training.

Conclusion: A brief, introductory and simulation-based ultrasound training session can increase trainee comfort and prepare participants for the use of ultrasound-guided lumbar puncture.
Presentation Title: Sleep Disordered Breathing in Children with Primary Mitochondrial Disorders

Authors: Tatiana Filina, MD, William DeBassio, MD, Sandford Auerbach, MD, Mandeep Rana, MD.

Abstract: Primary Mitochondrial Disorders (MD) are heritable spontaneous inborn errors of metabolism in which conversion of substrate fuels to energy is perturbed. This disorder is underdiagnosed.

Sleep disorders in MD have been reported, however sleep pathology in MD in not well described, and there are no recommendations regarding screening. We present a new case and review of the literature discussing pathophysiology and recommendations for further studies.

Case Report: 11 yo boy with history of Complex I, II, IV respiratory chain deficiency, developmental delays, and seizures. He was referred for evaluation of nighttime awakenings and recent increase in nocturnal seizures. Exam was notable for intellectual disability, severe hypotonia, but no scoliosis. BMI was 16.6Kg/m². Brain MRI was normal, with the exception of asymmetry of anterior frontal lobes.

Overnight Polysomnogram revealed obstructive and central sleep-disordered breathing, sleep fragmentation, intermittent hypoxia and hypoventilation. The overall AHI was 21/hour with obstructive AHI 2.4 and central AHI 18.7. End-tidal CO2 ranged between 48 to 57 torr with a peak of 63 torr during sleep and 54 torr during wakefulness. Baseline oxygenation was normal, nadir of 73% was noted with respiratory events. Patient had a good response to BiPAP 10/4 cm H2O, backup rate of 12. With BiPAP use, he was more alert and nocturnal seizures were markedly improved.

Sleep-disordered breathing may be underrecognized in patients with mitochondrial disorders. Central sleep apnea is likely related to energy failure and poor ventilatory response to hypercapnia. In our case, oxygen desaturations and hypercapnia were triggering seizures as evidenced by improved seizure control with BIPAP treatment without changes in seizure medications. Sleep disturbances, particularly central sleep apnea, should be considered in children with MD. Polysomnography and PAP treatment may improve quality of life for these patients, including seizure control. Unexplained central apneas may also raise a question of a MD.
STOP-OSA: Validation of STOP-BANG and Alternative Scoring Models at a Safety-net Hospital

Authors: Jami H Johnsen MD, Navin Bajaj MD and Sanford H Auerbach MD

Abstract: Introduction: STOP-BANG was developed as a screen for obstructive sleep apnea (OSA) in elective surgical patients though its utility in the sleep clinic is still unclear. While more sensitive than other sleep questionnaires, it is limited by low specificity. Alternative scoring models, with higher specificity, have been examined but only in the pre-surgical population.

We assessed the predictive value of STOP-BANG among patients referred to the sleep laboratory at a safety-net hospital as well as two alternative scoring models: STOP-BANG30 (BMI of 30) and STOP-OSA (Snoring, Tiredness, Observed Apneas, Blood Pressure, Obesity (BMI >30), Sex, Age)

Methods: We retrospectively analyzed in-laboratory polysomnography, Epworth Sleepiness Scale and STOP-BANG in consecutive adult patients presenting for baseline or split night studies for any reason between November 2013 and January 2014. We evaluated sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for STOP-BANG, STOP-BANG30 and STOP-OSA to identify OSA.

Results: Of 298 evaluated adults, 290 had complete data. Mean age was 49-years with 55% males; the population was equally divided between Caucasian, African-Americans and Hispanic ethnicities. Most were obese (65.9% BMI >30). The prevalence of OSA (AHI >5) was 68.6% with a mean AHI of 31.7. A positive STOP-BANG had a sensitivity of 100%, specificity 11.7%, PPV 44.07% and NPV 100% for moderate to severe OSA. A positive STOP-BANG30 or STOP-OSA (score ≥3) had similarly high sensitivity and NPV and low specificity.

Conclusion: All three variations represent good screening tools with high sensitivities and NPVs though unfortunately still with low specificity. The alternative models benefit from a more practical obesity definition and STOP-OSA eliminates the non-standardized neck circumference. Limitations of this study include retrospective data in a high prevalence population; these models should be further evaluated for applicability in community populations.
Presentation Title: Stroke Unit Evaluation of Sleep Apnea: Validity of Screening Tools and Use of a Portable Sleep Study

Authors: Hugo J. Aparicio, MD, Tudor Sturzoiu, MS, Saleh Abbas, Helena W. Lau, MsPH, Judith Clark, RN, Julie Grimes, MD, Hesham E. Masoud, MD, Thanh N. Nguyen, MD, Sanford H. Auerbach, MD, Yelena G. Pyatkevich, MD

Abstract: Background: Despite high prevalence and an association with poor cardiovascular outcomes, sleep apnea is underdiagnosed in the stroke population. No standard exists for screening hospitalized stroke patients. We investigated the use of screening tools and the implementation of an inpatient portable sleep test (PST) to evaluate stroke patients for sleep-disordered breathing in a hospital quality improvement study.

Methods: Patients admitted to the stroke unit were screened for sleep apnea using three instruments, the Epworth Sleepiness Scale (ESS), Berlin Questionnaire (BQ), and STOP-BANG Questionnaire (STOP-BANG). Patients were evaluated with a portable sleep study device, ApneaLink Air (ResMed, USA), prior to discharge. Respiration and oximetry data were recorded and sleep apnea was determined by apnea-hypopnea index (AHI) ≥5 events/hour. Predictions from the screening tools were compared to results from the PST and, in a subset of patients, outpatient overnight polysomnography (PSG). Sensitivity and specificity testing were used to assess the tools.

Results: Sleep questionnaires were administered on 37 patients who underwent an overnight sleep study. Obstructive sleep apnea was diagnosed in 38 (73%). Mean AHI was 17.6±16.7/hr and maximum AHI was 76.4 events/hr. Sensitivity for the ESS, BQ, and STOP-BANG were 0.39, 0.66, and 0.83 and specificity were 0.26, 0.33, and 0.29, respectively. For AHI results in 30 patients who underwent both PST and PSG, Pearson correlation was 0.75.

Conclusions: The STOP-BANG questionnaire, administered to hospitalized stroke patients, had high sensitivity and low-moderate specificity, compared to two other screening tools. The feasibility of using an unattended inpatient PST on stroke patients is demonstrated.
Temporal trends in stroke incidence in the young in the Framingham Study

Hugo J. Aparicio, Alexa S. Beiser, Jayandra J. Himali, Claudia L. Satizabal, Matthew Pase, Jose R. Romero, Carlos S. Kase, Sudha Seshadri

Abstract:

**Background:** Declining stroke incidence and mortality is well-documented, however recent reports have raised concerns that stroke incidence may be leveling off or increasing among younger adults. Early-onset stroke has a disproportionately large impact on disability-adjusted life-years lost. We explored long-term temporal trends in stroke incidence among young adults in a representative community sample.

**Design/Methods:** Prospective surveillance for incident stroke has been ongoing since 1948 in the Framingham Study. We compared age- and sex-adjusted 10-year stroke risk using Cox models in persons aged 35-55 and >55 years at start of follow-up. Test for linear trend were performed over the four epochs, controlling for the distance in time between intervals. Trends in prevalence of vascular risk factors were investigated.

**Results:** There were 179, 227, 200, and 197 incident clinical strokes within each epoch beginning in 1962 (n=3,966), 1971 (n=5,779), 1986 (n=5,133), and 1998 (n=6,964). Using the risk in the 1968 interval as the reference, the risk of stroke for young adults did not significantly decline (HR=0.89, 95%CI 0.77-1.02, for trend) through the follow-up periods, while it did significantly decline for those >55 years at start of follow-up (HR 0.83 95%CI 0.78-0.88). In both age groups, prevalence of hypertension, cholesterol, and smoking declined, while prevalence of diabetes and obesity increased.

**Conclusions:** In contrast to declining risk in older adults, the risk of incident stroke for young adults did not decline significantly over four time periods. Possible reasons for the persistently elevated risk, including genetic propensities and differences in stroke subtypes, will be explored.
The Boston University Neurology Video Case Library

Title:

Authors: Farhan Ladhani, BS\textsuperscript{a}, Panagiotis Kassavetis, MD, PhD\textsuperscript{a,b}, Karen Morgenshtern, MD\textsuperscript{c}, Anna Hohler, MD\textsuperscript{a,b}

\textsuperscript{a}Boston University School of Medicine, \textsuperscript{b}Boston Medical Center, Department of Neurology, \textsuperscript{c}Eisenhower Medical Center

Abstract: Video libraries have been extensively used as supplementary tools in the educational curriculum of graduate and postgraduate programs. The Neurology department at BUSM offers a large pool of patients, ideal for developing a video case library.

Objective: To develop a video library of neurological disorders (and associated questions and answers), accessible to medical students and neurology residents for education and research purposes. To assess the impact of the video library on improving the diagnostic confidence of medical students and residents by means of self-reported questionnaires.

Methods: The project will consist of three phases. The first phase (Development of pilot cases) consists of the development of a consent form, selection of accessible storage space and development of 10 pilot cases. During the second phase (Expansion), the library will be expanded with additional videos that will be collected from the inpatient and outpatient setting. The third phase (Integration in teaching) will involve integration of the video library into the curriculum of the neurology clerkship and neurology residency at BUSM and assessment of its impact by means of self-reported questionnaires.

Results: The project is currently in phase one. 10 pilot cases have been developed covering a spectrum of neurological disorders. These cases will be made available to students and residents.

Conclusions: The neurological video case library is under development. Phase one is complete with 10 pilot cases. The next steps include expansion of the video library and its integration into the educational curriculum of medical students and residents.
The Effect of Language Barriers on Delays to Treatment with IV Thrombolysis in Acute Stroke Patients

Authors: Shefali Dujari, BA, 1 Helena W. Lau, MsPH, 1 Judith Clark, RN, 1 Thanh N. Nguyen, 1 MD, Viken L. Babikian, MD, 1 Carlos S. Kase, MD, 1 Rafael J. Romero, MD, 1 Hugo J. Aparicio, MD 1

1. Boston University School of Medicine

Abstract: Background: Limited English proficiency (LEP) may limit a patient’s ability to effectively communicate with healthcare providers. We hypothesized that LEP patients presenting to the emergency department (ED) for acute ischemic stroke would experience delays in brain imaging acquisition and longer door-to-needle (DTN) times for administration of IV tPA.

Methods: Medical records were reviewed to determine LEP status on all patients who received IV tPA in the ED of an academic medical center in Boston, MA. LEP was defined as a language preference other than English, use of a professional interpreter, or ad hoc interpretation by a family member or bilingual staff. Average DTN time and average door-to-HCT time for LEP patients and fluent English speakers were compared in crude and adjusted models, including demographics and presentation characteristics.

Results: Between 1/2009-6/2015, 120 patients presenting with acute stroke received IV tPA (44% female, mean age 65[SD±16] years). 27.5% of patients met LEP criteria. DTN times were longer for LEP compared to non-LEP patients (77[SD±36] and 66[SD±30] minutes, p= 0.07). In the fully adjusted models, LEP patients had prolonged DTN times by 11.6 minutes (95% CI 0.5-24 minutes, p=0.06) and prolonged door-to-HCT times by 6.0 minutes (95% CI 0.5-11.5 minutes, p=0.03).

Conclusion: We found LEP patients tended to have longer DTN times than non-LEP patients, with a delay in imaging acquisition. Considering the value of each minute to minimize neuronal loss during an acute stroke, further studies are warranted to clarify the role of LEP as a barrier for acute stroke care.
Presentation Title: The Simplified Epiduralysis After Laminectomy/fusion (SEAL) procedure for postsurgical radicular low back pain.

Authors: Ge G, Dashkoff J, Perloff, MD. Boston University School of Medicine, Department of Neurology.

Abstract: Chronic radicular low back pain (LBP) following lumbar spine surgery is common (~20%) and can lead to surgical reinterventions. Here we reviewed the outcomes of a Simplified Epiduralysis After Laminectomy/fusion (SEAL) procedure. 

Methods: A retrospective study where all patients underwent decompressive spine surgery involving L4-5 or L5-S1 more than 6 months earlier, with persistent symptoms of intractable radicular LBP that failed conservative trials since surgery. SEAL procedure: Via an 18G Touhy needle in the sacral hiatus, a 21G catheter was advanced with physical disruption cephalad through the epidural space, to the 20cm catheter mark. 6mL of 25% bupivacaine (as 2-3 boluses) was injected, then 40mg triamcinolone (1mL triamcinolone and 0.5mL saline) was injected. The proceeding was repeated ~ 3cm further caudal. Patients experienced varying pain and pressure during the procedure, but all tolerated it. Patients were called for follow-up the following week and seen in clinic 3-12 months later.

Results: 35 patients were identified, 5 patients were eliminated due to malignancy, multiple SEAL procedures, or lost to follow-up. 85% of patients reported improvement of pain symptoms at 1 week with 65% reporting pain relief greater than 50%. At subsequent follow-up, 74% of patients reported improvement with 39% reporting pain relief greater than 50%. 10% of patients reported feeling pain-free or nearly pain-free at follow-up.

Conclusions: In this case-series, the SEAL procedure resulted in short term benefit in 74% of post-surgical radicular LBP. This procedure may be a useful for patients with persistent radicular pain symptoms after lumbar spine surgery.
Title: Treating Enuresis and OSA with CPAP: A Case Series

Authors: Jami H Johnsen MD\textsuperscript{1}, Yelena Gorfinkel Pyatkevich MD\textsuperscript{1}

\textsuperscript{1}Boston Medical Center, Boston MA

Abstract: **Introduction**: While the association between enuresis and obstructive sleep apnea (OSA) in children has been widely reported with several large population based studies, enuresis in adults with sleep-disordered breathing remains the subject of case reports. Here we describe four adult patients with OSA and enuresis with both conditions cured by CPAP.

**Report of Cases**: There were two males and two females with an average age of 47. All were obese (average BMI 39.5) and three had severe OSA. One had onset of enuresis during childhood, which briefly resolved after tonsillectomy. Another developed enuresis after his untreated OSA worsened from mild to severe. In a third patient with a remote history of multiple strokes, enuresis began after her diagnosis of mild OSA. She was trialed on oxybutynin without effect. The fourth noted onset of enuresis coinciding with CPAP machine malfunction; investigations for other causes of enuresis such as diabetes and prostate disease were negative. All four patients had complete resolution of enuresis with PAP therapy.

**Conclusion**: Although previous reports only describe enuresis in adults with severe OSA, we have found that it can occur even in mild disease. Given the long-term health risks of untreated OSA as well as the potential to cure enuresis with PAP therapy, all adults with enuresis should be screened for OSA. Large population based studies are needed to ascertain the prevalence of enuresis among adults with sleep-disordered breathing as well as better understand the effect of all OSA treatments on enuresis.
Presentation Title: Unusual case of posterior circulation stroke with negative MRI

Authors: C. Frances Fan MD, Melissa Mercado MD

Abstract: **Introduction**: MRI is considered gold standard in stroke diagnosis. However, DWI findings can be falsely negative in detecting posterior circulation stroke within the first twenty-four hours of symptom onset. We present the case of central pontine infarct initially diagnosed as botulism due to negative MRI findings.

**Methods**: 71-YO Cape-Verdean F w/hypertension, hyperlipidemia presented w/generalized weakness, nausea/vomiting and dysphagia. Exam revealed normal brainstem reflexes, strength and sensation. Initial MRI brain showed no DWI hyperintensities. She later developed worsening dysphagia and left-hemiparesis. Endoscopy revealed absent gag-reflex and laryngeal weakness. CTA head/neck was unremarkable. She required intubation because of respiratory distress. Botulinum toxicity was suspected due to progressive limb weakness, bulbar symptoms, and recent canned food ingestion; antitoxin administered. Findings not consistent with botulism included asymmetric plegia and intact pupillary-reflexes. Thus MRI was repeated (Fig1), showed an acute central pontine infarct. Stroke workup unremarkable; aspirin/statin given, tracheostomy placed, and discharged to rehab.

**Discussion**: False-negative MRI is not uncommon in the first twenty-four hours of ischemic strokes. Studies have shown ~2% for anterior-circulation strokes vs. ~19-31% for posterior circulation strokes [1]. In the case presented, multiple signs/symptoms and cardiovascular risk factors were suggestive of brainstem stroke. However, negative MRI misled the treatment team to discard cerebrovascular events as potential etiology.

Presentation
Title: Young-Onset Rapidly Progressive Dementia

Authors: Daniel Wallman, M.D., Chantale Branson, M.D., Brian McGeeney, M.D.

Affiliation: Department of Neurology, Boston University School of Medicine.

Abstract: Objective: A case report of a young man with rapidly progressive dementia with a positive 14-3-3 brain protein, abnormal PET-FDG brain imaging and literature review of FDG-PET imaging in patients with presumed Cruetzfeld-Jakob Disease.

Background: The use of PET-FDG imaging has been suggested to provide an additional modality in diagnosing Prion disease, Limbic Encephalitis and Alzheimer’s disease. A patient’s metabolism of FDG is compared to that of the average person’s metabolism, generated from a database comprised of patients above 50 years old. The body of case reports of young men with signs and symptoms clinically similar to the diseases mentioned above whom have undergone PET-FDG imaging is limited.

Methods: This is a single case report and literature review of a young man with progressive cognitive dysfunction found to have a normal electroencephalogram, an abnormal metabolism PET-FDG imaging and positive 14-3-3 protein consistent with presumed Cruetzfeld-Jakob Disease.

Results: A 32 year old Gambian man who suffered a motor vehicle accident 6 months prior to presentation demonstrates rapidly progressive dementia, mood behavior changes, headache, seizures, right sided ptosis, left extremity weakness and left arm intention tremor.

The patient’s 14-3-3 CSF count was elevated at >100ng/mL (nl<1.5ng/mL), a neuronal specific enolase at 10.3ng/mL (nl<10.8 ng/mL), a negative paraneoplastic and autoimmune antibody panel, an MRI brain revealing non-specific T2-hyperintensities and mesiotemporal hypometabolism on PET-FDG brain imaging.

Conclusion: PET-FDG imaging may show signs of prion disease earlier than that of other brain imaging. Pre-test probability of positive 14-3-3 should be considered when interpreting results.
Presentation Title: Zika Virus-associated Guillain-Barré Syndrome Variant in Haiti

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Abstract: 

Introduction: Zika virus is a single-stranded RNA virus (genus Flavivirus). An increased incidence of Guillain-Barré syndrome (GBS) in patients with Zika virus infection has been reported. We report a patient from Haiti who presented with a GBS variant and was found to be positive for Zika virus.

Case report: A 35-year-old man presented to his local hospital in Haiti with acute onset of bifacial weakness and the sensation of “electrical currents” in his hands and feet. On examination, he had bilateral lower motor neuron-pattern facial weakness, generalized areflexia, and a mildly ataxic gait. Several days later, he developed bilateral complete external ophthalmoplegia and mild upper extremity ataxia, and worsening gait ataxia in addition to the above-noted findings, consistent with Miller Fisher variant, with added features. Cerebrospinal fluid analysis demonstrated protein 114 mg/dl, Glucose 75 mg/dl, less than 1 white blood cell/µL. MRI of the brain was normal. Serum and CSF Zika virus IgM were positive (1:10,240 in serum; 1:64 in CSF; Centers for Disease Control Laboratory). The patient was treated with IVIg (2g/kg over 5 days). At discharge, the patient had marked improvement in his ataxia and was able to walk with a cane.

Discussion: It remains unknown whether an increase in GBS incidence in the setting of Zika epidemics is related to the widespread presence of a non-specific infectious trigger of GBS or whether there is specific molecular mimicry to antigens presented by the Zika virus that leads to GBS.