Proceedings from the Second Annual Boonshoft School of Medicine Medical Student Research Symposium

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Proceedings from the 2nd Annual Boonshoft School of Medicine Medical Student Research Symposium

April 1, 2010
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Hosted by: The BSOM Medical Student Research Club and
The BSOM Office of Research Affairs
Connectivity of individual Ia-motoneuron synapses after peripheral nerve regeneration

K. L. Bullinger, T. C. Cope

Abstract
Following peripheral nerve injury and consequent reinnervation, the stretch reflex is virtually absent. This deficit occurs despite functional restoration of the circuit components. For example, Ia afferents encode muscle stretch at nearly normal rates and patterns, and activation of motoneurons results in muscle force output. Electrical stimulation of the peripheral nerve at physiologic rates even results in EPSPs in homonymous motoneurons. However, when recording intracellularly from reinnervated rat motoneurons during muscle stretch, no excitatory synaptic potentials are detected in 2/3 motoneurons (Haftel et al., 2005), a clear sign that the synapses connecting stretch responsive afferents with motoneurons are in some way disrupted. Here we test the possibility that those regenerated afferents responding to muscle stretch in patterns typical of Ia afferents do not make functional connections with homonymous motoneurons. Using spike triggered averaging in adult Wistar rats, we measured EPSPs arising from individual medial gastrocnemius (MG) muscle afferents synapsing on MG motoneurons. Muscle afferents were selected for their ability to fire 1:1 with vibrational stretch, deceleration in firing during muscle contraction, and initial bursting activity during stretch. In control rats, 27/29 (93%) afferent-motoneuron pairs were determined to be functionally connected on the basis of the presence of an individual EPSP. In contrast, regenerated Ia-motoneuron pairs had dramatically reduced levels of connectivity (3/18, 16%). Among the three positive results, two had long intraspinal delays (greater than 1.5 ms) suggesting that they arose from polysynaptic input. These findings indicate a loss of functional synapses between regenerated Ia afferents and motoneurons. This may be the result of reinnervation of muscle spindles by inappropriate afferents, i.e. those not initially innervating annulospiral endings, and/or stripping (without recovery) of synapses formed by afferents appropriately innervating muscle spindles.
A Comparison of Spinal Cord Stimulation Sensations Using an Observational Mechanical Gateway

Amol Soin, Sara Chinnappan, Telisha Ortiz, Aneesha Ghaiy

Abstract
Three consecutive patients, who required spinal cord stimulation phase I trials were given the chance to participate in the OMG process. Of the three patients, one patient had a diagnosis of reflex sympathetic dystrophy (Medtronic) and two had a diagnosis of failed back/post laminectomy syndrome (St. Jude). Each patient had his or her trial leads placed for a 7-day trial. On day 7 of the trial, prior to the lead pull, the patients had an Observational Mechanical Gateway session for 30 minutes. During this time, the patients were asked a series of questions from a survey created by Boston Scientific. After conducting the Observational Mechanical Gateway, all three patients reported feeling a “smoother” and “more comfortable” stimulation with the Observational Mechanical Gateway than with their initial trialed device. All three patients stated they felt the coverage of pain was broader as far as surface area covered with the OMG in comparison to their trialed device. When asked by the author if this was significant enough to switch to Boston Scientific none of the patients desired to switch. When asked if their VAS pain score was lower with the OMG, 0 out of three patients reported an improved VAS pain score with the OMG. When asked why they did not want to switch devices 3 out of 3 mentioned that they received similar pain relief with both devices and that they were already comfortable with the current system they were using for the trial week and 2 out of 3 patients mentioned their positive relationship with the representative from their trialed device as a big factor to not switch. All three patients were successful trials, and each went to permanent phase II implantation using their original trialed device. Further studies with larger sample sizes are warranted to draw any type of clinically significant conclusions.
A Unique Right to Left Shunt through a Patent Foramen Ovale During Anesthesia in a Liver Transplantation Surgery.

Simon Choi, Bryan Hill, Amol Soin, Aneesha Ghaiy

Abstract
Patent Foramina Ovale are identified in up to 35% of the general population. Abnormal flows in the form of right to left shunt can occur despite normal intracardiac pressures. Right to left shunt physiology sometimes occurs in patients with severe end stage liver disease. Two of the more challenging manifestations of end stage liver disease that can create right to left shunt physiology include:

1) Hepatopulmonary syndrome (HPS)
   • HPS is often defined as a clinical triad of liver disease, increased alveolar to arterial oxygen gradient while breathing room air, and evidence of intrapulmonary vascular dilatations. HPS is characterized by a hyperdynamic state with low pulmonary vascular resistance with a prevalence as high as 30% in patients with end stage liver disease.

2) Portopulmonary hypertension (PPHTN)
   • PPHTN is on the opposite end of the spectrum of the pulmonary vascular disorders characterized by elevated PVR with low or normal cardiac output. PPHTN has a much lower prevalence, as low as 2%, and can demonstrate an anatomic left to right shunt through a patent foramen ovale. We describe a case of an anatomic right to left shunt through a patent foramen ovale in a patient with relatively normal pulmonary artery pressures. This case presented many unique challenges in determining the etiology of the right to left shunt, determination of the safety of Venovenous bypass given the presence of the shunt, and the difficulty obtaining central intravenous access on the right side of the patient.
Expression of Kv3.1b in the MNTB of Normal Hearing and Congenitally Deaf Mice

Adam S Deardorff

Abstract
The medial nucleus of the trapezoid body (MNTB) is a key brainstem relay involved in sound localization. The primary excitatory input to MNTB principal cells is formed by specialized calyx of Held synapses, arising from globular bushy cells in the contralateral anteroventral cochlear nucleus (AVCN). Neurons in the MNTB are topographically organized according to a tonotopic map present throughout the auditory system. Cells responding best to high frequency stimulation are located medially in the nucleus, while cells responding best to low frequency stimulation are located laterally. A variety of mechanisms underlies MNTB synaptic response properties and discharge capabilities in accordance with this tonotopic map. One such mechanism is likely to be rapidly activating K+ currents.

The functions of channels containing Kv3.1 subunits have been extensively characterized throughout the central nervous system. Within the MNTB, they contribute to a high voltage activating K+ current that rapidly repolarizes action potentials (APs), facilitating high frequency firing and the faithful propagation of synaptic inputs. Tonotopically organized expression gradients of Kv3.1b have been demonstrated in several auditory brainstem nuclei including the rat MNTB, the avian nucleus magnocellularis, and mouse spiral ganglion. That these studies indicate stronger Kv3.1b expression in portions of nuclei containing neurons with high characteristic frequency (CF), suggests such expression may correspond with other specializations in high CF neurons that allow for rapid synaptic transmission. This study attempts to characterize the distribution of Kv3.1b expression within the MNTB of normal hearing mice and to determine using a congenitally deaf (dn/dn) mouse model that lacks auditory nerve activity throughout development, if altered neural activity causes changes in the level and or pattern of Kv3.1b expression within the MNTB.
Calbindin D-28k is a Dendritic Marker in MNTB Principal Cells

Adam S Deardorff

Abstract

The medial nucleus of the trapezoid body (MNTB) has recently received considerable attention in the discipline of synaptic physiology. For decades, the direct examination of mammalian synapses in the CNS had been precluded by the small size and widespread distribution of synaptic terminals. However, the round morphology of the MNTB principal cell and the large size of its primary synaptic input, the glutamatergic calyx of Held, has allowed researchers to obtain simultaneous pre- and postsynaptic recordings without the electronic complications of dendritic filtering.

Nevertheless, the precise role of principal cell dendrites has yet to be defined, and the presence of significant functional dendritic inputs has become a contentious issue. Dendrites comprise up to 25% of the principal cell surface area, which both adds capacitance to the principal cell and potentiates the dendrite’s ability to alter principal cell firing capabilities. Further, recent physiological data indicates active dendritic Na+ and K+ conductances may contribute to the faithful propagation of high frequency synaptic input. These data suggest that principal cell dendrites may not be so readily ignored, but a reliable and effective immunohistochemical marker for them has yet to be identified and critical data regarding dendritic channel distribution and synaptic contacts yet to be obtained. Here, we examine preliminary observations using a method for direct immunohistochemical observations of MNTB principal cell dendrites using antibodies directed against CB-D28k, a known principal cell marker, as well as identify putative dendritic synaptic contacts and voltage gated potassium channels.
Assessing 1st Year Medical Student Opinion of Team-Based Learning After Participating in a Team Based Learning Curriculum

Adam S Deardorff, Jeremy Moore, Dean X. Parmelee, Nicole J. Borges

Abstract

Introduction: Medical school faculty have long recognized the importance of clinical application, group problem solving, and active learning in preparing first and second year medical students for national board examinations and clinical clerkships. While numerous strategies have evolved to supplement didactic lectures with active learning, a paucity of information exists within the literature regarding medical student attitudes toward the effectiveness of such active learning methods. Team-Based Learning is a well defined instructional strategy that is being employed increasingly in medical education. This study attempts to explore medical student attitudes on the effectiveness of Team-Based Learning after completing their first year in a TBL curriculum.

Methods: The 2008-2009 first year class at the Wright State University Boonshoft School of Medicine (94 students) was administered a 17 question Likert Questionnaire (1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly Disagree) at the end of their first year of medical to assess attitudes toward different aspects of a Team-Based Learning curriculum.

Results: As expected, there was a great deal of variability among student responses toward the details of the Team-Based Learning process (ex: public team rankings, internet access during Application Exercises, grade weighted peer evaluations, TBL exercise time commitments, etc). However, when presented with more general questions on TBL effectiveness, student attitudes were generally in favor of TBL.

Conclusion: While individual attitudes toward many aspects of Team-Based Learning varied, our data suggest that first year medical students see TBL as a more effective opportunity to foster critical reasoning and clinical problem solving skills than other non-lecture, active methods of teaching and learning (ex: labs, case discussions, etc), while also allowing for enhanced learning of core concepts through student-to student interaction.
Regulation of the Neuronal Taurine Transporter Protein

Amanda Freeman, James Olson

Abstract

Background: Cytotoxic brain edema occurs in a variety of pathological conditions. Net efflux of the amino acid taurine from neurons contributes to neuronal volume regulation during brain edema. Taurine is accumulated in both neurons and glial cells by a specific 72-75 kDa membrane transporter, TauT. Neuronal and glial forms of TauT are similar in structure; however, functional TauT activity decreases in swollen neurons, but is not altered in swollen astroglial cells. In contrast, activation of protein kinase-C (PKC) has no effect on neuronal TauT activity, but causes protein phosphorylation and inhibits the transporter in astroglial cells. Thus, we hypothesize regulation of neuronal and glial TauT is mediated by different signaling mechanisms.

Methods: Primary neuronal cultures from rat hippocampus were incubated under isoosmotic or hypoosmotic conditions. After 30 min we measured total and sub-cellular TauT expression using cell fractionation and western blot analysis.

Results: In control neurons, TauT appeared as a 97 kD peptide in cytosolic and membrane/particulate fractions. However, in neuronal cultures treated with hypoosmotic medium the density of the TauT band was significantly reduced in the cytosolic and membrane/particulate fractions while a prominent 74 kD band appeared in the nuclear fraction. Total TauT expression was not altered by hypoosmotic exposure.

Conclusion: TauT in normal cultured hippocampal neurons may be substantially glycosylated or closely associated with other peptides while in the plasma membrane. The apparent molecular weight of TauT is reduced in swollen neurons while it is redistributed from the cell membrane fraction to the nuclear fraction. Internalization of the transporter from the plasma membrane may account for the reduction in functional TauT transport activity observed in swollen neurons and may contribute to neuronal volume regulation.
Parental ability to correctly use written asthma management plans

Larry E Goldenberg, Shalini G Forbis, Erin Brigham, Adrienne Stolfi, Gary A Mueller,

Abstract

Background: National Asthma Guidelines recommend the routine use of written asthma management plans (WAMP) as part of asthma education and management. Little data exist documenting parents' ability to correctly utilize WAMPs to manage childhood asthma.

Objective: To assess parental ability to correctly utilize WAMPs to respond to asthma case scenarios and to assess types of decision making errors.

Methods: Surveys were distributed to parents of children with asthma from 3 participating practices within SOAR-Net, a Miami Valley, OH practice-based research network and hospital-based pediatric pulmonary clinic. The survey included demographic information, asthma severity/control assessment and parental exposure to WAMPs. Parents completed asthma management questions utilizing a provided WAMP based on 4 vignettes that described typical asthma situations. WAMP-based questions were divided into zone classification questions (ZQ) and asthma management questions. Of the latter, subsets were designated as critical management questions (CQ). The 4 vignettes included 5 zone questions paired with management questions.

Results: 155 surveys were completed. The mean (SD) length of child's asthma was 4.8 (3.0) years, with mean child age of 7.6 years (2.3). 24% of children had mild persistent asthma and 40% mod/severe disease. 91% of parents were confident that they could use the WAMP. 5% of respondents were incorrect on both ZQ and CQ for all 5 questions and 5% correctly identified ZQ + CQ for all 5 questions. When parents identified the correct zone for a vignette, correct management ranged from 28% - 83%. When parents got the zone incorrect, they were able to correctly manage the patient 0-24% of the time. For the green zone vignette, parents were able to identify the ZQ and answer the CQ 83% of the time. Parents scored the lowest for the 2 red zone vignettes, answering ZQ + CQ correctly only 28% & 42% of the time. For parents correctly identifying the red zones, 33% & 55% of them correctly answered the CQ.

Conclusions: This study finds that a large number of parents of children with asthma are unable to correctly identify WAMP zones or correctly answer critical asthma management questions. For certain vignettes, ability to correctly identify zone did not lead to correct management of the scenario. Further research is needed to understand parental barriers to utilizing these documents that are recommended as part of routine clinical asthma care.
How Soon? Anti-TNF PPD+ Psoriasis Patients

Thomas Hagele, Julian Trevino

Abstract

Anti-TNF therapy is effective in the treatment of widespread plaque psoriasis and psoriatic arthritis (PsA). Currently, 3 anti-TNF agents (infliximab, etanercept, adalimumab) are FDA-approved for the treatment of plaque psoriasis and PsA. Patients treated with anti-TNF therapy are at increased risk for serious, life-threatening bacterial infections. An important concern with the use of anti-TNF agents is the risk of reactivation of latent tuberculosis (LTB). Prior to initiation of anti-TNF therapy, it is recommended to perform a screening PPD test to identify patients with LTB. In patients with a positive PPD in whom anti-TNF therapy is indicated, anti-TNF therapy can be initiated following treatment for TB. Data by Keane in 2001 reports a four-fold increase in active TB among U.S. infliximab users. Similar risk was reported in the Swedish population, and a relative risk of 90 was reported in Spain, where TB prevalence is much higher. Moreover, given that current CDC estimates suggest over 12,000 cases of TB are reported per year in the U.S., the clinician must proceed with utmost caution when initiating anti-TNF therapy. We examined the appropriate time interval between starting anti-tuberculosis treatment for patients identified with LTB and commencing anti-TNF therapy.
3 Dimensional Color Discography- a novel advancement on traditional provocative discography

Bryan Hill, Simon Choi, Amol Soin, Aneesha Ghaiy

Abstract

Background: Provocative discography is a diagnostic technique that attempts to correlate the patient’s symptoms and morphology of the intervertebral disc.

Objective: To develop more advanced images of an intervertebral disc morphology, and advancement of traditional discography. Using a high powered 3 dimensional color CT Scan similar to those used for Cardiac CT scanning of coronary arteries, the author applied similar technique to the intervertebral disc to obtain color 3 dimensional images.

Methods: A 54-year-old white female presented to the outpatient pain center with complaints of low back pain that occasionally radiates to the bilateral buttocks and never extends below the thighs. The patient tried and failed NSAID’s, physical therapy, and lumbar traction. She also underwent DTS Decompression via a chiropractor. A presumptive diagnosis of discogenic pain was made by a neurosurgeon and a provocative discography was requested by a neurosurgeon. The patient underwent traditional discography using fluoroscopy and immediately from the fluoroscopy suite was sent to obtain CT scan form the “Cardiac CT Scanning Suite”. The CT scan was a high-powered 64 slice CT scan and the images were then reconstructed using color 3 Dimensional technology. The images were then manipulated to rotate the images, remove spinal tissue to obtain color images of the epiduralspace to visualize epidural leakage in color 3 and 3 dimensions, the intervertebral disc, and the morphology of the spine. These images represent advancement from traditional 2 dimension fluoroscopic or black and white CT scan. The ability to twist and rotate the image in multiple planes allow for imaging of subtle findings within the disc.

Discussion: Although this is an early description of the technique of 3 dimensional color discography it does open the door for further study and advancement of the technique. The possibilities of utilizing the technology to visualize subtle differences and pathological changes in intervertebral disc morphology are intriguing, and may provide superior information regarding discogenic pain than that obtained from a traditional MRI or CT scan. Additionally, this techniques allows for more targeted and directed percutaneous techniques to repair annular tears and defects using real time 3 dimensional color CT guidance to accurately repair potential damaged portions of the disc using techniques such as cobaltion, thermal or pulsed radiofrequency, or other techniques to further advance incisionless spine surgery. It may also enhance the diagnostic utility of an otherwise controversial technique by obtaining more objective data.

Conclusion: 1) A novel way to image the spine 2) Can obtain color 3 dimensional Images 3) Possibility for enhanced imaging of the intervertebral disk 4) Advancement of traditional 2 dimensional Discography
The Role of Calcium in Central Respiratory Control Neurons

Ann N. Imber, Robert W. Putnam

Abstract
The cellular pathways that underlie central respiratory control have been implicated in several respiratory diseases including Sudden Infant Death Syndrome and sleep apnea. Central respiratory control involves neurons from several brainstem regions whose firing rates are altered in response to changes in CO2. Most research has focused on the role of changes of pH and pH-sensitive ion channels as the basis for neuronal chemosensitive responses to CO2. Little is known, however, about the potential role of Ca2+ in central chemosensitive signaling. We have evidence that high CO2 activates L-type Ca2+ channels in the noradrenergic neurons of the locus coeruleus (LC), a known chemosensitive region involved in respiratory control. Our studies use electrophysiology to address the postnatal development of an L-type Ca2+ current in LC neurons that is sensitive to changes in CO2. The presence of Ca2+ -activated potassium channels (KCa) in conjunction with this pathway raises the possibility that activation of KCa channels by elevated intracellular Ca2+ may serve to limit the high CO2-induced increased firing rate in LC neurons. The activity of L-type Ca2+ channels increases dramatically over the first two weeks of life in neonatal rats, suggesting that the chemosensitive response of LC neurons may be most prominent shortly after birth. This agrees with our studies of the developmental changes of LC responsiveness to increased CO2 during early life. We have also studied the mechanism by which increased CO2 activates Ca2+ channels. We have evidence that L-type Ca2+ current is activated by increased intracellular HCO3 which activates a HCO3-sensitive adenylate cyclase (sAC). Activation of sAC results in subsequent phosphorylation and activation of L-type Ca2+ channels via cAMP-activated protein kinase A. Our work indicates a novel role for Ca2+ in controlling chemosensitive signaling. Disruption of this pathway may lead to breathing instabilities associated with respiratory diseases. [Supported by NIH Grant R01-HL56683-13 (to RWP) and an AHA Great River Affiliate Pre-doctoral Fellowship (to ANI)]

John D. Bullock, Shaden Z. Khalaf, Ronald E. Warwar, B. Laurel Elder.

Abstract: Between 2005 and 2006, an epidemic of keratitis caused by the fungal organism Fusarium spp. occurred in several parts of the world. In the United States, the outbreak was recognized in 2005, and resulted in nearly 200 reported cases of Fusarium keratitis. The infections were severe enough that corneal transplantation was required in 34% of the cases. Etiology was firmly linked to the use of Bausch & Lomb’s ReNu with MoistureLoc (ReNu ML) solution. This solution had been recently (2004) introduced by Bausch and Lomb into the contact lens solution market. An explanation for the reason for this outbreak and the association with ReNu ML was not evident at the time of the outbreak, although many different theories were proposed.

Investigators at Wright State University had identified and treated several of the early patients involved in the outbreak, and began researching the relationship between ReNu ML and the resulting Fusarium infections in 2006. Their results were published in 2008 and indicated that exposure of ReNu ML to excessive heat, as had been documented to have occurred at the Greenville, S.C. plant where the solution was made, resulted in a loss of the ability of the solution to inhibit the growth of Fusarium spp.. Similar heating of other contact lens solutions available at the time of the outbreak did not show a loss of efficacy. Further studies revealed that the breakdown only occurred in the HDPE plastic bottles that were used to package the solution, and not if the same solution was heated in a glass bottle. Thus it appeared that a combination of excessive heat (between 108°F and 133°F) and storage in the HDPE bottles used to package ReNu ML were responsible for the loss of efficacy. It was postulated that some component of the plastic was being released during heating of the solution, and that this component was blocking the ability of the alexidine (the antibacterial/antifungal agent in the solution) to inhibit the growth of the Fusarium fungi.

The research described in this proposal is designed to further investigate what may have contributed to this outbreak. This project will compare the antifungal activity of ReNu ML solution following exposure to identical temperature elevations in HDPE bottles from a variety of sources (including bottles used by competitor contact lens solution manufacturers, newly purchased HDPE bottles, original Bausch & Lomb HDPE bottles from the time of the epidemic, and bottles used to store currently available ReNu solutions.) One unresolved question is whether the sterilization technique used during the manufacturing of ReNu ML contributed to the breakdown that occurred in the bottles. Thus, using both sterilized and nonsterilized bottles will help to identify if this was a contributing factor. Secondarily, this research will begin to dissect out what components in the original ReNu ML were involved in the loss of activity. Individual components of the ReNu ML will be tested to see if the breakdown involved strictly the antifungal/antibacterial agent in the contact lens solution (alexidine) or if it was due to a reaction between some component of the plastic released during heating or sterilization and multiple components of the contact lens solution. Because HDPE plastic is widely used to store products ranging from pharmaceuticals to food, it becomes evident that having an understanding how the combination of plastic and excessive heat contributed to the loss of activity in ReNu ML can help us avoid further outbreaks of this type.
A Novel approach to Anomalous Pulmonary Artery Repair for the Pediatric Anesthesiologist in a Patient with a Documented Difficult Airway.

Amol Soin, Telisha Ortiz, Sara Chinnappan

Abstract

We describe a 4 week old infant with a diagnosis of left pulmonary artery originating from the ascending aorta. The patient has a documented difficult airway- being diagnosed with micrognathia, a cleft palate, and a history of a difficult intubation due to laryngomalacia, complicated by obstruction of the airway with arytenoid collapse. The patient was taken to the operating room and anesthesia was induced with midazolam, fentanyl, and rocuronium. The airway was secured via a nasal fiberoptic technique. Initially, an oral fiberoptic was attempted, but this was difficult secondary to the patient’s anatomic defects. An arterial catheter and central venous catheter were placed in the right groin. The patient was placed on the ventilator on 100% FIO2, and tidal volumes between 30 – 35 cc. Anesthesia was maintained with intermittent boluses of fentanyl. No volatile agents were used throughout the case, as the patient had hemodynamic instability with sevoflurane in a prior anesthetic for the patient's cardiac imaging. The case proceeded without incident.
Parents' Perspectives on their Children’s Health Insurance: Plight of the Underinsured

William Spears, John M Pascoe, Caroline McNicholas, Miryoung Lee, Greg Eberhart, Jessica Zagory, Mitali Pakvasa

Abstract

Background: While national attention has focused primarily on the millions of uninsured children and adults, many families struggle with their children's underinsurance and do not follow clinicians' recommendations due to their children's inadequate insurance and their inability to pay for the services/recommendations.

Methods: This study was conducted at 13 pediatric, medicine-pediatric, and family medicine practices, which were members of the Southwestern Ohio Ambulatory Research Network (SOARnet) group. The SOARnet practices represent the racial/ethnic, socioeconomic, and geographic diversity of the greater Dayton area. A consecutive sample of parents and guardians with a child aged 6 months to 18 years were approached by research assistants in the waiting area of the clinic. The parents or guardians completed a 3 page survey based on their experiences with medical care for the youngest child being seen at the visit. The survey was a self-administered, anonymous, voluntary survey that asked parents and guardians to answer questions about their child’s health insurance, if they delayed or were unable to access medical care due to difficulty paying for it, and whether they perceived their child’s health to have suffered due to their inability to afford recommended care. The survey also included questions about out-of-pocket medical expenses paid in the previous 12 months, health status, demographics, and annual household income.

Results: A total of 1978 parents and guardians completed the survey and were included in the study. Of these, 84.9% were mothers, 75.4% were Euro-American, 91.2% reported at least a high school education, and 61.2% of study children had some form of private insurance. About one in six parents reported that it has become more difficult to obtain necessary health care for their children over the past three years. Parents and guardians reported that their ability to obtain care for their child as compared to three years ago was more difficult in groups with private insurance, and in those whose annual income was greater than $15,000 but less than $75,000 (p<0.0001).

Conclusions: Families who had private insurance and/or were middle income responded with a higher rate of failure to comply with clinicians' recommendations. We conclude that the lowest and highest income subgroups of parents were less likely to report increasing difficulty, presumably because the lowest subgroup has public insurance and the highest has better private insurance compared to the middle income subgroups (between $15,000 and $75,000 annual income). Children's underinsurance and subsequent failure to comply with clinicians' recommendations has become a major public health issue early in the 21st century.
Hospitalization in Community-Dwelling Persons with Alzheimer’s Disease

NM Zanin, RN Jones, ER Marcantonio, JL Rudolph, TG Fong, FM Yang, L Yap, SK Inouye

Purpose: Despite its clinical and economic impact, hospitalization in persons with Alzheimer’s disease (AD) has not been well-examined. The aims of our study were to examine the frequency and risk factors for hospitalization in a community-dwelling cohort of persons with AD.

Methods: Study participants were drawn from the Massachusetts Alzheimer’s Disease Research Center (MADRC) Patient Registry, a prospective cohort enrolled from 1991 to 2006. Data were merged from the MADRC database, chart review, Medicare claims data, and the National Death Index. The outcome was any acute hospitalization following the initial MADRC visit. Risk factors, which included demographics, dementia duration and severity, and illness severity/comorbidity, were examined in bivariable and multivariable proportional hazards models. For hospitalized patients, principal admitting diagnoses from the Medicare data were rank-ordered by frequency.

Results: Of 827 patients (median follow-up 3.0 years), 542 (66%) were hospitalized at least once, and 389 (47%) were hospitalized 2 or more times, with a median of 3 days spent in the hospital per person-year. The most common reasons for admission included syncope or falls (26%), ischemic heart disease (17%), gastrointestinal disease (9%), pneumonia (6%), and delirium (5%). Five significant independent risk factors for hospitalization included higher comorbidity (hazard ratio (HR), 1.87; 95% confidence interval (CI) 1.57, 2.23), previous acute hospitalization (HR, 1.65; 95% CI 1.37, 1.99), older age (HR, 1.51; 95% CI 1.26, 1.81), male sex (HR, 1.27; 95% CI 1.04, 1.54) and shorter duration of dementia symptoms (HR, 1.26; 95% CI 1.02, 1.56). The cumulative risk of hospitalization increases with the number of risk factors present at baseline: 38% with 0 factors; 57% with 1 factor; 70% with 2-3 factors; and 85% with 4-5 factors (P trend<0.001).

Conclusions: In community-dwelling population with generally mild AD, hospitalization is frequent, occurring in two-thirds of participants. These results identified admitting diagnoses that are potentially preventable or amenable to intervention. This study also helps to identify high-risk patients to target for future intervention.
Computational prediction of the three-dimensional structure of Yippee like-3
Bryan Hill, Kevin Kelley and Steven Berberich.
Abstract not available

Stretch reflex gain as a mechanism for functional adaptation after partial ankle extensor denervation.
G.M. Horstman, P. Nardelli, T.C. Cope
Abstract not available

YPEL3, a p53-regulated gene that induces cellular senescence
Kevin Kelley *, Kelly Miller*, Amber Todd, Amy Kelley, Rebecca Tuttle and Steven J. Berberich. (*These authors contributed equally to this work)
Abstract not available

Expression of the tumor suppressor gene FHIT is regulated by the PIP3K/AKT/FOXO pathway.
Kevin Kelley, Kelly Miller and Steven Berberich.
Abstract not available

Melanoma Pathology in the Community Setting: Are we meeting the NCCN minimum reporting criteria?
Fox J, Loeb A, Ouellette J, Termuhlen P, Hellan M.
Abstract not available

Use of a Novel Fibrin Sealant in Total Hip and Knee Arthroplasty
Nicole Majoras, David Fabi, Pranay Patel, Brett R Levine
Abstract not available

HdmX Overexpression Inhibits Cellular Senescence in Human Tumor Cells
Kelly Miller, Kevin Kelley and Steven J. Berberich.
Abstract not available

Subcutaneous Choline Administered Postnatally to Young Rats Improves Trace but not Delay Eyeblink Conditioning
Jeremy A. Moore, Dragana I. Claflin
Abstract not available

Examining the relationship between online health information-seeking and health anxiety for college students
Jenn Rammel, Dr. Karen Wonders, Leatha Ross
Hypertension and Exaggerated Angiotensin II Induced Pressor Effects in db/db Mice
Nathan M. Weir, Danielle Senador, Mariana Morris, Khalid M. Elased

Abstract not available

2010 BSOM Poster Symposium Data Blitz

The Role of Calcium in Central Respiratory Control Neurons
Ann Imber

Hospitalization in Community-Dwelling Persons with Alzheimer's Disease
Nicole Zanin

Melanoma Pathology in the Community Setting: Are we meeting the NCCN minimum reporting criteria?
Aram Loeb

YPEL3: a new transcriptional target of the tumor suppressor p53
Kevin Kelley

YPEL3, a senescence inducer that is down-regulated in human tumors
Kelly Miller
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