WAYNE STATE UNIVERSITY

EUGENE APPLEBAUM COLLEGE OF PHARMACY AND HEALTH SCIENCES

10th Annual Research Forum

2013

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10th Annual Research Forum

2013

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  Oscar A. Carretero, M.D.
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Agenda:

8:00 AM Poster Setup

9:00 AM Student Poster Judging

10:45 AM Welcome: Lloyd Y. Young, Pharm. D., Dean

10:50 AM Introduction: Deepak K. Bhalla Ph.D., Associate Dean for Research

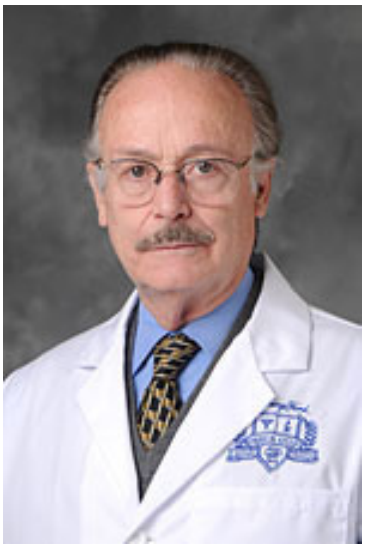
11:00 AM Key Note Speaker: Oscar A. Carretero, M.D.
"High Blood Pressure (hypertension) is widespread in Detroit, what we can do about it"

11:50 PM Faculty Research Recognition and
Student Poster Awards: Dean Lloyd Y. Young

12:30 PM Lunch

12:30 PM – 3:00 PM
Poster Display and Presentation

Keynote Speaker:



Oscar A. Carretero, MD

Oscar A. Carretero, M.D., will be the Keynote speaker at the EACPHS 2013 Research Forum. His presentation, titled "*High Blood Pressure (hypertension) is widespread in Detroit, what we can do about it*" addresses a local problem with global implications. Dr. Carretero, a division head at the Henry Ford Hospital in Detroit, MI is a world expert in hypertension and vascular research. He has published more than 300 papers in peer-reviewed journals and 35 book chapters. He has received numerous awards for his work. These include Novartis Award for Hypertension research from the Council for High Blood Pressure Research, the Lifetime Achievement Award in Hypertension research from the Inter-American Society of Hypertension and the Distinguished Scientist Award from the Henry Ford Medical Group.

Dr. Carretero's long and distinguished career is marked by research excellence and discoveries in hypertension, one of the most common cardiovascular diseases in the United States. Hypertension affects approximately 75 million Americans and is one of the main risk factors for cardiovascular diseases. When left untreated, hypertension leads to heart attacks, heart failure, vascular disease, kidney failure and stroke. Cardiovascular disease and stroke are responsible for nearly 50 percent of the total mortality rate in the United States. Dr. Carretero's group uses a model of hypertension in rodents to study the factors that promote and prevent high blood pressure. His studies focus on target organ damage in the heart, on the control of the filtration of blood by the kidney and on the mechanisms that control salt and water balance by the kidney. Dr. Carretero hopes to show that it is possible to derive therapeutic effects by altering the balance of pro- and anti-hypertensive systems. These studies are supported by a recently acquired $12.4 million grant from the National Institutes of Health. This five year grant will allow Dr. Carretero to study the role of the kidney in blood pressure regulation, as well as how chronic high blood pressure damages the kidney, heart and vasculature.

Poster Presentations

Abstracts

Abstract No. 1 (Student)

Title

Comparing Two Methods for Detection of Sepsis Pathogens: Roll Plate and Direct RT-PCR

Affilliations

Wayne State University-Detroit, MI
Detroit Medical Center-Detroit, MI

Authors

Linda Arabia CLAS, Gilad Ben-Yehuda MS, Timothy Burger MS, John P McRoberts BS, Paul Lephart PhD, Keith Kaye MD MPH, Emily Martin MPH PhD, Tal Mann MD

Abstract

Title: Comparing Two Methods for Detection of Sepsis Pathogens: Roll Plate and Direct RT-PCR
Authors: Linda Arabia CLAS, Gilad Ben-Yehuda MS, Timothy Burger MS, John P McRoberts BS, Paul Lephart PhD, Keith Kaye MD MPH, Emily Martin MPH PhD, Tal Mann MD
Background:
Roll plate broth cultures are typically used to detect the specific bacterial organism in peripheral venous blood culture and on the lumen of catheter tips from patients with sepsis. Each of these procedures takes 2 days to obtain complete growth and identify the infection. Using RT-PCR has the potential to enable the detection within a shorter time and may be more sensitive. RT-PCR takes up to 2 hours and 45 minutes for complete amplification and detection of the bacteria and help suggest a treatment to the infection.
Methods:
We performed RT-PCR, using 13 sets of primers that are specific to 13 different bacteria: Enterobacter cloacae, Enterobacter aerogenes, Acinetobacter baumannii, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Staphylococcus aureus, Staphylococcus epidermidis, Proteus mirabilis, Serratia marcescens, Enterococcus faecalis, Enterococcus faecium, Candida albicans.
Using the blood sample and the saline solution containing the catheter tip of patients known to have one of the specific bacteria listed above, we tested the validity of RT-PCR for identification of the bacteria.
Results:
Out of the 13 primers used, 7 of them worked on known positive controls and did not work on controls that were positive for other species: Enterobacter aerogenes, Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus, Staphylococcus epidermidis, Proteus mirabilis, Candida albicans. The 6 remaining primers did not work on known positive controls. The 7 successful primer sets were then tested on samples collected from patients. Out of the 2 blood samples collected from 2 different patients, 2 were identified to have S. aureus. Out of the 2 saline solutions collected from 2 different patients, 2 were identified to have S. aureus. Our results showed 100% concordance with the results determined by traditional culture methods by the Detroit Medical Center Clinical Microbiology Laboratory.
Conclusion:
Our RT-PCR reaction successfully identified specific bacterial causes of catheter related blood stream infection. This assay may be used in the future to shorten the time to identifying the best treatment for catheter related blood stream infection.

Abstract No. 2 (Student_Graduate)

Title

The role of interactions between CDCrel1, VMAT2, and parkin in Methamphetamine neurotoxicity

Affilliations

Department of Pharmaceutical Sciences, Eugene Applebaum College of Pharmacy and Health Sciences

Authors

Heli Chauhan ... Anna Moszczynska

Abstract

Methamphetamine (METH), a CNS stimulant, is a widely used drug of abuse. At high doses, METH is neurotoxic to dopaminergic (DAergic) terminals in the striatum. An early event in METH neurotoxicity is the release of Dopamine (DA) from VMAT2 storage vesicles and its autoxidation, followed by an oxidative stress within the terminals. The vesicular monoamine transporter 2 (VMAT2) plays a neurprotective role by transporting cytoplasmic DA into vesicles for storage and protection from oxidation. It has previously been shown that METH toxicity is associated with impaired VMAT2 trafficking and a decrease in the levels of E3 ligase parkin in striatal synaptosomes. Parkin regulates the levels of CDCrel1, a protein found to inhibit exocytosis.
The objective of our study was to elucidate whether CDCrel1, VMAT2, and parkin interact with each other and how these interactions affect trafficking of VMAT2 vesicles after METH administration. We have hypothesized that METH-mediated decrease in parkin results in over-expression of CDCrel1 which causes an entrapment of VMAT2 vesicles at the plasma membrane, preventing their recycling and sequestration of cytosolic DA. To test this hypothesis, adult male Sprague Dawley rats were treated with binge METH (4 x 10 mg/kg, every 2 h, i.p) or saline and sacrificed 1 h or 24 h after the last injection. Striatal synaptosomal fractions were subjected to SDS-PAGE and western blotting with CDCrel-1, VMAT2 and parkin antibodies. As compared to saline controls, CDCrel1 and VMAT2 levels increased in the membrane fraction in parkin deficient METH-treated rats shortly after the last dose of METH. Our co- immunoprecipitation studies revealed protein-protein interaction between parkin and CDCrel1 and CDCrel1 and VMAT2 in rat striatal synaptosomes. Our findings suggest that the deficit in parkin mediates the increase in CDCrel1 and that accumulated CDCrel1 entraps VMAT2 vesicles at the membrane, thus impairing sequestration of DA to vesicles. Our results support the hypothesis that the impairment of VMAT2 vesicles trafficking after binge METH results in an increase in pro-oxidant effects of the neurotransmitter DA thus mediating neurotoxicity of METH.
Keywords: Methamphetamine ... parkin ... VMAT2 ... CDCrel1

Abstract No. 3 (Student_Graduate)

Title

Minimum Detectable Change in the Timed Up and Go and the Step Test in People with Stroke

Affilliations

Wayne State Physical Therapy

Authors

Vicky Pardo, PT, DTS ... Amanda Fileccia ... Sarah Lewis ... Jessica Sesta ... Allon Goldberg, PH.D, PT

Abstract

Purpose/Hypothesis: The Timed Up and Go (TUG) is a test of functional mobility and dynamic balance. The Step Test is a measure of standing balance, motor control, coordination and the ability to load weight on one leg. Minimum detectable change (MDC) represents a value for real change that exceeds chance variation in performance and measurement. MDC can be used to interpret whether changes in these measures over time represent real change or are within the boundaries of measurement error. The purpose of this study

was to quantify measurement error and MDC in the TUG and the Step Test in people who have had a stroke.
Number of Subjects: Twenty participants with a history of stroke who could walk without physical assistance were recruited from the Metro Detroit area.
Materials/Methods: The TUG was measured by having participants stand from a chair with armrests, walk 3 meters at their self-determined safe walking speed, turn around, return to the chair and sit down. The Step Test was measured by counting how many times the participant could touch the top of a 7.5 cm step with the bottom of one foot in 15 seconds. The intraclass coefficient (ICC 2.1) was computed to assess the relative reliability of each test. Standard error of measurement (SEM), which quantifies measurement error in absolute values, was calculated as the standard deviation x √ ... (1-ICC). MDC at a 95% confidence level (MDC95) was calculated as z*SEM*√ ... 2 where z=1.96.
Results: Mean TUG was 16.27 seconds, with an ICC of 0.98 (SEM was 1.28sec, MDC95 was 3.55 sec). Measurement error and MDC95 expressed as a percentage of mean TUG were 7.9% and 21.8% respectively. Mean Step Test with the involved leg was 10.48 steps, with an ICC of 0.97 (SEM was 0.91 steps, MDC95 was 2.52 steps). Measurement error and MDC95 expressed as a percentage of mean Step Test with the involved leg were 8.7% and 24.1% respectively. Mean Step Test with the uninvolved leg was 11.85 steps, with an ICC of 0.97 (SEM was 0.85 steps, MDC95 was 2.35 steps). Measurement error and MDC95 expressed as a percentage of mean Step Test with the uninvolved leg were 7.2% and 19.8% respectively.
Conclusions: The high ICCs for the TUG and the Step Test (both for the involved and uninvolved leg) suggest high relative reliability. The low SEM% for the TUG and the Step Test is suggestive of low measurement error and good absolute reliability. The moderately low MDC95% for the TUG and the Step Test suggests that these tests may be able to detect real change in physical performance in people with stroke.
Clinical Relevance: In patients with stroke, real change was computed to be >3.55 sec for the TUG, >2.52 steps for the Step Test (involved), and >2.35 steps for the Step Test (uninvolved). These results will assist clinicians and researchers in interpreting whether real change has occurred when comparing repeated measures of the TUG and the Step Test.

Abstract No. 4 (Student_Graduate)

Title

Drug Encapsulated Nanoparticles Made of Chromophore -Conjugated Polymer For Lymph Targeting

Affilliations

Eugene Applebaum College of Pharmacy and Health Sciences ,Wayne State University, Detroit, Michigan

Authors

Avinash Ande,PhD(pursuing)
Dr Joshuva James Reineke,PhD

Abstract

Nanoparticles have been considered as one of the most promising approaches for fighting cancer. Passive targeting of nanoparticles to the cancer cells, such as the EPR effect, results in many positive gains. One of the major hurdles in exploiting the passive targeting of nanoparticles is understanding the pharmacokinetics, in vivo degradation and drug release in specific tissues. Our current work focuses on fabricating and testing in vivo a novel polymer that will greatly enhance the assay sensitivity and allow the determination of important kinetic parameters. We seek to utilize this information for fabricating nanoparticles that deliver the therapeutic cargo to the diseased tissues at higher concentrations. We conjugated a chromophore marker (fluorescein) to an amine compound which serves as monomer for our desired polymer. Meanwhile we fabricated poly

(lactic-co-glycolic) acid (PLGA) nanoparticles encapsulated with the anti-cancer drug paclitaxel, which are similar to our desired nanoparticles, and characterized them. Bio-distribution and in-vivo degradation studies will be performed for these nanoparticles, which will be helpful in predicting and performing the pharmacokinetic studies for the desired nanoparticle formulations from chromophore conjugated polymer

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Abstract No. 5 ()

Title

The Effect of Bariatric Surgery on Hypertension

Affilliations

Eugene Applebaum College of Pharmacy and Health Sciences,
Harper University Hospital
St. John Hospital and Medical Center
Detroit MI

Authors

Jamie Young, Pharm.D. Candidate,
Sheila Wilhelm, Pharm.D.,BCPS, and
Pramodini Kale-Pradhan,Pharm.D.

Abstract

Purpose: Obesity is a growing epidemic leading to world-wide public health concerns. Bariatric surgery is an option for patients with a body mass index (BMI) of greater than 40 or BMI of >35 with serious comorbid conditions. This meta-analysis examines the effect of bariatric surgery on the improvement or resolution of hypertension.
Methods: Two independent investigators conducted a literature search of PubMed (1990-2013) and Cochrane databases using terms bariatric surgery and hypertension to identify appropriate human adult studies published in English. Studies were included if they reported the number of patients with hypertension prior to undergoing any bariatric surgery procedure, and whether the hypertension improved or resolved post surgery. The number of patients with hypertension and their response rates were extracted and analyzed using RevMan 5.2.5.
Results: Thirty-one prospective and 26 retrospective studies met all criteria. The types of bariatric surgery performed included: Roux-en-Y, gastric banding, laparoscopic adjustable gastric banding, vertical gastric banding, sleeve gastrectomy, duodenal switch and biliopancreatic diversion. The time to first follow-up after surgery varied from one week to seven years. Thirty-two of the 57 studies reported the improvement of hypertension in 32,628 of 51,241 patients (OR: 13.24, 95% CI 7.73, 22.68, $p<0.00001$). Forty-six studies reported the resolution of hypertension in 24,902 of 49,844 patients (OR 1.70, 95% CI 1.13, 2.58, $p=0.01$). A random effects model was used as the heterogeneity between the studies was high ($I2=97\%$).
Conclusion: The results of this meta-analysis indicate that patients who undergo bariatric surgery experience improvement and resolution of their hypertension.

Abstract No. 6 (Student_Graduate)

Title

Associations between gait self-efficacy and walking performance in community-dwelling older adults

Affilliations

Wayne State University, Department of Health Care Sciences, Physical Therapy Program, Mobility Research Laboratory, and Institute of Gerontology

Authors

Amy Corbin, SPT ... Stacy Dewald, SPT ... Kourtney Willert, SPT ... Katie Shurkus, SPT ... Allon Goldberg, PT, PhD ... Susan Ann Talley,

PT, DPT, C/NDT ... Sujay Galen, PT, PhD, FHEA

Abstract

Introduction/purpose: Maintaining mobility in old age is a requisite for independent living. Although low self-perception of walking confidence may limit frequency of walking and lead to mobility declines with advancing age, walking self-efficacy is rarely assessed in geriatric clinical settings and is under-studied in older adults. The purpose of this study was to assess validity of the Modified Gait Efficacy Scale (mGES) in older adults.
Subjects: Twenty-four community-dwelling older adults (mean age 72.3 years, range 65-91 years).
Materials and Methods: Participants completed the mGES, which assesses confidence in safely walking under 10 conditions commonly encountered by older adults. mGES was scored on a scale of 0=no confidence to 100%=complete walking confidence. They also completed a series of walking tests: 10-feet tandem walk time (TWT), 10-meter usual (UGS) and fast (FGS) gait speed, figure-of-8 walk time (F8WT), timed up and go (TUG), 5-meter TUG with obstacle (TUGO), dynamic gait index (DGI). Spearman's correlation coefficients quantified strength of relationships between the mGES and walking tests. Alpha was set at p=0.05.
Results: Mean values ± SD were: mGES 93.9 ± 8.9% (range 62-100%) ... TWT 14.5 ± 5.3s (range 5.7-25.2s) ... UGS 1.2 ± 0.2m/s (range 0.8-1.6m/s) ... FGS 1.7 ± 0.4m/s (range 1.1-2.9m/s) ... F8WT 8.3 ± 2.2s (range 5.0-14.5s) ... TUG 9.8 ± 2.0 (7.2-14.6s) ... TUGO 13.6 ± 3.1s (10.1-22.4s) ... DGI 20.0 ± 3.9 (9-24). Spearman's r values between mGES and walking tests were: TWT r=-0.62, p=0.001 ... UGS r=0.45, p=0.03 ... FGS r=0.72, p<0.001 ... F8WT r=-0.44, p=0.03 ... TUG r=-0.44, p=0.03 ... TUGO r=-0.47, p=0.02 ... DGI r=0.50, p=0.01.
Conclusion: Associations between walking confidence and performance on walking tests were fair for F8WT, TUG, UGS and TUGO, moderate for DGI, and good for TWT and FGS. Higher levels of walking confidence were associated with faster gait speeds and a shorter duration to complete the timed walking tests and better performance on the DGI. These results support validity of the mGES as a measure of walking self-efficacy in community-dwelling older adults.
Clinical Relevance: Given the importance of walking and confidence in walking to maintaining independence with advancing age, these results which support the validity of the mGES as a measure of walking confidence, suggest that clinicians should consider using the scale to assess walking self-efficacy in clinical settings. The particularly strong relationship between fast gait speed and walking confidence raises the question as to whether interventions designed to increase gait speed may be an effective strategy to improve walking self-efficacy in older adults.

Abstract No. 7 (Post_Doctoral_Fellow)

Title

Knockdown of Protein Phosphatase 1 Regulatory Subunit Negatively Affects Insulin Action

Affilliations

1. Department of Pharmaceutical Sciences, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, MI.
2. Department of Physiology, School of Medicine, Wayne State University, Detroit, MI.

Authors

Xiangmin Zhang1, PhD, Danjun Ma1, PhD, Michael Caruso1, PhD, Monique K. Lewis1, PhD, Assia Shisheva2, PhD, Ognian Ikonomov2, PhD, and Zhengping Yi1, PhD

Abstract

Extensive research has been carried out to study the role of kinases in insulin action. However, a mechanism for serine/threonine phosphatase action in insulin signaling is largely unknown. Protein Phosphatase 1 Regulatory Subunit 12A (PPP1R12A) of serine/threonine Protein Phosphatase 1 (PP1) binds to the delta isoform of PP1 catalytic subunit (PP1cdelta) to modulate the dephosphorylation activity of this holoenzyme towards its substrates. To determine the role PPP1R12A plays in insulin signal transduction, we constructed lentiviruses expressing shRNAs targeting PPP1R12A, which showed efficient knock-down of PPP1R12A protein level in L6 rat skeletal muscle cells. Insulin stimulated IRS-1/p85 association transmits insulin signal downstream. To assess the effect of PPP1R12A knock-down on IRS-1/p85 association, L6 myotubes were transduced with lentiviruses encoding non-targeting scramble control shRNA or shRNA targeting PPP1R12A, respectively. 3 days after infection, cells were serum-starved and treated with/without 100nm insulin for 15min. IRS-1 was immuneprecipitated and IRS-1/p85 association was determined by the proteomics approach developed in our laboratory. The results indicated that either basal or insulin stimulated IRS-1/p85alpha association and IRS-1/p85alpha association were significantly reduced to approximately half after PPP1R12A knock-down. Furthermore, to determine the effect of PPP1R12A knock-down on glucose uptake, we transduced L6 myoblasts stably overexpressing GLUT4 (L6 GLUT4myc) with shRNA lentiviruses. The results indicated that after PPP1R12A knock-down, glucose uptake was significantly decreased to about half compared to scramble controls under both basal and insulin-stimulated conditions. In summary, PPP1R12A protein knock-down negatively affected insulin action, and led to reduced IRS-1/p85 association and impaired glucose uptake in L6 cells, suggesting that PPP1R12A may play a positive role in insulin signaling and glucose uptake.

Abstract No. 8 ()

Title

The Effect of Extended Head Position on Sway Velocity in Community-Dwelling Older Adults

Affilliations

Authors

Sara Ullenbruch, SPT ... Ellen Hammond, SPT ... Lauren Kelsch, SPT ... Fredrick Pociask, PhD, PT, OCS, OMT, FAAOMPT ... Allon Goldberg, PhD, PT ... Diane Adamo, OTR, PhD

Abstract

INTRODUCTION: The ability to control the body’s center of mass over the base of support is important in maintaining the necessary postural control required to perform daily activities. Postural control is dependent on the integration of sensory information from visual, foot somatosensory and vestibular sources. The purpose of this study was to investigate postural sway under conditions of altered vision, foot somatosensation and vestibular orientation in community-dwelling older adults. We hypothesized that when standing under varying visual-surface conditions, sway velocity would be significantly greater with the head extended than with the head in the neutral position. METHODS: Twenty-six older adults completed a medical history questionnaire and underwent testing of postural sway on a force plate. Postural sway velocity (degree/second) was assessed under each of the eight combinations of visual (eyes open, eyes closed), surface (firm, foam), and head position (neutral, extended 45 degrees) for each subject. A cervical range of motion (CROM) device was used to ensure the head was held in neutral or 45 degrees of extension while the participants focused their gaze on an individually placed disk on the wall. A 2 x 2 x 2 repeated measure ANOVA was used to evaluate main effects of surface, vision and head position, as well as interactions among these conditions on sway velocity. Significance was set at $p<0.05$. RESULTS: Significant main

effects were detected for surface, (foam versus firm surface [1.68 versus 0.53 degrees/second respectively ... p<0.001]) ... vision, (eyes closed versus opened [1.58 versus 0.63 degrees/second respectively ... p<0.001]) ... and head position (extended versus neutral [1.24 versus 0.97 degrees/second respectively ... p<0.001]), on sway velocity. Sway velocity was greatest when standing on foam, eyes closed and head extended (2.78 degrees/second) followed by standing on foam, eyes closed and head in neutral (2.14 degrees/second) (p<0.001). Sway velocity was greater with the head extended than when in neutral for each of the visual-surface conditions (p<0.05). A significant three-way interaction effect (p=0.006) was detected: when standing on foam the difference in sway velocity between the extended and neutral head positions was greater with eyes closed than with eyes opened (p<0.001). When standing on a firm surface, however, the difference in sway velocity between the extended and neutral head positions was similar with eyes closed and opened (p=0.13). DISCUSSION AND CONCLUSION: Sway velocity was significantly greater with the head extended than when in neutral for each of the visual-surface conditions, thus supporting the study hypothesis. The greatest differences between extended and neutral head positions appear to be when standing on foam with vision occluded. These results appear to have important implications for falls risk in older adults. As sway velocity is a measure of postural equilibrium and the ability to control the center of mass, these results suggests that when standing with the head extended, older adults may place themselves at risk for postural disequilibrium and losses of balance. The deleterious effects of extended head position appear to be greater on compliant surfaces, particularly in the absence of vision.

Abstract No. 9 (Faculty)

Title

Assessment of the Inpatient Treatment of COPD Exacerbations and the Effect on Patient Outcomes

Affilliations

1 Department of Pharmacy Practice, Wayne State University Eugene Applebaum College of Pharmacy, Detroit, MI
2 Harper University Hospital, Detroit, MI
3 Spectrum Health System, Grand Rapids, MI

Authors

Sheila Wilhelm, Pharm.D., BCPS 1,2,
Elisa Bahry, Pharm.D. Student 1,
Emily Fisher, Pharm.D. 3,
Geoffrey Morgan, Pharm.D. 2

Abstract

Purpose:
To assess management of Chronic Obstructive Pulmonary Disease (COPD) exacerbations and related patient outcomes at a large teaching institution.

Objectives:
1. Determine whether patients hospitalized for COPD exacerbation are managed with guideline-driven therapy
2. Determine the relationship between Charlson comorbidity score, length of stay (LOS) and number of inpatient COPD medications
3. Establish whether season affects length of stay, COPD admission rates, 30-day readmission rates and documentation of influenza and pneumococcal vaccines

Methods:
A retrospective chart review within a large academic institution was performed. Patients 18-89 years admitted between December 2010 and August 2012 with ICD9 code indicating COPD were included if they had documented shortness of breath due to COPD exacerbation in an initial

inpatient note. Patient demographics, pulmonary medications, season of admission, LOS, 30-day readmission, and Charlson Comorbidity score were collected. ANOVA and Spearman Rank Correlation were used for parametric and nonparametric data, respectively.

Results:
615 patients were screened ... 91 were included. COPD exacerbation was treated with short-acting beta-agonists (98.9% of patients), short-acting anticholinergics (81.3%), systemic corticosteroids (81.3%), and antimicrobials (73.6%). No correlation was found between Charlson comorbidity score and LOS or number of inpatient COPD medications (r=0.039, -0.016, respectively ... p>0.05 for both comparisons). A weak positive correlation was found between LOS and number of medications (r=0.23, p=0.0281). LOS did not differ by season (p=0.55). A greater number of admissions per month occurred in fall (8.0 admissions/month) versus winter, spring or summer (3.83, 5.17 and 3.5, respectively). Thirty-day readmissions per month followed a similar trend with 1, 0.83, 1, and 3 readmissions per month in winter, spring, summer, and fall, respectively). Rate of documented influenza and pneumococcal vaccinations remained consistent throughout the winter and spring months (51-56%) and decreased slightly in the fall (44%). During summer months, influenza vaccination documentation decreased (10%), while pneumococcal vaccination documentation remained consistent (62%).

Conclusion: COPD exacerbations are treated according to guidelines. Documentation of vaccination is an area for improvement.

Abstract No. 10 (Post_Doctoral_Fellow)

Title

Eye-Mediated Induction of Specific Immune Tolerance to Encephalitogenic Antigens

Affilliations

Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University

Authors

Shukkur M Farooq and Hossam M Ashour

Abstract

Aims: Administration of antigens into the anterior chamber (AC) of the eye induces a form of antigen-specific immune tolerance termed anterior chamber-associated immune deviation (ACAID). This immune tolerance effectively impairs host delayed-type hypersensitivity (DTH) responses. We hypothesized that ACAID could be generated in BALB/c mice following AC inoculation of the encephalitogenic antigens myelin oligodendrocyte glycoprotein (MOG) and myelin basic protein (MBP). Methods: We used DTH assays and local adoptive transfer (LAT) assays to test whether MOG/MBP-induced ACAID following their administration into the AC, whether they elicited this immune tolerance via CD8+ T cells, and whether their AC coadministration (MOG/MBP) induced specific immune tolerance to one or both antigens. Results: We showed that MOG/MBP-induced AC-mediated specific immune tolerance, as evident from impaired DTH responses. This antigen-driven DTH suppression was solely mediated via splenic CD8+ T cells as confirmed by LAT assays. Finally, a single AC injection with both antigens was sufficient to induce specific immune tolerance to these antigens, as evident from DTH and LAT assays. Conclusion: ACAID T-cell regulation could be used as a therapeutic tool in the treatment of

complicated autoimmune diseases that involve multiple antigens such as multiple sclerosis.

Abstract No. 11 (Faculty)

Title

Immediate Effect of Whole Body Vibration on Gait in Patients with
Incomplete Spinal Cord Injury: Preliminary Results.

Affilliations

1Rehabilitation Institute of Michigan, and Physical Therapy Program, 2Department of Health Care Sciences, Wayne State University

Authors

D. Patzer,1, P. Vu, 1 P. Khan,2, J. Stahl,2, T. El-Bohy,2, V. Pardo,1,2, S. Galen,2

Abstract

Background
Whole body vibration (WBV) is relatively a new intervention that is being increasingly used in the rehabilitation of spinal cord injured (SCI) patients. An important observation that was recently made in patients with incomplete SCI was the reduction in spasticity in their lower extremities immediately following the application of WBV, especially within the first 15 minutes. However to date there have been no scientific investigations that have studied the immediate effect of reduction in spasticity following WBV on walking in patients with incomplete SCI (ISCI).

Aim

The aim of this study was to investigate the immediate effects of WBV on gait in Incomplete SCI patients

Methods
A cross over design was adopted to research the immediate effects of WBV following two types of WBV interventions (Type A and Type B). All subjects received the two types of intervention twice over a 4 week period ... however the order in which these interventions were delivered were randomized. Type A intervention consisted of four bouts of WBV lasting 45 s each with three 60s rest periods interspersed between each bout. Type B intervention consisted of a WBV dosage (number of bouts of WBV) matched to the severity of the subject's lower extremity (LE) spasticity. Subjects assessed as having mild, moderate or severe LE spasticity received two, three or four bouts of WBV respectively. A rest period of 60s was interspersed between each bout of WBV. The spatio-termporal gait parameters (walking speed, stride length, stance time, swing time, double support time, and foot contact pattern) were recorded before and after WBV intervention using an insole based wireless gait assessment tool (Wi-GAT). Subjects were randomly tested either immediately after the WBV intervention (test 1) or following a 15 minute delay (test 2). Subjects are currently being recruited from the Rehabilitation Institute of Michigan (RIM), Detroit, into this ongoing study. Here we present the preliminary results from the first two subjects ... subject 1 (Male, 34 years, C4 ISCI, moderate LE spasticity) and subject 2 (Male, 43 years, C4-C5 ISCI, severe LE spasticity).

Results
A greater decrease in stance time was observed in Subject 2 compared to Subject 1. This may indicate that following WBV the subjects were able to spend less time with their feet on the ground during walking, indicating a shift towards a more 'normal' pattern of walking. The swing time also increased, as they were now able to keep their feet off the ground longer while walking. This effect was more pronounced in Subject 2 compared to Subject 1. As a result their double support time (duration when both feet were on the ground) decreased. The changes in gait seem to be more pronounced in Subject 2 who had more spasticity in his lower extremity compared to Subject 1.

Conclusions

These are preliminary results and therefore must be interpreted with caution. The results so far seem to suggest that WBV as a pre-gait intervention may be useful for patients with high level of spasticity in their lower extremity.

Abstract No. 12 (Post_Doctoral_Fellow)

Title

The Combination of Ceftaroline Plus Daptomycin Allows for Therapeutic De-escalation and is Daptomycin Sparing

Affilliations

Anti-Infective Research Laboratory, Wayne State University, Detroit, MI

Authors

Katie E. Barber, PharmD
Brian J. Werth, PharmD
Michael J. Rybak, PharmD

Abstract

Background: CPT, the active form of CPT-fosamil, demonstrates in vitro activity against MRSA, including hVISA, VISA and DNS strains. We previously demonstrated in vitro that CPT enhances the activity of high dose (HD) DAP resulting in potent and sustained activity, greater than either agent alone. The purpose of this study was to determine if this combination can be de-escalated to a single agent after 4 days.

Methods: We investigated the activity of CPT + DAP de-escalated to CPT or DAP against 2 clinical DNS MRSA isolates in an in vitro PK/PD hollow-fiber model over 192h. Simulated regimens: CPT 600mg q12h (fCmax 17.0 mg/L, t1/2 2.66h) x 8 d, DAP 10mg/kg/d (fCmax 11.3 mg/L, t1/2 8h) x 8 d, CPT + DAP x 8 d and CPT + DAP x 4 d de-escalated to either CPT or DAP x 4 days. Additionally CPT + DAP 6mg/kg/day (fCmax 7.5 mg/L, t1/2 8h) with de-escalations was evaluated. Differences in log10 CFU/mL (96 and 192 h) were evaluated by analysis of variance with Tukey's-HSD post hoc test.

Results: DAP and CPT MICs for R5563 and R6063 were 2, 4 and 0.5, 1 mg/L, respectively. CPT + DAP 6 or 10mg/kg/d displayed bactericidal activity within 8 h and resulted in >5 log10 CFU/mL reduction from initial inocula by 96 h against both strains and maintained bacterial counts within 0.5 log10 CFU/mL of the detection limit from 96-192 h with or without de-escalated to either agent. There was no significant difference between the combination/de-escalation regimens for either organism at either dose of DAP. CPT monotherapy resulted in 2-2.5 log10 CFU/mL kill at 192 h. DAP was minimally active in the first 8 h but not significantly different than drug free controls by 24h. All combination/de-escalation regimens resulted in significantly improved activity compared to CPT or DAP monotherapy ($p<0.01$) at 96 and 192 h.

Conclusion: These findings confirm CPT + DAP is a potent combination against DNS MRSA. The high degree of bactericidal activity observed with this combination appears robust enough to allow for de-escalation to a single agent without any bacterial regrowth. Equivalent activity observed with CPT plus DAP 6 and 10mg/kg/d suggests this combination is also DAP sparing. Further research is warranted to determine optimal DAP dose and de-escalation timing.

Abstract No. 13 (Student_Graduate)

Title

Activity of ceftobiprole (BPR) combination regimens against multiple strains of Staphylococcus aureus with differing resistance phenotypes.

Affilliations

Anti-Infective Res. Lab., Wayne State Univ., Detroit, MI

Authors

Katie Barber PharmD, Brian Werth PharmD, Cortney Ireland, Nicole Stone, Michael Rybak PharmD

Abstract

Background: BPR is a broad-spectrum cephalosporin, active against Gram-positives including methicillin-resistant S. aureus (MRSA). S. aureus is the leading cause of hospital-acquired infections with over 55% of isolates displaying methicillin-resistant phenotype. Currently, vancomycin (VAN) is the mainstay of therapy for MRSA infections ... however, reports of VAN failure are emerging due to elevated MICs. BPR is currently under regulatory review and may provide an alternative treatment for MRSA. We have previously described increased activity of beta-lactams (BL) against strains with decreased glycopeptide susceptibility and potent therapeutic enhancement with BL combinations with glyco- and lipopeptides. Therefore, the objective was to determine if BPR is synergistic with daptomycin or standard of care combination agents [gentamicin (GEN) or rifampin (RIF)].

Methods: Broth microdilution MICs for BPR, daptomycin (DAP) and VAN were determined for 20 MRSA isolates with additional resistance phenotypes: 8 VSSA, 8 hVISA (5 DAP non-susceptible ... DNS), 7 VISA (5 DNS). 5 representative isolates (1 VSSA, 2 hVISA, 2 VISA ... all DNS) were chosen to investigate synergy in time-kill analysis against BPR, DAP, BPR+DAP, BPR+RIF, and BPR+GEN. For time kills, concentrations of ½ x MIC for BPR and DAP were utilized. Therapeutic synergistic free peak concentrations of RIF and GEN were used. Bactericidal activity was defined as ≥ ... 3 log10 CFU/mL reduction from the starting inoculum and therapeutic enhancement of combinations was defined as ≥ ... 2 log10 CFU/mL reduction over most active agent alone.

Results: MIC90 for BPR, DAP and VAN were 2, 4, 4 mg/L, respectively. BPR and DAP monotherapy at ½ x MIC resulted in minimal to no kill. BPR+DAP displayed bactericidal enhancement in all strains ($p<0.05$) with greater activity in the more VAN resistant strains. BPR+GEN demonstrated enhancement in all but 1 VISA strain. BPR+RIF demonstrated initial kill within first 8 h in 3 of 5 strains but was not maintained to 24h.

Conclusions: BPR displays potent synergistic activity when combined with DAP. Synergy with standard of care combinations was inconsistent with GEN providing the most comparable enhancement to BPR+DAP. Further studies with more advanced PK/PD modeling is warranted to further explore synergistic relationships seen with BPR.

Abstract No. 14 (Faculty)

Title

RELATIONSHIP BETWEEN NORMALIZED LOWER EXTREMITY FORCE PRODUCTION, BODY MASS AND POSTURAL SWAY IN YOUNG CHILDREN

Affilliations

Physical Therapy Program
Department of Health Care Sciences

Authors

Susan Ann Talley, PT, DPT, C/NDT and Sujay Galen, PT, PhD

Abstract

INTRODUCTION/CLINICAL RELEVANCE: Activity limitations and participation restrictions have been observed in children with LE muscle

weakness. Understanding the relationship between LE muscle force production, body mass and balance may help physical therapists develop interventions to improve function in children with strength and balance impairments. The purpose of this study was to examine the relationship between LE muscle force, body mass and postural sway in 6 and 8 year old (YO) children. METHODS: Forty typically developing children ... 20 (50% female) were 6 YO (76.8 +/- 2.78 mos) and 20 (50% female) were 8 YO (100.8 mos +/- 3.12 mos). Height, weight and dominant leg were recorded. The strength of 8 LE muscle groups was measured in the preferred leg using a hand-held dynamometer ("make" test). Mean force (kg) of 3 trials was recorded. Force was normalized (mean force/height). Postural sway was measured under 4 conditions: bipedal stance (eyes open/closed) and tandem stance (eyes/closed). Center of pressure displacement was measured during three 10-second trials per position. The mean was recorded (degrees/s). Participants were divided into 4 groups (n = 10) based on weight quartiles. Descriptive statistics, Independent t-tests, Mann Whitney U and ANOVA with post hoc Bonferroni corrections were used to compare groups. Pearson's correlation was used to examine the relationships between strength and postural sway. Alpha =.05. RESULTS: The 8 YO group was significantly taller and heavier than the 6 YO group. Weight was not normally distributed in the 6 YO group resulting in overlap between age groups. The lightest quartile group had the most significant correlations between normalized force and postural sway (r = -.66 - .79). The majority of the correlations in this group were positive, i.e. as normalized force increased postural sway increased. The middle two weight groups had more negative fair to good correlations (r = -.74 - .47), i.e. postural sway decreased as normalized force production increased. In the heaviest group, there was a return to a preponderance of positive correlations in the fair to good range (r =.46 - .74). DISCUSSION: Control of postural sway was poorer in the lightest and heaviest groups as normalized muscle force increased ... there were more instances in the middle groups of increased force production resulting in decreased postural sway. This may indicate that muscle force production relative to weight is a factor in balance control. CONCLUSIONS: Postural sway is negatively correlated with muscle force production in children with the lightest and heaviest body weight. Physical therapists may need to develop interventions which help children with balance impairments to modulate LE muscle force production in order to improve balance. ACKNOWLEDGMENTS: A special thank you to the principal, teachers, staff and children at Wegienka Elementary School who volunteered and supported this research study and to the students who assisted in data collection: Krista Duhaime, Emily McIntyre and Kevy Nycek.

Abstract No. 15 (Student_Graduate)

Title

Pharmacy student participation in an interprofessional medical relief trip as members of a joint student organization

Affilliations

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Authors

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Abstract

Analyze learning activities and pharmacy student perspectives of participation in an interprofessional medical relief student organization during separate week-long medical relief trips to Haiti and Nicaragua.

A medical school relief organization was expanded to include a sister organization at the pharmacy school. Pharmacy student activities included pre-trip preparation and patient care while in country. The number of patients seen and medications dispensed were recorded daily. Student perceptions were assessed using an anonymous and voluntary, post-trip 40-question survey (29 likert-scale and 11 open-ended questions).

Nine pharmacy students, 1 pharmacist, 33 medical students and 4 physicians participated in these trips. For the 1089 patients seen, 3128 prescriptions were dispensed. Pharmacy students assisted in triage, made recommendations, and participated in dispensing and patient counseling.

Seven of nine (78%) pharmacy students completed the survey. All agreed that pharmacy services were beneficial and reported positive overall satisfaction with team and pharmacy services. All students agreed that their individual involvement was helpful and that the organization of the medications by the pharmacy team enhanced the workflow process. The reported level of confidence with regards to making recommendations varied among the students. Four students reported feeling confident with dosing, 3 with therapeutic, and 2 with substitution recommendations. Students with more years of education generally expressed more confidence. Results from open-ended questions revealed that students felt they would have benefited from pharmacy focused education prior to the trips. Additionally, they felt that participating in teamwork was their greatest contribution. Students all agreed that interprofessional care is needed to maximize patient care and that they see themselves practicing within an interprofessional team in the future.

Pharmacy students participated in many interprofessional activities and perceived a significant benefit from their involvement. Ongoing program evaluation will lead to continued improvements in the interprofessional student organization.

Abstract No. 16 (Student_Graduate)

Title

Validating the EMGFT from a Single Incremental Cycling Test

Affilliations

Wayne State University Physical Therapy Program.

Authors

Matt J. Briscoe, SPT
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Abstract

The purposes of this study were to 1) identify the EMGFT from a single incremental cycle ergometry test ... and 2) validate this fatigue threshold by having participants perform constant workload rides at 70%, 100%, and 130% of the estimated EMGFT. Eleven healthy college-aged participants performed incremental cycle ergometry on the initial visit. The EMG amplitude was recorded from the vastus lateralis muscle for each power output and fitted with linear regression which provided the estimated EMGFT. In subsequent visits, participants exercised at three percentages of their EMGFT with the EMG amplitude recorded for each condition. The results indicated no significant ($p > 0.05$) increases in EMG amplitude versus time for the 70% and 100% workloads, respectively. In addition, the participants were able to maintain these exercise intensities for over 40 minutes. For the 130% workload, however, EMG amplitude versus time increased significantly ($p < 0.001$) and the participants were able to maintain the exercise condition for less than 12 minutes. These findings indicate that the EMGFT estimated from a single incremental cycle ergometry test is a valid

measure of neuromuscular fatigue and may potentially have application for assessing the

efficacy of rehabilitative interventions.

Abstract No. 17 (Student_Graduate)

Title

Concurrent Validity of the V1 Pro All Sport® system for measuring spatio-temporal gait parameters in healthy adults.

Affilliations

Physical Therapy Program, Department of Health Care Sciences, Wayne State University

Authors

J Balagot, J Malilay, J Potvin, S Galen & K Reid

Abstract

Introduction: Observational gait analysis has been shown to be unreliable and inaccurate in estimating the temporal and spatial measures of gait. Hence, there is a clinical need for gait analysis systems that are able to make valid and reliable estimates. The GAITRite® system is the current gold standard for estimating spatio-temporal measures, but is limited by its cost and portability. The V1 Pro All Sport® system is video based, portable and less expensive golf-swing analysis software, that has the potential to be used as a clinical gait analysis tool. The purpose of this study was to determine the concurrent validity of the V1 Pro All Sport® software in computing step length and step velocity by comparing its measures against the measures recorded by the GAITRite® system.

Methods: Twenty two healthy adults (8M, 14F, age range: 21-36 years) participated in this validation study. Spatio-temporal measures such as step length and step velocity were simultaneously recorded by the V1-Pro and GAITRite® systems. Data collections by the two systems were synced using an electronic/visual signal. A video camera connected to a laptop running the V1 Pro All Sport® software was placed 4.72 meters from the center of a 10 meter walkway, so that approximately the middle 3 meters of the walkway were visible in the video recording. Prior to testing the V1 Pro All Sport® measurement tool was calibrated by measuring a 1 meter ruler placed on the middle of the 10 meter walkway. The GAITRite® mat was placed over the middle 5.74 meters of the same 10 meter walkway. All subjects were then asked to walk thrice over the 10 meter walkway using their preferred/regular walking speed. An ICC (2,k) method was used to analyze the agreement between the measures recorded by the two systems. Bland-Altman plots were used to view the average differences between the measures recorded by the V1 Pro All Sport® system the GAITRite® system.

Results: The ICC (2,k) analysis showed a good agreement between the GAITRite and V1-Pro measures for right step length (0.724, $p<0.001$), right step velocity (0.824, $p<0.001$), and left step velocity (0.783, $p<0.001$). However, there was a moderate agreement for left step length (0.676, $p<0.001$). The Bland-Altman plot revealed that the V1 Pro had an approximately 8 cm systematic error in estimating step length. The Bland-Altman plot also revealed that the V1 Pro All Sport® had a slight proportional error in estimating the step velocity, meaning that as the magnitude of the recorded step velocity increases there was a slight increase in the estimation error.

Conclusion: The current validation study showed that the V1 Pro All Sport® made errors in estimating step length and step velocity when the video camera was placed at a distance of 4.74 meters from the center of the walkway. Errors may vary with different distances based on the camera optics. Clinicians may need to take these findings into account while analyzing gait using video based systems such as the V1

Pro All Sport® .

Abstract No. 18 (Student_Graduate)

Title

Vancomycin Treatment Failures for MRSA Bacteremia Based on MIC

Affilliations

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Authors

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Pramodini Kale-Pradhan, Pharm.D.
Sheila Wilhelm, Pharm.D., BCPS
Shannon Jacobs, Pharm.D. Candidate
Leonard Johnson, M.D.

Abstract

Background:
Vancomycin is used to treat serious infections caused by methicillin-resistant Staphylococcus aureus (MRSA). Clinical Laboratory Standards Institute (CLSI) defines vancomycin minimum inhibitory concentration (MIC) susceptibility breakpoint as 2mcg/mL, reduced from 4mcg/mL, for MRSA. It is unclear whether MRSA isolates with MIC 1.5-2mcg/mL are successfully treated with vancomycin. This study examines vancomycin failure rates in MRSA bacteremia with a MIC <1.5mcg/mL versus ≥ ... 1.5mcg/mL, and MIC ≤ ... 1mcg/mL versus ≥ ... 2mcg/mL.
Methods:
Two independent investigators conducted a literature search of PubMed (1966-2013) and Cochrane databases using MESH terms vancomycin, MRSA, bacteremia, MIC, treatment and vancomycin failure to identify appropriate human studies published in English. Retrospective studies of patients with MRSA bacteremia treated with vancomycin were included if they evaluated vancomycin failures, defined as mortality, and reported associated MICs determined by E-test. Study sample size, vancomycin failure rates, and corresponding MIC values were extracted and analyzed using RevMan 5.2.5.
Results:
Seven studies (n = 1907) met all criteria. 516 patients had isolates with a MIC of <1. 5mcg/mL while 1391 had a MIC of ≥ ... 1.5mcg/mL. Therapeutic failure occurred in 141 cases with MIC <1.5mcg/mL and 324 with a MIC ≥ ... 1.5mcg/mL (OR: 1.00, 95% CI 0.77, 1.30). 277 patients had isolates with MIC ≤ ... 1mcg/mL, 302 had a MIC ≥ ... 2mcg/mL. Therapeutic failure occurred in 50 and 63 patients, respectively (OR 0.77, 95% CI 0.48, 1.21). A fixed effects model was used as the heterogeneity between the studies was low (I2<50%).
Conclusion:
The results of this meta-analysis indicate that patients with MRSA isolates with MIC of ≥ ... 1.5mcg/mL have similar failure rates compared to those with MIC < 1.5mcg/mL. Additionally, patients with MRSA isolates with MIC ≤ ... 1mcg/mL had similar failure rates compared to those with MIC ≥ ... 2mcg/mL. MIC may not be an optimal sole indicator of vancomycin treatment failure in MRSA bacteremia.

Abstract No. 19 ()

Title

Project ImPACT Hypertension: Outcomes of a Pharmacist-Provided Hypertension Service

Affilliations

Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Department of Pharmacy, Henry Ford Hospital, University Pharmacy, Department of Pharmacy, Harper University Hospital

Authors

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Abstract

Objective: To evaluate the impact of pharmacists, working collaboratively with patients, on blood pressure control, lifestyle goal setting, adherence to antihypertensive therapy, patient knowledge and satisfaction, and modification of cardiovascular risk factors.
Setting: University Pharmacy, located in Detroit, Michigan, is an independently owned and operated community pharmacy on the campus of Wayne State University.
Methods: Self-declared hypertensive patients met with the pharmacist for blood pressure monitoring, lifestyle goal setting, and education about medications and disease state on four occasions over a 6–month period.
Practice innovation: A community pharmacy partnered with an employer wellness plan to provide education and monitoring for patients with hypertension based on home blood pressure readings obtained using monitors that wirelessly transmit information to the pharmacist.
Main outcome measure(s): Percentage of patients at blood pressure goal, mean blood pressure, percentage of patients with lifestyle goals, medication adherence, patient knowledge and satisfaction, and modification of cardiovascular risk factors.
Results: Patients not at their goal blood pressure at baseline had a significant decrease in blood pressures and a significant increase in achievement of their blood pressure goals. Across the population, no significant changes were seen in the primary outcome, lifestyle goals, medication adherence or modification of cardiovascular risk factors. Patient knowledge increased from baseline and satisfaction with the service was high.
Conclusion: Blood pressure control improved in patients not at their treatment goal. All patients increased their knowledge about hypertension and reported high satisfaction with the pharmacy service. Pharmacy services should be offered to patients who are more likely to reap a benefit. Home blood pressure readings are useful to inform clinical decision making and supplement patient consultation within the pharmacy setting.

Abstract No. 20 (Post_Doctoral_Fellow)

Title

Multicenter Experience of the Effectiveness and Safety with Ceftaroline Fosamil Therapy

Affilliations

Anti-Infective Research Laboratory, Eugene Applebaum College of Pharmacy and Health Sciences Wayne State Univ., Detroit, MI ... Henry Ford Health System, Detroit, MI ... Alexian Brothers Health System, Arlington Heights, IL ... Shands at University of Florida, Gainesville, FL ... Ohio State University Medical Center, Columbus, OH ... Detroit Medical Center, Detroit, MI ... School of Medicine, Wayne State University, Detroit, MI

Authors

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Abstract

Background: The US Food & Drug Administration (FDA) approved CPT for acute bacterial skin & skin structure infections (ABSSSI) & community-acquired bacterial

pneumonia (CABP). CPT is indicated for ABSSSI caused by S. aureus (SA) including methicillin-susceptible (MSSA) & resistant (MRSA) strains. Limited clinical data exists for use outside these indications. Objective of this study is to describe the outcomes of patients (pts) treated with CPT for various infections.
Methods: Retrospective cohort analysis in pts receiving ≥ ... 72 hrs of CPT at 5 different hospitals from 2011 to 2013. Clinical & microbiological outcomes were analyzed. Clinical cure (CC) was defined as infection resolved at the end of CPT & no additional therapy needed.
Results: 527 pts receiving CPT were included and 33% were within the FDA labeling, see Figure 1 for types of infections. Median APACHE II was 11 (8-16). Most pts (80%) were initiated on CPT after receipt of alternative therapy, with 48% citing disease progression as a reason for switching. A total of 327 (62) were culture positive, 83% of which were SA (241 MRSA, 30 MSSA). Median CPT MIC for SA was 0.5 mg/L (0.5- 0.75). For patients with SA bacteremia (SAB): 112 MRSA, 10 MSSA, & 11 daptomycin-nonsusceptible S. aureus. Remaining cultures were 21% (68) other Gram-positive & 20% (67) Gram-negative bacteria. Of the SA infections, 21% (56/271) were polymicrobial with another bacteria. Clinically, 426/484 (88%) achieved CC at the end of CPT therapy. Median duration of CPT was 6 days (4-9) and the most common CPT dose was 600mg q12h. 29% were given another antibiotic with CPT. Median length of stay was 13 days (7-24). For SAB, median time to bacterial clearance was 3 days (1-4). In hospital mortality was seen in 20 (5%) pts. 37 (9%) experienced an adverse event while on CPT and 21 (7%) were re-admitted within 30 days after discharge, with 8 (3%) for the same infection.
Conclusions: The majority of pts treated with CPT for off-label infections had favorable outcomes. Further research is necessary to clarify its clinical role in these infection types outside its FDA approved label.

Abstract No. 21 (Faculty)

Title

GAIT PARAMETERS MEASURED USING A WIRELESS GAIT ASSESSMENT TOOL AND ITS ASSOCIATION WITH CLINICAL WALKING MEASURES IN OLDER ADULTS

Affilliations

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Authors

Galen, Sujay1 ... Goldberg, Allon1,2 ... Talley, Susan A.1 ... Dewald, Stacy1 ... Willert, Kourtney1 ... Shurkus, Katie1 ... Corbin, Amy1

Abstract

Introduction: Previous studies have shown associations between spatio-temporal gait parameters and falls risk and/or a history of falls in older adults. In a clinical environment it is often challenging for Physical Therapists to monitor subtle changes in gait parameters (eg. stride length, double support time) due to time, cost and testing space constraints. The Wireless Gait Assessment Tool (Wi-GAT) was developed to address these constraints. The Wi-GAT records spatio-temporal gait parameters, using an instrumented insole, and wirelessly transmits the data in real time. The purpose of this study was to assess the relationship between the Wi-GAT recorded gait parameters and the clinical measures of walking performance in older adults.

Methods: Twenty-two community dwelling older adults. The Wi-GAT system recorded the spatio-temporal gait parameters while participants performed two 10-meter walks. Walking performance was also assessed using standard clinical measures such as the 10-feet tandem walk time (TWT), figure-of-8 walk time (F8WT), Timed Up and Go (TUG), 5-meter

TUG with obstacle (TUGO), Dynamic Gait Index (DGI). Spearman's rank correlation coefficients were used to establish the strength of relationships between the Wi-GAT recorded gait parameters and walking performance measures. Alpha was set at p=0.05.

Results: The following gait parameters (shown in bold) recorded by the Wi-GAT showed a significant association with the standard clinical measures in the twenty two subjects that were tested (Female=10, mean age 72.3 years, range 65-91 years). Walking speed vs TWT(ρ ... =-.544,p=.009), F8WT(ρ ... =-.721,p<.001), TUG(ρ ... =-.743,p<.001), TUGO(ρ ... =-.738,p<.001),DGI(ρ ... =.700,p<.001). Double support time vs TWT(ρ ... =.466,p=.029), F8WT(ρ ... =.600,p=.003), TUG(ρ ... =.518,p=.014), TUGO(ρ ... =.535,p=.010), DGI(ρ ... =-.603,p=.003). Stride Length vs TWT(ρ ... =-.540,p=.009), F8WT(r=-.764,p<.001), TUG(ρ ... =-.612,p=.002), TUGO(ρ ... =-.553,p=.008), DGI(ρ ... =.670,p=.001). % Stance Time vs TWT(ρ ... =.441,p=.040), F8WT(ρ ... =.596,p=.003), TUG(ρ ... =.475,p=.026), TUGO(ρ ... =.433,p=.044), DGI(ρ ... =-.550,p=.008).

Discussion: Walking speed recorded by the Wi-GAT showed strong (ρ ... >0.7) association with all the clinical walking performance tests except TWT. Stride Length showed strong (ρ ... >0.7) association with F8WT. Other spatio-temporal gait parameters showed a moderate to good association (ρ ... = 0.4 to 0.699) with the walking performance tests. In summary a faster walking speed, shorter double support time, shorter % stance time and longer stride length were associated with a better walking performance. These significant associations suggest that the Wi-GAT measures are valid and can be used alongside walking performance measures.

Conclusions: The Wi-GAT has the potential to be used by Physical Therapists as an assessment tool in the clinic to assess walking performance in older adults. Further studies in older adults with history of falls are planned to assess the possibility of using it as a screening tool for risk of falls.

Abstract No. 22 ()

Title

Postural Correction in Older Compared to Younger Females

Affilliations

Wayne State University Physical Therapy Program

Authors

Jennifer Bickel, SPT ... Erin Courtney, SPT ... Jenny Yu, SPT ... Rajiv George, M.Sc ... Diane Adamo, Ph.D, OTR ... Kim Dunleavy, Ph.D, PT, OCS

Abstract

POSTURAL CORRECTION IN OLDER COMPARED TO YOUNGER FEMALES
Bickel JL, Courtney EK, Yu J, George R, Adamo DE, Dunleavy K ... Physical Therapy Program Wayne State University, Detroit, MI.

INTRODUCTION/CLINICAL RELEVANCE: There is inconclusive evidence of the typical patterns used to self-correct posture in comparison to habitual patterns or an optimal posture to assist with postural re-education for prevention and rehabilitation purposes. There is also limited information available about patterns typically used by younger compared to older adults. The purpose of this study was to determine if: 1) habitual (HAB), self-corrected (SC) and therapist corrected TC postures differ and 2) postural adjustment differs between younger and older adults. METHODS: Design: Comparative descriptive. Subjects: 28 (18 < 39, 10 > 40) asymptomatic females. Procedures: Postural angles and distances were recorded using a three-dimensional optoelectronic system. Sagittal plane angles were recorded from

markers placed on S1, L3, T12, T6, C7, sternum, ear, nose and the occiput. Participants were instructed to sit normally (HAB), in their "best posture" (SC), and with therapist corrections (TC). Lumbar lordosis (LL), thoracic kyphosis (TK), cervical thoracic (CT) craniovertebral (CVA) and head inclination (HI), sagittal plane angles and distances from nose to occiput, C7, and T6 were calculated. Statistical analysis: The means of 3 trials were compared using 2 x3 Repeated Measures ANOVA with significance set at $p < 0.05$. RESULTS: SC posture showed significantly increased LL, decreased TK, decreased CT, and increased CVA compared to HAB curvatures representing a more erect posture across the sample ($p<0.05$). TC compared to HAB showed similar changes ... but larger CT and smaller HI were present compared to SC. Sagittal distances from nose to T6 were smaller in both SC and TC compared to HAB, and distance from the nose to the occiput was smaller in SC compared to TC. LL, TK, CVA, and nose to T6 distance were significantly different between age groups ($p<0.05$). Older adults did not alter LL significantly between sitting postures, but flattened TK accompanied by a less extended HI in TC compared to HAB and SC. Younger adults increased LL and flattened TK with exaggerated HI) and increased CVA in SC compared to both HAB and TC. DISCUSSION: Young adults altered all spinal areas when assuming SC compared to HAB postures and over-corrected the cervical region compared to TC postures. Older adults only adjusted thoracic curvature suggesting a decrease ability to modify posture with advancing age possibly related to age related decreases in spinal mobility. Further research is necessary to expand on these results in a larger sample size and to investigate patterns in individuals with spinal pain. CONCLUSIONS: Perceptions of ideal posture differ from optimal posture achieved with therapist correction in young females which needs to be taken into account during postural re-education. Older adults may not be able to modify posture in all regions and primarily use the thoracic spine to create a supported active seated position.

Abstract No. 23 (Post_Doctoral_Fellow)

Title

REGULATORY ROLE OF VAV2, A GUANINE-NUCLEOTIDE EXCHANGE FACTOR FOR RAC1, IN GLUCOSE STIMULATED INSULIN SECRETION IN PANCREATIC β ... -CELLS.

Affilliations

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Authors

Daleep K Arora, Vaibhav Sidarala, Ismail Syed, Cornelis P. Vlaar* and Anjan Kowluru

Abstract

Rac 1, a small G-protein plays an important role in glucose-stimulated insulin secretion [GSIS] through cytoskeletal rearrangements to promote granule recruitment, fusion with plasma membrane and release of insulin. Cycling through GTP/GDP state is critical for functionality of this small G protein ... this is achieved with the aid of a guanine-nucleotide exchange factor (GEF), which catalyzes the exchange of GTP for GDP. Vav2, a member of the Dbl family of proteins has been identified as one of the GEFs for Rho family proteins, including Rac1 and Cdc42. Despite a large body of evidence on the expression of Vav2 in multiple cell types, very little is known about its expression and role in pancreatic β ... -cells, specifically in the context of physiological insulin secretion. In the present study we used molecular biological and pharmacological approaches to study the role of Vav2-Rac1 cascade in GSIS in pancreatic β ... cells. Western

blotting indicated expression of Vav2 in INS-1 832/13 cells, normal rat islets and human islets. siRNA-mediated knock-down of Vav2 markedly attenuated GSIS. Ehop-016, a specific inhibitor of Vav2-mediated activation of Rac1, markedly inhibited glucose-induced Rac1 activation and insulin secretion in INS-1 832/13 cells and rat islets. Moreover, incubation of INS-1 832/13 cells and human islets to high glucose [20 mM for 24 hours ... glucotoxicity] significantly increased Vav2 phosphorylation at tyrosine-172, thus implicating Vav2 in glucotoxic effects on the islet β ... -cell. Together, these studies present the first evidence for a regulatory role for Vav2-Rac1 cascade in the functional regulation of pancreatic β ... -cells.

Abstract No. 24 (Student_Graduate)

Title

Treating acidosis comparing sodium acetate with sodium bicarbonate

Affilliations

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Oakwood Hospital and Medical Center

Authors

Ellen Chackunkal
Raymond Cha, PharmD.
Krassimir Denchev, M.D.
Jessica Jones, PharmD.

Abstract

Sodium bicarbonate is the current exogenous alkali drug of choice to treat metabolic acidosis in intensive care units (ICU). A recent sodium bicarbonate shortage prompted usage of sodium acetate as an alternate, but data supporting the use of sodium acetate is sparse. The purpose of this study is to compare intravenous sodium acetate to intravenous sodium bicarbonate for the treatment of acidosis in critically ill patients. This study will be submitted to the Institutional Review Board for approval. A retrospective chart review will be performed of patients greater than 18 years, admitted to critical care or step-down units who were treated for acidosis with sodium acetate infusion from October 2012 through January 2013. We will match these patients with a control group of patients who received intravenous sodium bicarbonate for metabolic acidosis from August 2012 through June 2013. Approximately 50 patients received sodium acetate during this time. Specific variables that will be collected include: age, gender, blood pressure, heart rate, BUN, serum creatinine, GFR, ALT, AST, alkaline phosphate, bilirubin, albumin, ventilator status, pH, CO2, HCO3, oxygen saturation, lactate, anion gap and alternative sources of alkali therapy received. The cause of acidosis and any contributing factors including respiratory, renal, liver, and gastrointestinal function will be evaluated. The primary outcome is the time to resolution of acidosis. Secondary outcomes are ICU length of stay and mortality rate in both groups. Patient variables will be compared between groups with Students t-test or Chi Square. Outcome variables will be compared using multi-variable regression. Preliminary data will be presented at the 48th American Society of Health-System Pharmacists Midyear Clinical Meeting.

Abstract No. 25 (Post_Doctoral_Fellow)

Title

Differential Phosphoproteome in human skeletal muscle in obesity and type 2 diabetes

Affilliations

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Authors

Danjun Ma, PhD 1, Michael Caruso, PhD 1, Monique K. Lewis, PhD 1, Xiangmin Zhang, PhD 1, Wissam Anteer, MD 1, Rodney Berry 1, Nour Daboul, MD 1, Zaher Msallaty, MD 1,2, Michael P. Diamond, MD 3, Abdul Abou-Samra, MD/PhD 2, Berhane Seyoum, MD 2, Jeffrey Horowitz, PhD 4, and Zhengping Yi, PhD 1

Abstract

Insulin resistance in skeletal muscle is vital in the development of type 2 diabetes since skeletal muscle is normally responsible for more than 70% of insulin-mediated glucose disposal. Abnormal response of muscle protein phosphorylation to insulin has been implicated in the pathogenesis of insulin resistance and T2D. Phosphopeptide enrichment techniques combined with HPLC-ESI-MS/MS have been shown to be effective in detecting and quantifying hundreds of phosphorylation sites simultaneously in either cell culture or animal models. However, no large scale in vivo human skeletal muscle differential phosphoproteome study has been reported so far. Here, we attempted to quantitatively characterize the protein phosphorylation of the human skeletal muscle under basal and insulin stimulated conditions from muscle biopsies of three lean healthy, three obese nondiabetic and three type 2 diabetic volunteers. A total of 1431 phosphosites are identified and quantified by a combination of titanium dioxide (TiO2) for phosphopeptide enrichments and SILAC method, including 1117 pSer, 282 pThr and 32 pTyr. Sixty-one phosphorylation sites on 48 proteins show significant changes on basal level in lean, obese and type 2 diabetic groups, while twenty-four phosphorylation sites on 22 proteins show significant changes upon insulin stimulation.The global patterns of all identified phosphorylation sites in the 3 groups are further quantitatively analyzed by cluster analysis. More experiments are on-going to confirm these results. Our results provide changes of many phosphorylation sites in in healthy and insulin resistant human muscle under basal and insulin infused conditions, providing novel targets to the diagnosis and treatment of T2D and other insulin resistance related diseases.

Abstract No. 26 (Student_Graduate)

Title

Further Biological Evaluation of Novel Multifunctional Drug D-264 and It’s Analogs for The Treatment of Parkinson's Disease.

Affilliations

1 Department of Pharmaceutical Sciences, Wayne State University, Detroit, MI (adutta@wayne.edu)
2 Department of Psychiatry, New York University School of Medicine, New York, NY 10016

Authors

Gyan Modi 1, Tamara Antonio 2, Maarten Reith 2, Aloke Dutta

Abstract

Parkinson's disease (PD) is a multifactorial progressive neurological disorder that results from the degeneration of dopaminergic neurons in the substantia nigra pars compacta (SNPc) region of the brain. The etiology of PD is not well understood. However, it is well established that both mitochondrial dysfunction and oxidative stress are interdependent and emphasize a central role in the pathogenesis of the disease process. Oxidative stress and excessive amounts of metals especially iron can lead to the formation of reactive oxygen species (ROS). In addition, auto-oxidation of 6-hydroxydopamine (6-OHDA) and its biosynthetic precursor dopamine (DA) can also contribute to the ROS. The environmental toxin

MPTP (protoxin of MPP+) Inhibits mitochondrial complex I, which leads to oxidative stress and is toxic towards dopaminergic neurons. These mitochondria-derived ROS inhibit mitochondrial respiration and promote the aggregation of alpha synuclein protein (ASN).
The currently available therapies provide only symptomatic relief without addressing the underlying pathophysiological factors responsible for the disease. Our hypothesis is to develop multifunctional ligands with D2/D3 agonist, antioxidant, and neuroprotection property to provide symptomatic and disease modifying benefits to PD. D-264 is one of our lead molecules which has shown neuroprotection property in two different PD animal models. In our effort to further enhance brain penetration of D-264 related compounds, various analogs of D-264 have been designed and synthesized. Interestingly, in both reserpine-induced hypolocomotion and 6-OHDA lesioned animal model of PD, lead compounds exhibited long duration of action similar to D-264. DPPH assay with lead compounds demonstrated potent antioxidant activity. Furthermore, in cell culture study, the lead compounds demonstrated significant reduction of toxicity induced by treatment with neurotoxins such as 6-OHDA and MPP+, thereby, producing neuroprotection effect.

Abstract No. 27 (Student_Graduate)

Title

Postural Muscle Activation in Seated Postures - Differences Between Younger and Older Asymptomatic Adults

Affilliations

Physical Therapy Program, Department of Health Care Sciences, Wayne State University

Authors

Zubair Fayyaz, Christopher Orow, Matthew Zahl, Rajiv George, Diane Adamo, Kim Dunleavy

Abstract

Sitting posture is is often addressed during rehabilitation for spinal pain as a potential source of cumulative stress. Patient's perceptions of an optimal posture may be different from aligned posture obtained with corrections from a Physical Therapist. There is a limited research comparing muscle activation in seated positions. The purpose of this study was to investigate: 1) if muscle activation (%MVC) of superficial muscles differed between Habitual (HAB), self-corrected (SC), and therapist corrected (TC) seated postures and 2) if %MVC changes differed between younger and older asymptomatic adult females.

Study Design
A quantitative, within-subject, repeated measures experimental design with 3 trials of surface EMG measurements

Methods
36 asymptomatic females provided informed consent and were divided up into a younger group (18-40 years old), and an older group (40-70). Participants were required to be able to lay prone for 20 minutes, sit for 30 minutes, and pain free to be eligible for the study. 19 younger and 17 older subjects were fitted with 16 EMG surface electrodes placed on bilateral superficial back, neck and scapular muscles. Maximum voluntary contractions (MVC) were performed against manual resistance with the subject in prone, and sitting. EMG data for the three-seated postures with three trials each were collected for 6 seconds and the mean calculated for 2s, with calculation of %MVC.

Results
L Mid trapezius (LMT) MVC was significantly higher in the younger group ($p<.05$) compared to the older individuals with the opposite was found for the RMT with the younger individuals

having a lower MVC than the older individuals ($p<.05$). %MVC was significantly higher in TC compared to HAB postures for the entire group in R thoracic extensors (RTES), and RMT ($p<.05$) which were found to be higher in TC postures. There were significant differences when comparing age groups between all postures for R sternocleidomastoid activity was significantly higher in the younger group, while R upper trapezius , L lower trapezius , R lower trapezius , and L lumbar extensor activity was higher for the older group ($p<.05$). Within subject differences were found between L vs R %MVC for cervical and thoracic extensors and lower trapezius ($p<.05$).

Discussion/conclusions
This study suggests that muscular activation to achieve an optimal posture vary between younger and older age groups. There were surprisingly few differences in %MVC across postural conditions possibly due to different postural subtypes or habitual patterns. The asymmetries found in R vs L %MVC requires consideration for hand dominance. Future studies are needed to establish how muscle activation changes in the presence of pain, as well as the influence of hand dominance on the left vs right activation.

Abstract No. 28 (Student_Graduate)

Title

Role of the c-terminus of iron sulfur cluster scaffold protein Isu in iron binding and interaction with iron chaperone Frataxin

Affilliations

Department of Biochemistry & Molecular Biology, Wayne State University School of Medicine

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- *Department of Hematology/Oncology, University of Pennsylvania Health System

Authors

Andria Rodrigues, John Rotondo, Andrew Dancis** and Timothy Stemmler*

Abstract

Objective:
Friedreich's Ataxia (FRDA) is a disorder onset predominantly during childhood characterized by pooling of iron in muscle and nerve cells leading to progressive neurodegeneration and fatal cardiomyopathy. The cause of this disease is an inability to produce functional levels of the mitochondrial protein Frataxin. Frataxin plays a key role in the maintenance of cellular iron homeostasis, in part by serving as the iron chaperone for the genesis of iron-sulfur (Fe-S) clusters in the mitochondria. The objective of this research is to study the molecular mechanism by which iron is delivered to the cluster assembly scaffold protein Isu and incorporated into Fe-S clusters, events that are deficient in FRDA patients.

Methods:
Protein purification, site directed mutagenesis, together with spectroscopic tools such as X-Ray Absorption Spectroscopy, UV-Vis assays, Circular Dichroism and in vitro Fe binding studies using Isothermal Titration Calorimetry were employed in this research.

Results:
Studies using XAS have shown that the scaffold protein Isu binds iron initially at a site comprising an oxygen/nitrogen rich ligand environment different from its cysteine rich active site. Collaborative studies have shown that this site is located on Isu's c-terminal helix. Site directed mutagenesis of conserved residues on the c-terminal helix of Isu followed by iron binding studies show a decreased iron binding ability of these mutants. Combined with in vitro Fe-S cluster biosynthesis assays, this suggests the c-terminal helix of Isu could be involved in

metal binding and could be a site for modulation of the Fe-S synthesis process by Frataxin.

Discussion:
This research is aimed at providing a molecular level understanding into the role of Frataxin in the Fe-S cluster assembly pathway. A structural characterization of the Frataxin – Isu interface would provide insight into the iron delivery and cluster modulator functions of Frataxin and this could aid drug design of possibly small molecule iron binding compounds that can selectively target Isu as Frataxin does and restore normal Fe-S cluster biogenesis.

Acknowledgements:
Funding for this research comes from NIHR01DK068139 (Prof. Timothy Stemmler) & AHA12PRE11720005 (Andria Rodrigues). XAS data was collected at the Stanford Synchrotron Radiation Lightsource (SSRL) and National Synchrotron Light Source (NSLS).

Abstract No. 29 (Student_Graduate)

Title

Medical student perceptions of pharmacy integration into a medical relief student organization

Affilliations

Wayne State University, Department of Pharmacy Practice, Detroit, Michigan ... Wayne State University, School of Medicine, Detroit, Michigan

Authors

Sabrina Grandi, Pharm.D. Candidate IV ...
Jordan Masse, Pharm.D. Candidate IV ...
Chih Chuang, M.D. ...
Helen Berlie, Pharm.D.

Abstract

Purpose: A pharmacy school at a nationally recognized metropolitan research institution created a sister organization to a medical relief student organization at the medical school. This provided interprofessional education (IPE) opportunities for both medical and pharmacy students. The results of a survey demonstrating medical student perceptions of pharmacy integration, specifically into medical relief trips to Haiti and Nicaragua are presented.

Methods: An anonymous and voluntary post-trip survey was designed to assess medical students perceptions of pharmacy involvement and enable program improvements of pharmacy services. Surveys included likert scale (five point) and open ended questions with an emphasis on experiences with pharmacy students, satisfaction of pharmacy services, and importance of interprofessional care. All of the medical students from the Haiti team were given surveys at a mandatory post-trip debriefing, while those from the Nicaragua team received the same survey via SurveyMonkey. Data from each medical relief trip w as combined and analyzed descriptively.

Results: The Haiti team consisted of two physicians, sixteen medical (fourteen M2, two M4), and five pharmacy students (four P3, one P2). The Nicaragua team consisted of two physicians, one pharmacist, seventeen medical (three M1, eleven M2, three M4) and four pharmacy students (three P2, one P1). The survey response rate was 82% with the average age being 25 years old and 56% male. Eighteen (67%) had been on a prior medical relief trip and four (15%) reported having some experience practicing with pharmacists prior to these trips. All agreed (19%) or strongly agreed (81%) that interprofessional care is needed to maximize patient care. Twenty-five agreed (37%) or strongly agreed (56%) that the trip enhanced their understanding a pharmacists role. Students reported satisfaction with overall pharmacy services (100%), pre-trip medication packing (78%), clinic medication organization (93%), therapeutic (85%) and dosing (85%) recommendations provided by the pharmacy

team. All students agreed that the pharmacy team positively impacted overall clinic flow (100%) and that it was important to have a pharmacy team on their trip (100%) and on future trips (100%).

Conclusion: The expansion of a medical relief student organization to include pharmacy has provided multiple IPE opportunities. A survey of medical student perceptions of pharmacy integration revealed increased exposure to the practice of pharmacy, enhanced understanding of the role of a pharmacist and an overall satisfaction with pharmacy services. The success of these experiences has ensured continued pharmacy participation as an interprofessional student organization with the medical school. The joint organization will continue to work together to plan annual interprofessional medical relief trips and to provide programmatic improvement.

Abstract No. 30 (Student_Graduate)

Title

Stress kinase activation underlies glucose and cytokine-induced metabolic dysfunction of the pancreatic islet β ... -cell: Evidence for involvement of Rac1.

Affilliations

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Authors

Vaibhav Sidarala, Abiy M. Mohammed, Randall L. Commissaris, Fei Chen and Anjan Kowluru.

Abstract

Several earlier studies, including our own, have shown that oxidative stress contributes to cytokine and high glucose-induced metabolic dysfunction of the islet β ... -cell. However, putative regulatory roles of stress kinase [e.g., JNK1/2 and p38 MAP kinase] activation in β ... -cell dysfunction induced by cytokines and high glucose remain unexplored. Herein, we report significant activation of JNK1/2 and p38 kinases in INS-1 832/13 cells within 30 min of exposure to a mixture of pro-inflammatory cytokines [IL-1β ... , TNFα ... and IFNγ ...]. Such activation persisted up to 24-48 hrs of incubation with these stimuli. Moreover, pharmacological inhibitors of Rac1 activation such as 2-bromopalmitate [inhibitor of palmitoylation], EHOP-016 [inhibitor of Vav2-Rac1 axis] and NSC23766 [inhibitor of Tiam1-Rac1 axis] markedly attenuated cytokine-induced JNK1/2, but not p38 MAP kinase activation. However, glucose-induced JNK1/2 and p38 MAP kinase activation are inhibited by 2-bromopalmitate, NSC23766 and EHOP-016. These results indicate that Rac1 activation represents an upstream signaling step in cytokine and glucose-induced JNK1/2 activation. Our findings also implicate differential regulatory roles of Rac1 in p38 MAP kinase in beta-cells exposed to glucose and cytokines. Based on these findings, we conclude that pro-inflammatory cytokines and glucose exert distinct regulatory effects to induce stress signaling kinases, and Rac1 could represent a potential therapeutic target for the prevention of cytokine- and glucose-induced metabolic dysfunction of the islet β ... -cell.

Abstract No. 31 (Student_Graduate)

Title

GLUCOTOXIC CONDITIONS PROMOTE ER-STRESS - MEDIATED CASPASE ACTIVATION AND LAMIN DEGRADATION IN PANCREATIC β ... -CELLS

Affilliations

Department of Pharmaceutical Sciences, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University & R&D Service, John D. Dingell VA Medical Center, Detroit, Michigan, USA.

Authors

Khadija Syeda and Anjan Kowluru

Abstract

Lamins form the nuclear lamina on the interior of the nucleus membrane. These nuclear membrane proteins are vitally important for the structural integrity of the nucleus and the overall functions of the cell. Their major functions are regulation of various nuclear processes, including DNA replication, transcription and chromatin organization. It has been reported that degradation of lamins occurs by a caspase dependent mechanism causing nuclear collapse which may lead to cell death. Previous results from our laboratory indicated that IL-1β ... treatment causes an increase in lamin B degradation by caspases. Herein, we investigated potential effects of high glucose on lamin A and lamin B degradation. Our findings suggested that incubation of insulin-secreting INS-1 832/13 cells under glucotoxic conditions results in the cleavage of mature lamins A and B leading to accumulation of the degraded products and a significant increase in the activation of caspase 3 and 6. Further, we observed a similar degradation of lamins along with caspase 3 and 6 activation under glucotoxic conditions in rat islets and human islets. Moreover, the effects of high glucose on caspase 3 activation and lamin B degradation were mimicked by thapsigargin, a known inducer of endoplasmic reticulum [ER] stress. 4-phenyl butyric acid [PBA], a known inhibitor of ER stress, markedly attenuated glucose-induced CHOP expression [ER stress marker], caspase 3 activation and lamin B degradation. Together, our data suggest that glucotoxic conditions promote caspase 3 and 6 activation and lamin A/B degradation ... which may, in part, be due to increased ER stress under these conditions.

Abstract No. 32 (Student_Graduate)

Title

Vancomycin Consensus Guidelines Application and Serum Concentration Target Attainment

Affilliations

1Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University

2Detroit Receiving Hospital and University Health Center, Detroit, MI

Authors

Danfeng Ni1,, Kyle Rising1,, Anthony M. Casapao1,, Katie E. Barber,1 Ryan P. Mynatt,2 Michael J. Rybak1,2

Abstract

Purpose: The Vancomycin Consensus Guidelines (VCG) recommends vancomycin (VAN) dosing based upon serum trough concentrations with a target therapeutic range from 15-20 mg/L. This study was designed to assess vancomycin target attainment at Detroit Receiving Hospital and to evaluate patient characteristics associated with VAN-related nephrotoxicity.

Methods: Electronic medical records of patients receiving VAN therapy at Detroit Receiving Hospital were reviewed from January 2012 to August 2012. Adult patients receiving ≥ ... 72 hours of VAN treatment for a confirmed infection by the prescriber with at least one VAN trough concentration were included. Patients' baseline demographics including age, body mass index (BMI), serum creatinine, and co-morbidities were obtained. Information related to VAN therapy including dosage, serum

trough concentration, and duration of therapy were also documented. The primary outcomes of this study were documentation of VAN target attainment (TA) and nephrotoxicity as defined by the VCG. Of interest, the Risk, Injury, Failure, Loss, and End Stage Renal Disease (RIFLE) criteria and Acute Kidney Injury Network (AKIN) criteria of nephrotoxicity were also assessed. Secondary outcomes included all cause mortality, readmission at 30 days and length of stay.

Results: Out of 1,404 patients screened, 291 met inclusion criteria. 87 (29.9%) patients reached TA of 15-20mg/L within the first 72 hours of therapy ... however, 132 (45.4%) achieved TA anytime during course of VAN. Patients that experienced nephrotoxicity per VCG, RIFLE, and AKIN definitions were 9.3% (27/291), 12% (35/291) and 6.9% (20/291), respectively. 25.5% (83/291) received a nephrotoxic agent concomitantly. There was a significant association with RIFLE and AKIN in relation to the initial VAN trough (p=0.011 and p=0.008, respectively) but not with VCG. In comparison between initial VAN trough groups of ≥ ... 15mg/L there was no statistical difference for VCG and AKIN definition for nephrotoxicity compared to no nephrotoxicity (p=0.059 and p=0.054, respectively). The RIFLE definition for nephrotoxicity was significantly associated with troughs >15mg/L compared to troughs <15mg/L (16% vs. 5% ... p=0.005). By logistic regression, patients had an aOR 3.5 (95% CI, 1.3-9.4) to experience nephrotoxicity defined by the RIFLE criteria when their initial VAN trough was ≥ ... 15mg/L (p=0.004). Of interest, an initial VAN trough of ≥ ... 15 mg/L was not a predictor for nephrotoxicity as defined by the VCG or AKIN criteria.

Conclusions: Despite recommendations from the VCG, approximately one-third of the patients receiving VAN therapy achieved target attainment within 72 hours of initiating therapy and slightly less than one-half of the patients achieved target attainment anytime during therapy. This reflects the complexity of VAN dosing as patients vary in their baseline characteristics and disease conditions as well as the need for more accurate dosing protocols. Patients with initial VAN trough concentration of ≥ ... 15mg/L are more likely to experience nephrotoxicity as defined by RIFLE definition but not by the VCG or AKIN definitions.

Abstract No. 33 (Student_Graduate)

Title

The Control of Grasp Force in the Right and Left Hands

Affilliations

Physical Therapy Program, Department of Health Care Sciences (1), Institute of Gerontology (2), Wayne State University

Authors

Mark Mitchell (1), Rebecca Sonn (1), Ryan Fakult (1), Kyle Sullivan (1), Rajiv George (1), Diane Adamo PhD (1,2)

Abstract

Grip force is required to perform everyday activities and the force requirements may be different for the right and left hand in right-handed individuals. Although research supports clear hand differences for aiming and timed dexterity tasks, less is known about hand differences in the control of grasp force and the role of visual feedback in processing force related information. Furthermore, task specific hand differences are rarely considered in the practice of physical therapy which means subsequent treatments may be less effective. The purpose of this study was to determine if the control of grasp force differed for the right and left hand in right-handed males. We were also interested in investigating if visual feedback of the right or left reference force influenced right or left hand matching. We hypothesized that when vision was provided for the left reference force, matching with the right hand would be more accurate than in the opposite condition.

Fifteen right handed male participants (mean age: 24.9 +/- 1.9 yrs) performed a grasp force matching task that required they match a 20% and 70% of maximum voluntary contraction (MVC) right or left reference force with the opposite hand. Visual feedback was only provided while establishing the reference force. Reference hand (Right = RH, Left = LH) and force level (20%, 70%) were counterbalanced across participants using a randomized block experimental design. A repeated measures analysis of variance tested for main and interaction effects for hand (RH, LH) and force level (20%, 70 %) for each of the dependent variables: relative error and constant error. When main and interaction effects were found, post hocs were performed to identify specific force and hand differences.
Results: (1) Significant difference (20% MVC-70% MVC, $p < .05$) of mean relative error between the 20% MVC and 70% MVC for both RH (10.11%) and LH (-5.9%) matching trials. (2) Significant difference (RH-LH, $p < .05$) between the RH match and LH match mean relative error (-14.9 %) at the 70% MVC reference condition. (3) Significant difference (RH-LH, $p < .05$) in mean constant error between RH and LH match conditions at the 20% MVC (15.47 N) condition and the 70% MVC (86.3 N) conditions. (4) Significant difference (20% MVC- 70% MVC $p < .05$) in mean constant error between the 20% MVC and 70% MVC reference condition (104.76 N) for the LH match condition.
This study corroborates previous findings showing increased variance in force response at higher force magnitudes. This was most evident when matching a right force reference with the left hand. New findings here show that matching hand has a stronger influence on force matching accuracy than the magnitude of force. Future studies may include clinical populations to maximize recovery for hand-grasp treatment programs.

Abstract No. 34 (Student_Graduate)

Title

Reactive oxygen species contribute to arsenic-induced EZH2 phosphorylation in human bronchial epithelial cells and lung cancer

Affilliations

Department of Pharmaceutical Sciences, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University

Authors

Lingzhi Li, Ph.D ... Ping Qiu, Ph.D ... Bailing Chen, Ph.D ... Yongju Lu, Bachelor ... Kai Wu, Ph.D ... Chitra Thakur, Ph.D ... Qingshan Chang, Ph.D ... Jiaying Sun, MD ... Fei Chen*, Ph.D

Abstract

Our previous studies suggested that arsenic is able to induce serine 21 phosphorylation of the EZH2 protein through activation of JNK, STAT3 and Akt signaling pathways in the bronchial epithelial cell line, BEAS-2B. In the present report, we further demonstrated that reactive oxygen species (ROS) are involved in the arsenic-induced protein kinase activation that leads to EZH2 phosphorylation. Several lines of evidence supported this notion. First, pre-treatment of cells with N-acetyl-L-cysteine (NAC), a potent antioxidant, abolishes arsenic-induced EZH2 phosphorylation along with the activation of JNK, STAT3 and Akt. Second, H2O2, the most important form of ROS in the cells in response to extracellular stress signals, can induce phosphorylation of the EZH2 protein and the activation of JNK/STAT3/Akt signaling. By ectopic expression of the tagged-EZH2, we indentified that both arsenic and H2O2 are able to induce translocation of the ectopically expressed EZH2 from nuclear to cytoplasm. In summary, the data presented in this report indicate that oxidative stress due to ROS generation plays important role on the arsenic-

induced EZH2 phosphorylation.

Abstract No. 35 (Student_Graduate)

Title

Vancomycin Consensus Guidelines Application and Serum Concentration Target Attainment

Affilliations

Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University Detroit Receiving Hospital and University Health Center, Detroit, MI

Authors

Danfeng Ni
Kyle Rising
Anthony M. Casapao
Ryan P. Mynatt
Michael J. Rybak

Abstract

Purpose: The Vancomycin Consensus Guidelines (VCG) recommends vancomycin (VAN) dosing based upon serum trough concentrations with a target therapeutic range from 15-20 mg/L. Currently, limited data are available on the degree of compliance with the guideline recommendations. This study was designed to assess vancomycin target attainment at Detroit Receiving Hospital and to evaluate patient characteristics associated with VAN-related nephrotoxicity.

Methods: Electronic medical records of patients receiving VAN therapy at Detroit Receiving Hospital were reviewed from January 2012 to August 2012. Adult patients receiving ≥ ... 72 hours of VAN treatment for a confirmed infection by the prescriber with at least one VAN trough concentration were included. Patients' baseline demographics including age, body mass index (BMI), serum creatinine, and co-morbidities were obtained. Information related to VAN therapy including dosage, serum trough concentration, and duration of therapy were also documented. The primary outcomes of this study were documentation of VAN target attainment (TA) and nephrotoxicity as defined by the VCG. Of interest, the Risk, Injury, Failure, Loss, and End Stage Renal Disease (RIFLE) criteria and Acute Kidney Injury Network (AKIN) criteria of nephrotoxicity were also assessed. Secondary outcomes included all cause mortality, readmission at 30 days and length of stay.

Results: Out of 1,404 patients screened, 291 met inclusion criteria. 87 (29.9%) patients reached TA of 15-20mg/L within the first 72 hours of therapy ... however, 132 (45.4%) achieved TA anytime during course of VAN. Patients that experienced nephrotoxicity per VCG, RIFLE, and AKIN definitions were 9.3% (27/291), 12% (35/291) and 6.9% (20/291), respectively. 25.5% (83/291) received a nephrotoxic agent concomitantly. There was a significant association with RIFLE and AKIN in relation to the initial VAN trough (p=0.011 and p=0.008, respectively) but not with VCG. In comparison between initial VAN trough groups of ≥ ... 15mg/L there was no statistical difference for VCG and AKIN definition for nephrotoxicity compared to no nephrotoxicity (p=0.059 and p=0.054, respectively). The RIFLE definition for nephrotoxicity was significantly associated with troughs >15mg/L compared to troughs <15mg/L (16% vs. 5% ... p=0.005). By logistic regression, patients had an aOR 3.5 (95% CI, 1.3-9.4) to experience nephrotoxicity defined by the RIFLE criteria when their initial VAN trough was ≥ ... 15mg/L (p=0.004). Another predictor of nephrotoxicity by RIFLE criteria was concomitant nephrotoxic agent with an aOR 2.4 (95% CI, 1.0-4.6) ... p=0.021. Of interest, an initial VAN trough of ≥ ... 15 mg/L was not a predictor for nephrotoxicity as defined by the VCG or AKIN criteria.

Conclusions: Despite recommendations from the VCG, approximately one-third of the patients receiving VAN therapy achieved target attainment within 72 hours of initiating therapy and slightly less than one-half of the patients

achieved target attainment anytime during therapy. This reflects the complexity of VAN dosing as patients vary in their baseline characteristics and disease conditions as well as the need for more accurate dosing protocols.

Abstract No. 36 (Student_Graduate)

Title

Effect Of Rotavirus Vaccination On Seizure-Associated Hospital Admissions Of Children In United States

Affilliations

1Department of Pharmacy Practice, College of Pharmacy and Health Sciences, Wayne State University,
2Department of Family Medicine and Public Health Sciences, School of Medicine, Wayne State University and 3Seattle Children's Hospital

Authors

Sadasivan, S.M PhD, MPH 1,2., Kilgore, P.E.MD MPH1, Zerr, D.M MD MPH 3 and Martin, E.T MPH PhD1

Abstract

Childhood seizures are events that cause substantial emotional and financial burden on families and the health care system. Most common seizures in children below 5 years of age are febrile in nature, but a significant proportion of first time non-febrile seizures are associated with gastrointestinal illness, caused by rotavirus and norovirus mostly in children less than 2 years of age (1). Gastrointestinal illness (GI) in children has been successfully controlled since the recommended use of rotavirus vaccination in 2006. The current study evaluates the effect of rotavirus vaccination in reducing seizure-associated hospitalization of children below 2 years of age in United States. Along with reduction in rate of GI-associated hospitalizations, there was a 20% reduction in all seizure-associated hospitalizations of children in United States. The decline in rate recorded was from 40% for inpatient admissions to 37% for emergency room visits in 2009-2010 when restricted to admissions in peak GI season of January-June. Interestingly, the seizures that are coded as "other seizure", (which we hypothesize to be mostly non-febrile), had the most reduction during 2009-2010 season suggesting that the efficacy of rotavirus vaccination could be specific for non-febrile seizures that have been previously shown to be associated with rotavirus and norovirus induced GI (2). We also observed significant reductions in all hospitalizations of children who presented with both seizures and GI, supporting our initial hypothesis that rotavirus vaccination could result in reduction of seizure-associated hospitalizations.

Abstract No. 37 (Student_Graduate)

Title

Characterization of antimicrobial exposure in patients with a history of Clostridium difficile infection

Affilliations

Authors

Hana Alawy, Corey Tschannan, Shawn Bockelman, Celeste Hirsch, Jamie Wagner

Abstract

PURPOSE
Clostridium difficile infection (CDI) is a growing concern associated with significant morbidity and mortality. Exposure to broad spectrum antimicrobials is commonly associated with CDI. The purpose of this medication use evaluation was to identify opportunities for improving antibiotic use among patients who have a history of CDI.

METHODS
This was an IRB-approved retrospective cohort study of patients (July 2012-June 2013) who experienced a CDI episode and readmission within 30 days. Data collected: patient characteristics, reason for readmission, comorbid conditions, antimicrobial therapy during readmission and discharge disposition. Antimicrobial therapy was characterized as completely appropriate if: initially according to guidelines and streamlined within 72 hours when possible ... partially appropriate if: initially according to guideline and delayed/no streamlining OR initially not according to guideline but streamlined within 72 hours ... and inappropriate if: initially not according to guideline with delayed/no streamlining. A poor disposition was defined as death during hospitalization, discharge to hospice, or discharge to a skilled nursing facility if admitted from home. Patient characteristics were compared using standard bivariate tests with a $p<0.05$ considered significant.

RESULTS
283 patients were screened for inclusion ... 59 (21%) were readmitted within 30 days. Of the 54 meeting inclusion criteria, 18 (33%) were readmitted for non-CDI infection, 8 (15%) for CDI and 28 (52%) for non-infection. 49 (91%) patients were treated with antibiotics during readmission ... 14 (26%) only for CDI, 15 (28%) only for non-CDI and 20 (37%) for both. Indication for therapy was documented in 25/35 (71%) pts receiving any non-CDI antimicrobial. The most common sites of suspected infection were respiratory, urinary and sepsis not otherwise specified. Appropriate cultures were obtained in 24/35 (68%). The most common non-CDI antibiotics were: cefepime (43%), vancomycin (41%), other beta lactams (28%), and linezolid (13%). The median days of therapy (DOT) of total non-CDI antimicrobials was 7 days (IQR 3, 17). Non-CDI antimicrobials could have been streamlined based on cultures in 30 patients and was completed within 72hrs in 19/30 (63%). Antimicrobial therapy was completely appropriate in 19/35 (54%), partially in 10 (29%) and inappropriate in 6 (17%). Treatment with linezolid was statistically associated with receipt of inappropriate therapy ($p=0.032$). Poor disposition was identified in 12/54 (22%) and was more common when readmitted for non-infectious causes. Receipt of antimicrobials wasn't associated with discharge disposition.

CONCLUSIONS
In this cohort of patients readmitted following an episode of CDI, readmission was most commonly for non-infectious causes. However, nearly all patients received antimicrobial therapy during readmission. Improvements in obtaining diagnostic cultures, adhering to guidelines and de-escalating when appropriate could reduce exposure to unnecessary antimicrobials in this high risk population.

Abstract No. 38 (Faculty)

Title

Evaluation of Methicillin Resistant Staphylococcus aureus (MRSA) blood stream infections (BSI) minimum inhibitory concentrations (MICs) to Vancomycin (VAN) and Daptomycin(DAP) at an urban Detroit medical institution

Affilliations

Anti-Infective Research Laboratory, Eugene Applebaum College of Pharmacy and Health Sciences ... Detroit Medical Center University Laboratories ... School of Medicine, Wayne State University

Authors

John McRoberts, B.S. ... Anthony Casapao, Pharm. D. ... Paul Lephart Ph.D. ... Michael Rybak, Pharm. D., MPH

Abstract

Background: The ability to detect MRSA susceptibility to frontline antimicrobial agents for treatment of BSI is an important feature of

clinical decision making with recent consensus and guideline recommendations. In recent years reports of trends of reduced susceptibility to VAN have emerged. Accurate susceptibility to DAP, an alternative in therapy in case of VAN failure, is also critically important. The objective of this study was to evaluate 869 MRSA bloodstream isolate susceptibilities to VAN and DAP via broth microdilution (BMD) and MicroScan (McSn).
Methods: We evaluated MRSA blood isolates collected from the Detroit Medical Center (DMC) from 2008 to 2013. VAN and DAP MICs were obtained through the DMC's automated susceptibility system, McSn® and via BMD per Clinical Laboratory Standards Institute (CLSI) guidelines. The MIC50, MIC90, and range were derived and compared by BMD and McSn. Isolates were screened for heterogeneous vancomycin-intermediate Staphylococcus aureus (hVISA) by Macro E-test (MET) and confirmed by Population Analysis Profile (PAP).
Results: Of the 869 isolates, VAN MBD was performed on 869, DAP MBD on 851. McSn provided 817 isolates for VAN MIC and 798 for DAP MIC. Of the 869 isolates, 6.2% were hVISAs, 1.8% VISAs, and 2.9% daptomycin non-susceptible (DNS), of these DNS 24% were VISAs. MBD and McSn susceptibility by the MIC50, MIC90 and range are in Table 1. Compared to BMD, McSn overcalled VAN MICs of 1 by 53% and undercalled by 4.9%. VAN MICs of 2 were overcalled by 5.7%, undercalled by 24.7% by McSn. In addition, McSn overcalled DAP MICs of 0.5 by 49%, and undercalled by 34.7%. Of interest, McSn detected a high percentage of VISA strains (81%).
Conclusions: Overall, McSn susceptibility testing for VAN and DAP MIC appears to be highly variable compared to BMD. Continued evaluation of automated susceptibility testing versus BMD is warranted to evaluate the ability of these systems to accurately detect VAN and DAP susceptibility.

Table 1. MIC50, MIC90 and Range by BMD and McSn

	VAN BMD	VANMcSn	DAP BMD	DAP McSn
MIC50	1	2	0.25	<0.5
MIC90	2	2	0.5	1
Range	0.25 - 4	1 - 8	0.0625 – 4	<0.5 - 4

Abstract No. 39 (Faculty)

Title

Decreasing MRSA Prevalence Among ABSSSI-associated Hospitalizations
In The Detroit Metropolitan Area, 2006-2012

Affilliations

Eugene Applebaum College of Pharmacy & Health Sciences and School of Medicine, Wayne State University, Henry Ford Health System, Detroit Medical Center, Detroit MI

Authors

Carolyn Archer, MSc ... Richard Evans, BS ... Susan L. Davis, PharmD ... Jason M. Pogue, PharmD ... Michael J. Rybak, PharmD, MPH ... Keith S. Kaye, MD, MPH ... Emily T. Martin, MPH, PhD

Abstract

Background: The epidemiology of MRSA in the Detroit metropolitan area continues to evolve and is of particular interest, given the area's high prevalence of diabetes and chronic wound infections and of the emergence of vancomycin-resistant Staphylococcus aureus. The objective of our study was to evaluate temporal trends in the prevalence of clinical MRSA detection and management of these infections among patients hospitalized with ABSSSI in the Detroit Metropolitan area.
Methods: A retrospective cohort study was conducted using data from January 1, 2006 through November 30, 2012. Primary and secondary ICD-9-CM codes were used to identify adult inpatients with ABSSSI and clinical laboratory data was used to identify positive MRSA cultures from skin.
Results: A total of 37,773 inpatient admissions

for ABSSSI were identified, including 3,771 with MRSA. The prevalence of MRSA as determined by clinical culture significantly declined during the study period: 12% in 2006, 11% in 2007, 10% in 2008, 9% in 2009, 10% in 2010, 9% in 2011, 8% in 2012 (linear regression coefficient: -0.006 ... p=0.01). Age of inpatients with MRSA detected remained stable during this period, ranging from an average of 53 years of age in 2006 to 56 years of age in 2008 (median 51 to 55, respectively). Among admissions where a single MRSA-active agent was used, vancomycin was the most common therapy (1692/1873 ... 90%). During admissions in which therapy was switched, vancomycin was the most frequent initial therapy (876/896 ... 98%) which was changed to daptomycin in 242 (27%), trimethoprim/sulfamethoxazole in 226(25%), clindamycin in 164 (18%) and linezolid in 150 (17%).
Discussion: Our observations of a decreasing trend in prevalence of MRSA-associated ABSSSI is encouraging in light of the many antimicrobial stewardship and infection control efforts put in place in recent years to curb the spread of MRSA infection. Our estimates are conservative, as they are the proportion of all ABSSSI, without regards to whether culture was obtained. We found high numbers of ABSSI-related admissions in the Detroit-area. More work is needed to evaluate the outcomes of changing treatment regimens for ABSSSI.

Abstract No. 40 (Student_Graduate)

Title

Contribution of Student Pharmacists to Patient Care on a General Pediatric Service

Affilliations

Eugene Applebaum College of Pharmacy and Health Sciences. Pharmacy Practice Department.

Authors

Dana Sulaiman, PharmD Candidate 2014 ...
Sana Bashir, BS, PharmD Candidate 2014 ...
Victoria Tutag Lehr B.S. Pharm., Pharm D

Abstract

Introduction: During the General Pediatric experience at Children's Hospital of Michigan, 4th year Doctor of Pharmacy students are assigned to a Pediatric unit where they are responsible for patients' pharmacotherapy and education of caregivers. Pediatricians, residents, and student pharmacists as an inter-professional team to improve patient outcomes using several strategies to prevent drug related problems. The value of pharmacist participation has been shown on an adult ICU service and student pharmacists have demonstrated value in medication reconciliation. Yet no data are available on student pharmacist interventions for the pediatric population. As children are vulnerable to adverse drug events, it's important to determine the contribution of student interventions.

Hypothesis: Student pharmacists' interventions on a General Pediatric inter-professional team contribute to patient care by decreasing drug-related morbidity, mortality and improved outcomes.

Objectives: To describe 1.) type and frequency of interventions made by 4th year pharmacy students during a General Pediatric rotation and 2.) contribution of student interventions to patient care.

Primary Outcome: Type (minor, major, moderate) interventions by students to General Pediatric team as classified by a pharmacotherapeutic documentation form.

Exploratory outcomes include: Frequency of interventions, therapeutic class intervention, and comparison of type and frequency of interventions of pharmacy students compared with PGY-1 residents.

Study Design: Descriptive, retrospective review convenience sample of interventions documented by Doctor of Pharmacy students and PGY-1 residents during a General Pediatric rotation (August 2012-September 2013).

Methods: Clinical interventions documented by 4th year pharmacy students/residents during usual clinical workday including patient care rounds from Monday-Friday. Students documented and classified all interventions made for their patients as minor, moderate, and major significance using a standardized form. Preceptor reviewed interventions and classifications. Descriptive statistics were used to analyze results.
Inclusion: All patient interventions during this period that were accepted by a physician that resulted in an order change or change in patient care. Interventions that changed care included: drug information, in-service presentation, patient/caregiver counseling, dosing adjustment/change, medication addition/discontinuation/change, medication reconciliation, therapeutic drug monitoring, and dosing interval duration change.

Exclusion: Interventions not accepted by a physician were not included.

Results: During the review period, pharmacy students contributed a total of 118 interventions which represented 18 therapeutic classes for 611 patients (significance: 11% major, 73% moderate, and 16% minor). PGY-1 residents contributed a total of 54 interventions for 550 patients (significance: 9% major, 75% moderate, and 14% minor).
($p<0.05$)

Discussion & Conclusion: Pharmacy students and residents made 172 interventions on approximately 1000 children admitted to general pediatric units. These were primarily of moderate to major significance and may have resulted in cost avoidance or prevented readmissions. Student interventions have clinical value. Antimicrobials, gastrointestinal agents, analgesics, opioids and antiepileptics involved in our interventions have been associated with drug related problems in children. Data collection is ongoing. Results will be used to focus future education and research. Next phase will assess cost avoidance associated with student interventions.

Abstract No. 41 (Student_Graduate)

Title

Gefitinib resistance due to STAT3-mediated Akt activation in lung cancer cells

Affilliations

Eugene Applebaum College of Pharmacy and Health Science, Wayne State University

Authors

Kai Wu, Yongju Lu, Bailing Chen, Qingshan Chang, Ping Qiu, Miaomiao Yu, Fei Chen

Abstract

Epidermal Growth Factor Receptor (EGFR) tyrosine kinase inhibitors (TKIs), including gefitinib and erlotinib, are effective drugs against non-small cell lung cancer. Gefitinib effectively inhibits EGFR activities and its downstream signaling pathways. However, most patients received gefitinib eventually developed resistance to this drug. In this study, we demonstrated that in lung cancer cells, Akt activation undergoes time-dependent recovery following initial inhibition by gefitinib.
More interestingly, we also found that gefitinib induces STAT3 activation which is a prosurvival downstream regulator in EGFR signaling pathway. Further studies showed that interruption of the STAT3 signaling by both chemical inhibitor and siRNA against STAT3 prevents fast recovery of Akt activation and enhance gefitinib-induced suppression of cell proliferation. Taken together, this study suggests that activation of STAT3 is an intrinsic mechanism of drug resistance in response to EGFR TKIs. Combinational targeting on both

EGFR and STAT3 may enhance the efficacy of gefitinib or other EGFR TKIs on lung cancer.

Abstract No. 42 (Student_Graduate)

Title

Optical bioassay for measuring sub-lethal toxicity of insecticides in Daphnia pulex

Affilliations

†Department of Civil & Environmental Engineering
‡Department of Biological Sciences
§Department of Pharmaceutical Sciences

Authors

Maya Zein†, Shawn P. McElmurry†, Donna R. Kashian‡, Peter T. Savolainen†, David K. Pitts§

Abstract

Many emerging contaminants (ECs) tend to be biologically active at very low concentrations, occur in water as part of complex mixtures and impact biota in ways that are not detected using traditional toxicity tests (e.g., LC50). To evaluate ECs, a method was developed for detecting sub-lethal behavioral effects by quantifying the swimming behavior of Daphnia pulex, a model organism for studying aquatic toxicity. This optical tracking technique is capable of measuring many swimming parameters ... two of which, cumulative distance and angular change, are presented. To validate this technique, two prototypical compounds that exhibit different modes of action, as well as corresponding insecticides that are commonly found in surface waters, were investigated. The acetylcholinesterase inhibitor (AChE-I), physostigmine, was used as the prototypical compound for the large number of AChE-I insecticides (e.g., chlorpyrifos). Nicotine was used as the prototypical compound for neonicotinoid insecticides (e.g., imidacloprid). Results demonstrate this assay is capable of detecting sub-lethal behavioral effects that are concentration-dependent, and that insecticides with the same mode of action yield similar results. The method can easily be scaled up to serve as a high-throughput screening tool to detect sub-lethal toxic effects of a variety of chemicals. This method is likely to aid in enhancing our understanding of ECs and serve as a novel water-quality screen tool.

Abstract No. 43 (Faculty)

Title

Medication Use in Patients 50 and Over with Chronic Neck Pain: an Interim Analysis

Affilliations

EACPHS Department of Pharmacy Practice ... EACPHS Physical Therapy Program Wayne State University, Detroit, MI.

Authors

Victoria Tutag Lehr BS Pharm, Pharm D, Kim Dunleavy PhD, PT, OCS

Abstract

Background: Individuals with chronic neck pain (CNP) condition seek relief from analgesics, supplements, and alternative therapies along with physical therapy or exercise. Patterns of analgesic and supplement use in individuals seeking relief from exercise modalities have not been widely reported. Descriptive data could enhance Physical Therapist’s knowledge of analgesic and supplement use for medical screening. Aims: 1) Determine incidence of use of analgesics and medications for co-morbidities,2) compare analgesic use in patients with mild vs moderate pain and disability and 3) identify potential for drug-related problems (DRP) in patients with CNP > 50 years old volunteering for an exercise study. Methods:

WSU IRB approved this descriptive review as part of a larger investigation of therapeutic exercise for CNP. Participants completed a medication questionnaire, average numeric pain rating scales (11 point NRS) and pain levels prior to and after taking analgesics, and Neck Disability Index (NDI). Potential drug interactions and other DRPs were assessed by first author (Pharmacist). Medication use was compared for 1) mild vs moderate NDI and 2) NRS ≤ ... 5/10 vs > 6/10 groups using Chi square analysis. Results: n=64 (mean age 59, 88% F) reporting CNP > 3 months (mean 8.3 ys) volunteered for the study. Average pain was rated as 4.8 for 5 days/week, with worst pain 6.3 and NDI 12.8/50. Comorbidities reported by 98% included (gastrointestinal 70%, other arthritis 56%, insomnia 48%, hypertension 29% thyroid dysfunction 26%, anxiety 11%, depression 10%) ... for which 89% took medication. 70 % reported self-medicating. Average daily "pill burden" 5 (1-21). 92% used analgesics for neck pain with high use of NSAIDS 44%, followed by acetaminophen 25%. Less frequent analgesics were: aspirin 14%, opioids 10%, muscle relaxants 9% and pentanoids 3%. Herbals, vitamins, supplements used for pain by 33% with 100% using ≥ ... 1 of these products for comorbidities. Pain requiring medication was 6.5 with reduction to 2. There was no significant difference in extent pain relief with medication between NDI or pain groups. Potential DRPs included: drug interaction 56%, adverse effects (sedation 20%, GI toxicity - NSAID 26%), duplicate analgesics (NSAIDs, acetaminophen) 11%, and decreased antihypertensive effect 4%. Discussion & Conclusions: NSAIDS were used frequently despite reported high incidence of GI conditions. Depression and anxiety were lower than anticipated. Comorbidities requiring review when assessing pain medication include other arthritis, coagulopathy, insomnia, thyroid dysfunction, and hypertension. Duplication of analgesics or inappropriate dose may predispose to GI toxicity, fall risk and sedation. Limitations include retrospective design with no verification of DRP. Patient education and outcome evaluation of medication use are areas of focus for clinical practice and research. Physical Therapists should screen analgesic use and potential DRPs with attention to NSAIDS, acetaminophen and sedating agents in patients with CNP. Prospective studies to establish incidence of DRPs and development of validated instruments to quantify medication use for outcomes or to identify need for referral are planned.

Abstract No. 44 (Student_Graduate)

Title

Reliability and Validity of V1 Pro Using Step Length and Gait Speed in Participants with Amputations.

Affilliations

Physical Therapy Program, Department of Health Care Sciences, Wayne State University

Authors

Kelsey Baker, SPT ... Jessica Gilbert, SPT ... Jessica Peterson, SPT, Kristina Reid, P.T., M.S., C/NDT.

Abstract

Introduction: Gait analysis of individuals with amputations is crucial in ensuring proper fit of a prosthetic device. Gait analysis systems are often expensive or time consuming. V1Pro is a simple software program that is more clinically applicable than the current gold standard (GAITRite®) in gait analysis. The purpose of this study is to test the reliability and validity of the V1Pro when compared to GAITRite®

Methods: Seven subjects (n=7) with transtibial amputations participated in the study. Participants were asked to walk across the GAITRite® instrumented walkway at a self - selected walking speed while simultaneously being recorded with the V1 Pro. Participants were filmed only below shoulder level to maintain anonymity. The V1Pro captured video

based data that was used to measure step length and velocity. Data collection was synchronized using an electronic/visual signal. Results were analyzed using descriptive statistics including Mean, Standard Deviation and Test of Normality. A Bland Altman Plot was created to graphically compare the differences in measures between the GAITRite® and the V1 Pro system. Intraclass Correlation Coefficient (ICC) was calculated using the (2,k) method for the mean step length and velocity.

Results: The ICC (2,k) analysis showed: right step length ICC= .959, F = 25.631 and p= .000 ... left step length ICC= .973, F = 25.631, p=.000 ... left step velocity ICC= .957, F= 34.456, p= .000 ... and right step velocity ICC= .960, F= 25.252, p=.000.

Conclusion: Our study found the V1Pro to be both valid and reliable when measuring gait speed and step length of individuals with transtibial or transfemoral amputations when compared to the GAITRite® system. This gives clinicians a more practical method of evaluating gait with objective measurements in a variety of settings.

Abstract No. 45 (Student_Graduate)

Title

An evaluation of patient characteristics associated with the use of linezolid for complicated skin and soft tissue infections due to MRSA.

Affilliations

(1) Eugene Applebaum College of Pharmacy and Health Sciences and (2) School of Medicine, Wayne State University

Authors

Narcis Baran, PharmD Candidate1, Richard Evans, BS1, Carolyn Archer, MS1, Linda Jaber, PharmD1, Keith Kaye, MD MPH2, Michael Rybak, PharmD MPH1, Susan L. Davis, PharmD1, Emily T. Martin, MPH PhD1

Abstract

Introduction
Linezolid is an antibiotic usually reserved to treat complicated Gram positive infections, including MRSA. As part of a larger study assessing the clinical outcomes associated with the use of linezolid therapy in complicated skin and soft tissue infections (cSSTI) due to MRSA, as implemented in actual clinical practice, a preliminary subanalysis was performed to assess the likeliness that patients receive linezolid based on their baseline characteristics.

Methods
Data was obtained from an ongoing retrospective cohort study comparing linezolid to other antibiotics for the treatment of MRSA cSSTI's. Data was abstracted between 2006 and 2012 from the electronic medical records of the Detroit Medical Center and the Henry Ford Health system, the two largest healthcare providers in Detroit, Michigan. Extracted variables included patient demographics, medical history, and known risk factors of serious cSSTI outcomes. Patient characteristics at baseline were compared between those treated with linezolid versus those treated with other antibiotics using t-test and chi-squared tests for continuous and categorical variables, respectively.

Results
A total of 286 patients were reviewed, and they were categorized according to treatment received into the linezolid group (n=112) or control group (n=174). The following variables were associated with the use of linezolid: Age > 65 years (33.9% vs. 21.3%, p= 0.0175), sepsis (33% vs. 20.1%, p=0.0140), chronic kidney disease (CKD) or renal insufficiency (32.1% vs. 17.2%, p=0.0035), vancomycin use in the past 3 months (52.7% vs. 33.3%, p=0.0012), linezolid use in the past 3 months (21.4% vs. 1.7%, p<0.0001), and Charlson Score (3 vs. 2, p=0.0018).

Conclusion
The linezolid group tended to be older, with a higher Charlson Score, and were more likely to have sepsis, likely because linezolid may be preferred in patients with higher disease severity. Those with renal insufficiency or CKD were also more likely to receive linezolid, possibly as an effort to avoid nephrotoxicity with vancomycin, the most common (>90%) treatment. This analysis provides insight regarding decision making for antibiotic selection for cSSTI. Overall, linezolid prescribing was associated with older age patients with underlying comorbidities including reduced renal function. Future comparative analyses of linezolid effectiveness should take these differences into consideration as potential confounding factors through the use of propensity scoring, a statistical tool allowing for the comparison of non-randomized, observational study groups.

Abstract No. 46 (Student_Graduate)

Title

EVALUATION OF THE PHYSICAL THERAPY STUDENT EXPERIENCE AT THE DIABETES EDUCATON AND WELLNESS STUDENT-RUN FREE CLINIC: A PILOT STUDY

Affilliations

Wayne State University Physical Therapy

Authors

Sana Siddiqui, SPT Shelly Dittmar, SPT Martha Schiller PT, DPT, MSA

Abstract

INTRODUCTION: Type II diabetes is prevalent in the uninsured and medically underserved population. Student-run free clinics (SRFC) can deliver quality care to low-income uninsured patients. The Diabetes Education and Wellness (DEW) Student-Run Free Clinic offers free diabetes education from Pharmacy, Physical Therapy (PT), Occupational Therapy, Social Work, and Dietetics at the SAY Detroit Family Health Center. It provides an opportunity for students to educate patients while collaborating with other health care professions. The purpose of this study was to determine the impact of the PT student experience at the DEW clinic on their attitudes regarding diabetes, their perceived abilities and comfort levels with an underserved population and teamwork. METHODS: This was a prospective pilot study with a pre/post survey design. Students enrolled in the second year of the DPT program at WSU were invited to complete a survey through SurveyMonkey prior to a standardized interdisciplinary training session and after the completion of two experiences at the DEW clinic. The survey consisted of demographic information, self-assessment questions (comfort with the team, underserved population and confidence in educating) and the Diabetes Attitude Scale (DAS-3) that evaluated students' general diabetes related attitudes and beliefs. Descriptive statistics were analyzed using SPSS. RESULTS: Nine students completed survey 1 and 8 of these completed survey 2 for a response rate of 30%. Following the 2 DEW experiences, all students reported understanding the role of other health care disciplines in diabetes education, that they were comfortable interacting with patients in underserved populations and understood the barriers to care these patients must face. Student confidence in educating diabetic patients increased in all 12 behaviors including teaching an exercise program and performing foot exams. The mean for each of the 5 DAS-3 subscales increased, greatest with attitudes regarding patient autonomy and psychological impact of diabetes. DISCUSSION: The students overall level of understanding the role of other health care disciplines and barriers to care the underserved patients face shows positive trends promoting the importance of interprofessional education where students can learn with, from and about each to promote collaboration and quality of care. Positive trends were also noted with student confidence on all 12 behaviors including educating the diabetic patient on

exercise, foot care and PT goals which are important for patient management in future PT clinical experiences. Positive trends were noted with the student's general attitudes and beliefs towards diabetes in all subscales however the means for the DAS-3 scores are lower than those reported for other health professionals which may be due to their student status. Limitations include sample size, self-report and difficulty with technology. CONCLUSION: Preliminary data demonstrates that the DEW experience for the second year PT students has potential to be a valuable educational experience promoting student understanding of the interprofessional team, underserved diabetic population and confidence in education regarding diabetes management.

Abstract No. 47 (Student_Graduate)

Title

Rhinovirus Shedding in Daycare Children

Affilliations

Eugene Applebaum College of Pharmacy and Health Sciences, Detroit, MI ... Seattle Children's Research Institute, Seattle, WA

Authors

Hilary Jones, PharmD Candidate, Janet A. Englund, MD, Emily T Martin, MPH PhD

Abstract

INTRODUCTION: Rhinovirus infections are the most common cause of respiratory illness in adults and children. Use of RT-PCR technology has allowed for more enhanced detection of rhinovirus in both clinical and community settings. Use of this technology has allowed for a more detailed view of the epidemiology of rhinovirus infections and detection in asymptomatic carriers. This study looked at the duration of shedding of rhinovirus in symptomatic and asymptomatic children attending daycare.
METHODS: Children, between the age of 5 weeks and 30 months, were prospectively enrolled from three large daycare centers located on a military base in Washington State. Nasal swabs were collected at enrollment and examined for rhinovirus. Throughout the study, participants were followed following an incident respiratory illness. Data was compiled to determine the occurrence of extended respiratory symptoms. Real-time PCR and RT-PCR assays were used to test for human rhinovirus in nasal swab samples.
RESULTS: During the study period, 225 children were enrolled and 123 children found to have rhinovirus were included in analysis. Extended shedding was found to be similar to that in illnesses that had no extended shedding. Follow-up time between the extended shedding and no extended shedding groups was significant. Rhinovirus was detected in 223 illnesses and extended shedding occurred in 28% of all rhinovirus illnesses. The mean duration of shedding among extended shedding events was 16 days. Rhinovirus infections detected in the presence of viral co-infections had a longer duration of shedding compared to rhinovirus detected alone ($p<0.001$). 38 (30.89%) children had two or more rhinovirus infections throughout the study period. Repeat illnesses were not more likely to be extended compared to the first rhinovirus illness observed and they did not have a longer duration of shedding overall. 127 children provided an asymptomatic nasal swab at enrollment, with 52 (41%) having rhinovirus present.
CONCLUSIONS: We found that extended shedding occurred in over a quarter of all incident rhinovirus infections. Detection of extended rhinovirus shedding through RT-PCR has been reported between 12-35% in other studies. Risk factors for rhinovirus extended shedding include viral-coinfections, with shedding increased from 8.5 to 11.5 days following an infection. We also found a high rate of repeated infection. This extended and repeated shedding may provide an explanation for the high rates of asymptomatic detection of rhinovirus that has been reported by our group

and others.

Abstract No. 48 (Student_Graduate)

Title

Unadjusted outcomes of complicated skin and soft tissue infections in patients treated with linezolid

Affilliations

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Authors

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Abstract

Objective

Vancomycin has been used as first-line therapy for MRSA, however the increase in vancomycin-resistant MRSA (VRSA) and vancomycin-intermediate MRSA (VISA) demands a need for alternative treatments for MRSA infections. Linezolid has been shown to be effective in the treatment of complicated skin and soft tissue infections (cSSTIs) due to MRSA. The objective of this study was to evaluate the clinical outcomes in patients treated with linezolid for cSSTIs due to MRSA.

Methods

A retrospective cohort study using chart reviews was performed for patients with cSSTIs due to MRSA from January 1, 2006 through November 31, 2012. Outcomes assessed included length of hospital stay, treatment failure (defined as change in antibiotic regimen due to lack of clinical response, admission to intensive care unit, need for organ support or re-operation, death attributable to infection, and evidence of infection >4 days while on antimicrobial therapy), and 30-day mortality rates. Outcomes were compared between patients receiving linezolid and those receiving other antibiotics using t-tests and chi-squared tests.

Results

A total of 286 patients were reviewed, and they were categorized according to treatment received into the linezolid group (n=112) or control group (n=174). The majority of the control group (>90%) received vancomycin. The median length of hospital stay for the linezolid group was 13.5 days and 6 days for the control group (P=0.0001). Treatment failure for the linezolid group was 46/112 (41.1%) vs 42/174 (24.1%) for the control group (P=0.0039). Thirty-day mortality for the linezolid group was 14/112 (12.5%) vs. 3/174 (1.7%) for the control group (P=0.002).

Discussion

Based on evaluations of patients receiving linezolid versus vancomycin and other products for treatment of cSSTIs, linezolid was inferior in the unadjusted clinical outcomes examined in the study. Further research is needed to explore the comparative effects of linezolid versus other antibiotics for the treatment of cSSTIs due to MRSA. Future research should control for potential confounders between the two treatment regimens.

Abstract No. 49 (Faculty)

Title

Effect of FASD on Force Control, Fine Motor Coordination and Handwriting in Children

Affilliations

Wayne State University

Authors

GE Conti PhD ... S Ahmed, BS ... K Bogden, BS ... L Hultman, BS ... J Lenz, BS ... B Maffesoli, BS ... C Sinclair, BS.

Abstract

BACKGROUND: Children with Fetal Alcohol Spectrum Disorder (FASD) show sensorimotor problems in addition to neuropsychological, social-behavioral and learning impairments. However, there has been limited research about issues of force regulation, fine motor coordination, and the functional skill of handwriting in children with FASD. Understanding more about handwriting is important because handwriting deficits are associated with lowered self-esteem and academic and personal development in all children. METHODS: Eleven children with and without FASD between 6 and 17 years participated in this study. Tests included clinical assessments (fine motor coordination ... steadiness ... pinch strength), kinematic assessments(analyses of grasp force and of a simple cursive handwriting form), and a standardized assessment of cursive handwriting. RESULTS: Handwriting. Four of 11 children with FASD were unable to write, while all 11 typically developing (TD) children were able to do so. Clinical skills. Children with FASD, compared to TD children, showed decreased pinch force, decreased fine motor coordination skills and decreased hand steadiness. This suggests that incoordination may be a major clinical contributing factor limiting the sensorimotor production of cursive handwriting. Kinematic skills. Children with FASD compared to TD children demonstrated an impaired ability to maintain grasp force. Decreased grasp force maintenance has correlated with impaired handwriting quality in adults with neurological deficits. CONCLUSION: The ability to maintain grasp force may be a motor substrate of both coordination and hand steadiness. Therefore, interventions focused at remediation of grasp/pinch force maintenance may lead to improvements in fine coordination, hand steadiness, and cursive handwriting performance.

Abstract No. 50 (Student_Graduate)

Title

The Clinical Importance of Student Pharmacist Obtained Medication Histories

Affilliations

EACHPS, Detroit Receiving Hospital, Harper University Hospital

Authors

Priyasha Patel, Student Pharmacist ... Justine Gortney, Pharm.D., BCPS ... Lynette Moser,Pharm.D.

Abstract

Purpose
The purpose of this study is to evaluate the differences in accuracy and completeness of the medication discharge list in pharmacy student interviewed patients versus matched controls.

Methods
An earlier study documented the interventions made by student pharmacists in medication history collection improving the accuracy of the patient’s discharge medication list. This is the follow-up study to compare medication discharge lists and the potential patient impact that student pharmacists can make on patient care when compared to patients that have not received student pharmacist intervention. The Wayne State University IRB approved this retrospective study. Patient groups included: (1) Interviewed: those over age of 18 admitted within 72 hours who were provided with care by student pharmacists on a cardiology or internal

medicine service vs. (2) Controls: those on Heart Failure Core Quality Measures List or Internal Medicine Service that were not interviewed by student pharmacists. Patients were grouped based on their number of diseases in their PMH(1-4, 4-8, >8).Interviewed patients were matched to controls based on prescribing service type (cardiology versus internal medicine) and PMH. Primary endpoints included an accuracy and completeness score based on collated medication discrepancies.Secondary endpoints included types of discrepancies found on medication discharge list, ED visits and readmission within 30 days.

Results
Patient groups were as follows (interviewed/control): medicine 25/23, heart failure 189/167. Final analysis included 370 patients split 180/190. No difference was seen in gender or length of stay in patient demographics, however ... control patients appeared older than those interviewed: 67 vs. 63yop<0.01.) Univariate analysis yielded no difference in accuracy scores showing between overall study groups when controlling for number of disease states and service type (p=0.914, p=0.405). Similar results were found using 1:1 matched categories of cormorbid conditions using the paired t-test (score=0.92 ... p=0.918). Heart failure patients interviewed by student pharmacists had a significantly higher completeness score using paired t-test (score=0.85 vs 0.96 ... p<0.01). Data collection is still in process for ED and readmissions.

Conclusion
Preliminary data shows that student pharmacist interviews have not had an impact on the potential accuracy of a patient's medication discharge list, but have improved the completeness of the medication discharge list. Potential reasons for this could be other health care providers (HCPs) updating the medication history after student pharmacist intervention, individual HCPs level of attentiveness to the reconciliation process, or limitations and changes in the electronic medical record.

Abstract No. 51 (Faculty)

Title

Epidemiology of Polymicrobial Infections in Methicillin Resistant Staphylococcus aureus Associated cSSTIs

Affilliations

(1) Eugene Applebaum College of Pharmacy and Health Sciences and (2) School of Medicine, Wayne State University

Authors

Richard Evans, BS1, Carolyn Archer, MS1, Linda Jaber, PharmD1, Keith Kaye, MD MPH2, Michael Rybak, PharmD MPH1, Susan L. Davis, PharmD1, Emily T. Martin, MPH PhD1

Abstract

Background: The coincident detection of multiple organisms can drive the transfer of antimicrobial resistance genes between bacterial species. It is unclear to what extent polymicrobial infections are correlated with poor clinical outcomes in patients with polymicrobial infections and whether this would reflect differences in underlying patient health or the severity of the infection itself. The objective of this evaluation was to describe the clinical and demographic predictors and disease outcomes of cSSTIs due to MRSA in conjunction with other pathogens.

Methods: A retrospective cohort study was conducted using data collected from medical charts from January 1, 2006 through November 30, 2012. Outcomes and baseline characteristics were compared between patients with single and polymicrobial infections. Outcomes assessed included ICU admission, 30-day all-cause mortality, and length of stay. History of diabetes, cSSTI class, and Charlson scores were also collected as potential modifiers of the observed outcomes. A secondary analysis was performed to examine the outcomes and characteristics related to the presence and

absence of other resistant organisms in addition to MRSA.

Results: A total of 343 patients were included of which 118 (34.8%) were found to be co-colonized, the two most common co-colonizing pathogens being Corynebacterium (13.3%) and P. aeurginosa (8.9%). Co-colonized patients were found to be of a significantly higher age 56.4 (95%CI ... 53, 60) than the mono-microbial cSSTIs, 49.3 (95%CI ... 47, 52), (p=0.0004). A higher proportion of co-infected patients had type I or II diabetes than the MRSA only group, 61(50%), and 76 (34%), respectively (p=0.0031). Median Charlson comorbidity scores differed between the two groups, being significantly higher for the co-infected individuals (3, IQR=4) than the singly infected (1, IQR=3), (p=<0.0001). The number of patients readmitted within 30 days of discharge was found to be significantly higher in the co-colonized group 39 (33%), than the MRSA only group 38 (17%), (p=0.0018). All-cause mortality was found to be significantly higher in the polymicrobial infection group than the singly infected, 33 (49%) and 30 (24%), respectively (p=0.0004 ... unadjusted). The median length of stay was 17 and 9.5 days for the co-colonized and MRSA only patients, respectively (p=<0.0001 ... unadjusted).

Discussion: One-third of all MRSA cSSTI patients involved in this study were co-colonized at time of culture. A majority of these patients were elderly with multiple comorbidities and were readmitted soon after discharge, indicating a possible risk for treatment failure for MRSA cSSTIs when additional Gram-positive and Gram-negative organisms are present.

Abstract No. 52 (Post_Doctoral_Fellow)

Title

Encapsulation of an antimicrobial drug in biodegradable nanoparticles

Affilliations

Department of Pharmaceutical Sciences, Wayne State University, Detroit, MI

Authors

Katherine VanDenburgh, Venkatareddy Nadithe PhD, Qian Lin, Shiv Sharma PhD, Steven Firestine PhD, Olivia Merkel PhD

Abstract

Bacterial infections are a cause of numerous illnesses and deaths in the world. Many antimicrobial drugs have been developed, but some lack the ability to be effective as a free drug in an animal system. Most importantly, poor water solubility of potent drugs can limit their bioavailability and thus their efficiency. One such drug, SV7, has been shown to kill Gram positive bacteria, such as Staphylococcus aureus if dissolved in dimethyl sulfoxide (DMSO). Polymer based nanoparticles may be a way to improve the bioavailability and effectiveness of a drug like SV7. By encapsulating SV7 with the biodegradable polymer poly(lactic-co-glycolic acid) (PLGA) the potential usefulness of SV7 could be increased. By solvent evaporation, SV7 was encapsulated with PLGA, forming spherical nanoparticles. The encapsulation efficiency was determined with UV spectrometrically and found to be approximately 60%. Hydrodynamic diameters were determined by Dynamic Light Scattering and were found to be varying from approximately 2 mm to 100 nm in diameter. Also, the Zeta Potential for the particles was found to be negative. Nanoparticles encapsulating SV7 were found effective against bacterial growth as studied with the Minimum Inhibitory Concentration Assay.

Abstract No. 53 (Post_Doctoral_Fellow)

Title

A Novel Approach Toward the Development of Multifunctional Agents for Symptomatic and Neuroprotective Treatment of Parkinson's Disease

Affilliations

Pharmaceutical Sciences

Authors

Soumava Santra,Liping Xu, Mark Johnson, Tamara Antonio, Maarten E. A. Reith,Julie Andersen, Aloke K. Dutta

Abstract

Parkinson's Disease (PD) is a progressive neurodegenerative disorder characterized by degeneration of the nigrostriatal dopaminergic pathway. The etiology of PD is not fully understood. Both oxidative stress and mitochondrial dysfunction have been strongly implicated in cell death. The role of iron in the pathogenesis of Parkinson's disease (PD) has been implicated strongly due to generation of oxidative stress leading to dopamine cell death. In addition, α ... -synuclein, a presynaptic protein involved in fibrilization, has been implicated in the pathogenesis of PD. It is increasingly evident that for a complex disease such as PD, a drug aimed at one target site will only partially address the therapeutic need of the disease. Thus, it is hypothesized that multi-functional drugs, having multiple pharmacological activities, will be more effective in the case of PD. In our overall goal to develop bifunctional/multifunctional drugs as neuroprotective treatment agents for PD, we designed novel dopamine D2/D3 agonist molecules with potent antioxidant activity as well as some such agonists with a capacity to bind to iron or to modulate aggregation of α ... -synuclein protein to reduce toxicity. Such molecules should not only address symptomatic aspect of the disease by normalizing motor dysfunction but also at the same time should slow down or stop the process of degeneration. The lead compounds were efficacious in animal models of PD. In vivo and in vitro neuroprotection assays carried out in dopaminergic cell lines and in mouse MPTP model for neuroprotection indicated potent neuroprotection properties.

Abstract No. 54 (Post_Doctoral_Fellow)

Title

Novel Triple Dopamine, Serotonin and Norepinephrine Transporters Blockers as Potent Antidepressant: Characterization of a Lead Molecule in In Vitro and In Vivo Pharmacological Assays

Affilliations

Pharmaceutical Sciences

Authors

Soumava Santra, Tamara Antonio, Marteen E. A Reith, Aloke K. Dutta

Abstract

Major depression disorder is a significant health problem and about 10-20% of all adult population suffers from this disease. Unipolar depression is ranked as number one before all other somatic and psychiatric illnesses. In spite of its prevalence, the underlying causes of depression are still unclear and 15% of depressed patients are resistant to all known therapies. Monoamine therapies have so far been most successful and have been used most widely to treat depression. Triple monoamine reuptake inhibitors have recently been implicated in generation of potent antidepressant activity with possible lowering of side effects profile. The underlying involvement of dopaminergic system in depression prompted our efforts to develop triple reuptake inhibitors, which are expected to

produce strong antidepressant effects in addition to the treatment of anhedonia. For this purpose, we have recently demonstrated the development and synthesis of novel asymmetric trisubstituted and disubstituted pyran derivatives as inhibitors of monoamine transporter systems in the CNS. Number of other molecules from this series also displayed triple reuptake inhibitory activity. Molecules with triple uptake blocking activity exhibited low nano-molar affinity at the norepinephrine transporter followed by potent to good affinities at the both serotonin and dopamine transporters. Our lead selected compounds, D-142 and D-473, exhibited uptake inhibition (ki) activities for the norepinephrine, serotonin and dopamine transporters, respectively. The compound D-473 exhibited oral activity and was next tested in a well established in vivo animal models for antidepressant activity. Thus, in vivo rat forced swimming test was carried out to under oral administration condition to evaluate potential of this compound as an antidepressant agent. Compound D-473 exhibited potent antidepressant activity in the dose range tested and was far more potent than the reference Imipramine. In locomotor activity test, compound D-473 did not exhibit any locomotor stimulation in the dose range tested. In the extended CNS receptors screening assay these molecules exhibited no non-specific interaction in the CNS. These results indicate that D-473 might possesses potent antidepressant activity.

Abstract No. 55 (Student_Graduate)

Title

Single High Dose Methamphetamine Recruits Dopamine Transporter and Parkin to Rat Striatal Terminals in a Microtubule Dependent Manner

Affilliations

Department of Pharmaceutical Sciences. Eugene Applebaum College of Pharmacy and Health Sciences.

Authors

Bryan Killinger, M.A.
Anna Moszczynska, PhD

Abstract

Methamphetamine (METH) is a potent psychostimulant that can cause toxicity to both dopaminergic (DAergic) and serotonergic (5HTergic) nerve terminals in the striatum. METH inhibits and reverses the function of dopamine transporter (DAT) ... the membrane bound protein responsible for the reuptake of dopamine (DA) from the synapse. The regulation of DA influx/efflux across the presynaptic terminal of DAergic terminals via DAT is the primary factor mediating METH neurotoxicity. The efficient trafficking of membrane-bound proteins to their cellular targets is required for the protein to retain proper functioning. However, the regulation of DAT protein trafficking in response to METH is still poorly understood. In vitro, METH causes a transient recruitment of DAT to the presynaptic membrane, but in vivo METH administration does not effect localization of DAT in the presynaptic nerve terminals. In cultured cells, the interaction of E3 ligase parkin with DAT inhibits the activity of DAT at the presynaptic membrane and the disruption of microtubule polymerization increases membrane expression of DAT. Previously, our lab have found that acute administration of METH quickly increases total levels of both parkin and DAT in the rat striatum suggesting that METH quickly increases DAT trafficking in a parkin dependent manner. The current study investigated whether this METH induced recruitment of DAT via parkin was dependent upon microtubule polymerization. We found that intracerebroventricular injection of the microtubule polymerization inhibitor, colchicine, increased the membrane expression of DAT. Furthermore pre-treatment with colchicine prior to IV METH inhibited the increase in DAT levels in the striatum. Our results suggest that, in vivo, the METH induced trafficking of DAT to the striatal presynaptic membrane depends upon both its interaction

with parkin and the polymerized microtubules. This further supports the in vivo role of DAT trafficking in the early cellular response to METH.

Abstract No. 56 (Post_Doctoral_Fellow)

Title

Time kill evaluation of novel daptomycin combinations with beta-lactams against Methicillin-resistant Staphylococcus aureus and vancomycin-resistant Enterococci

Affilliations

Anti-Infective Research Laboratory - Eugene Applebaum College of Pharmacy and Health Sciences

Authors

Jordan R Smith, PharmD ... Nishit Shah ... Katie E Barber, PharmD ... Michael J Rybak, PharmD

Abstract

Background:
Methicillin-resistant Staphylococcus aureus (MRSA) has developed resistance to various antimicrobial agents, including beta-lactam, glycopeptide, and lipopeptide antibiotics. MRSA often carries a mutation in mecA, conferring mutated penicillin binding proteins that can be effectively targeted by only two MRSA beta-lactam antibiotics, one of which is ceftaroline (CPT). Enterococcus faecium are primarily resistant to vancomycin and beta-lactam antibiotics. In MRSA with reduced glycopeptide susceptibility, and in enterococci resistant to vancomycin and beta-lactams, increased beta-lactam susceptibility has been documented and is known as the “seesaw effect”. In vitro data suggest potent synergy between several beta-lactams and glycopeptides against these resistant pathogens. Our objective was to conduct time-kill experiments involving multiple bacterial strain pairs and antibiotic combinations to evaluate potential synergy with daptomycin (DAP).

Methods:
Two isogenic MRSA strain pairs, JH1/JH2 and D592/D712, and two isogenic Enterococcus strain pairs, R6981/R7808 (E. faecalis) and R7206/R7207 (E. faecium), were tested for DAP susceptibility via broth microdilution. DAP MIC values were obtained both in the absence and presence of CPT, meropenem (MEM), cefepime (FEP), ceftriaxone (CRO), cefotaxime (CTX), cefoxitin (FOX), cefazolin (CFZ), ampicillin (AMP), and aztreonam (AZT) in an effort to determine synergy. All bacterial strains were evaluated for synergy with DAP combination therapy using time-kill methods. DAP exposures of 0.5 x the MIC were used in combination with beta-lactam exposures of either the biologic free concentration or 0.5 x the MIC. Synergy was defined as >2 log10 CFU/ml reduction of combination over the most active single agent.

Results:
In S. aureus time-kill experiments, DAP synergy was observed for all antibiotic combinations except AZT, which showed no synergy. DAP MIC values in S. aureus showed the greatest median reduction with CPT combination (4 log reductions), followed by MEM (3.5), FEP (3), FOX (2.5), CFZ (2.5), CRO (2), and AZT (1.5). However, this reduction in MIC values did not translate to ranked synergy in time-kill experiments, as all antibiotic combinations had similar time-kill efficacy. Combination MIC values in Enterococcus demonstrated the greatest median reduction for CPT (4), followed by MEM (2), FEP (1.5), CRO (1.5), and CTX (1.5). FOX and CFZ showed no synergy. In preliminary Enterococcus time-kill experiments, CRO has shown significantly more synergistic killing effects than both CPT and CTX in strains 7207 (E. faecium) and 6981 (E. faecalis). CTX has shown the least synergy on average, although results on strains 7206 and 7808 did not reach statistical significance. Further research is warranted with other lipopeptide and glycopeptide combinations with beta-lactams.

Conclusions:
The data obtained from this study further establish the role of synergistic beta-lactam/daptomycin combination therapy. In Enterococcus, the more beneficial effects of ceftriaxone may suggest an actual clinical benefit, and further analysis will reveal if it is superior to other beta-lactams against these Enterococcus strains.

Abstract No. 57 (Student_Graduate)

Title

Impact of pharmacist-driven heart failure patient education on readmission rates

Affilliations

Oakwood Hospital and Medical Center, Dearborn MI

Authors

Malissa Shapas, PharmD Candidate 2014
Larry Diamond, PharmD
Sin-Ling Jennings, PharmD

Abstract

The prevalence of congestive heart failure (CHF) in the U.S. is more than 5 million people, accompanied by nearly 34.4 billion dollars in annual healthcare costs. CHF is also complicated with historically low adherence to medications and lifestyle modifications. Therefore, education programs have been implemented by nurses, and have been shown in literature to be beneficial in improving adherence and readmission rates. We aim to explore the impact of pharmacist-driven educational programs to further reduce readmission rates. Our objective is to assess the impact of a pharmacist-driven education program for patients discharged with congestive heart failure on 30-day readmission rates.

This study will be submitted to the Institutional Review Board for approval. We will retrospectively assess patients admitted to a local community hospital for CHF. Patients are selected to undergo heart failure patient education by a daily report generated by an administrative nurse practitioner for the International Classification of Diseases (ICD), ninth edition code “428.0” for “congestive heart failure, unspecified.” The nurse practitioner will interview the selected patients and determine their eligibility for a pharmacist-driven patient education. Education and medication informational handout is provided on any of the following medications the patient is discharged on: beta-blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium channel blockers, diuretics, aldosterone antagonists, hydralazine and isosorbide dinitrate. Patients educated by a pharmacist are followed for 30 days post-discharge to determine readmission occurred. The following data that will be analyzed from a patient’s electronic medical record chart: admission date, date education was provided by a pharmacist, date of readmission within 30 days of discharge. Patients readmitted within 30 days will then be sub-analyzed to reason for readmission. All data will be recorded without patient identifiers and maintained confidentially. We hypothesize that patients that received pharmacist-driven patient education will have lower readmission rates than historical patients that did not receive education.

Abstract No. 58 ()

Title

Integrating Diabetes Self-Management into Daily Life: Exploring Process, Habit, and Occupation

Affilliations

Institute of Gerontology, Wayne State University

Authors

Heather Fritz PhD,OTR/L

Abstract

Purpose:
The purpose of this qualitative research study was to explore the process by which low income women with type II diabetes integrate diabetes self-management (DSM)into daily life, the conditions through which integration occurs, and the role of habit and occupation in the process.

Methods:
A qualitative multiple methods-multiple case design was used in a sample of 10 low income women ages 40-64 with type II diabetes. Participants completed four phases of data collection including completing: the Diabetes Care Profile and participating in a semi-structured interview, performing participant generated photography and participating in a photo elicitation interviews, and completing a two day time geographic diary with participation in a corresponding time geographic diary interview. Data were analyzed using a grounded theory approach.

Summary of Results

Data analysis resulted in the development of the Transactional Model of Diabetes Self-Management Integration, which depicts the theorized process of DSM integration. The primary phases: Potential Uptake, Inquiry, Practice, Contingent Integration, and Reconfiguration describe the process whereby individuals accept aspects of diabetes education and training as congruent with their circumstances, act on them, and practice with them until they become an integrated part of daily life operating under the control of habits. Once integrated, DSM components were consistently engaged in until destabilizing life events necessitated reconfiguration. Within the larger integration process, inquiry and practice were the means by which individuals became able to modify their habits and corresponding micro-contexts and improve their inquiry skills. Repeated practice also resulted in the development of strategies to facilitate consistent engagement in DSM in the face of minor fluctuations in daily life circumstances. However, inquiry and practice were imperfect processes that could be adversely influenced by individuals' habits, life situations, and their capacity for inquiry.

Statement of Conclusions Reached

Findings suggest that inquiry and opportunities for practice are key to developing self-management capacities. Current approaches to promoting self-management skills would be enhanced by including structured opportunities for inquiry coupled with “coaching” clients as they practice engagement with DSM components.

Abstract No. 59 (Student_Graduate)

Title

Vaccine Knowledge and Attitudes Among Emergency Department Patients in Detroit

Affilliations

1. Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, MI ... 2. School of Medicine, Wayne State University, Detroit, MI

Authors

Kaitlyn DeHoff1, Holly Kallek1, Clara Nassif1, Heather O’Connor1, Sapna Sutariya1, PharmD Candidates, Paul Kilgore, MD MPH1, Keith Kaye, MD MPH2, Robert Sherwin, MD2, Emily T. Martin, MPH PhD1

Abstract

Objectives: Immunization rates among adults in the United States fall behind those in children. The emergency department has been identified

as a potential source of vaccine delivery and education. The objective of our study was to gather data on vaccine knowledge and attitudes among emergency department patient in Detroit. Method: We used convenience sampling to survey emergency department patients within Detroit Receiving Hospital's Fast-Track unit. To be included in the study patients had to be at least 18 years of age and English speaking. Exclusion criteria included mental instability or current incarceration. Our survey collected information about each patient's demographics, their attitudes about vaccine safety, knowledge of vaccinations, and personal vaccination history. Results: A total of 250 surveys were conducted from June-August 2013. The results of the surveys indicated that 58.4% of surveyed patients believed that vaccines for adults are safe. Of the surveyed patients, 44.9% would prefer to receive a vaccination in a doctor's office and 31.0% would prefer the emergency department. Awareness of available adult vaccinations was low ... for example, only 54.0% of patients were aware of the pertussis vaccine. Self-reported vaccine history was also low among the surveyed patients ... only 58.2% of patients reported receiving the tetanus vaccination. Only 5.2% knew the correct age to receive the shingles vaccine and 0.0% knew the correct age to receive the pneumococcal vaccine. Implications: Several conclusions can be made from the data gathered with the emergency department surveys. First of all, adult patients are largely unaware of the available adult vaccinations and their safety. This indicates that further education is needed for adults regarding vaccine safety and the different vaccines that are available for adults. In addition, the survey found that patients are receptive to receiving text message alerts regarding needed vaccinations. We also found that patients prefer to receive their vaccinations in either doctor's offices or emergency departments.

Abstract No. 60 (Student_Undergrad)

Title

The Effects of Texting on Driving Performance in a Human Driving Simulator in Young and Older Drivers

Affilliations

Department of Pharmaceutical Sciences, EACPHS ... Department of Health Care Sciences, EACPHS

Authors

Gordon Rumschlag, Theresa Palumbo, Doreen Head, Rajiv George and Randall L. Commissaris

Abstract

Background and Rationale: Distracted driving is a significant contributor to motor vehicle accidents and fatalities. Texting while driving is a particularly potent form of distraction. Past studies on the impact of texting on driving have focused on young adults. Many older individuals now use texting as a frequent form of communication, but there are no studies examining the effects of texting on driving performance in older drivers.
Purpose: The present study examined the effects of texting on simulated driving behavior in both younger and older drivers.

Subjects: All research subjects were unpaid volunteers, 18–71 years of age ... most subjects were recruited from the population of students, faculty and staff at the EACPHS.

Experimental Design: When driving the simulator, subjects were engaged in series of brief text conversations with a member of the research team. Data from the 'drive' were analyzed during the periods (1) shortly before texting, (2) during texting and (3) shortly after texting.

Data Collection and Analysis: Two primary dependent variables were monitored during

driving: Lane Excursions and Steering Variance. A Lane Excursion was defined as any time the center of the vehicle moved outside the proper driving lane, e.g., into the lane for oncoming traffic or onto the shoulder of the road. Steering Variance assessed the extent of the steering wheel movements, i.e., attempted 'recovery' following deviation from the center of the intended traffic lane. Data were sorted by a number of demographic variables including subject Gender, Texting Experience, and by Age ... subjects were grouped into YOUNG (i.e., < 30 years old) and OLD (i.e., > 30 years old). Data were analyzed by Factorial ANOVA with repeated measures, with the PRE – TEXTING – POST periods as the repeated measure, and Age (YOUNG v OLD) as the primary sorting variable. In addition, data on the presence or absence of Lane Excursions during texting as a function of Age (YOUNG v OLD) were analyzed using Chi Square analyses.

Results: Texting significantly increased Steering Variance. There was a tendency for older subjects to exhibit a greater effect, but this was not statistically significant. Texting also dramatically increased the frequency of occurrence of Lane Excursions ... there was a statistically greater incidence of Lane Excursions among Older Drivers ... this effect was observed even when the frequency of texting was similar for the two Age Groups.

Discussion and Conclusions: The present studies confirmed past reports that texting impairs driving simulator performance in young drivers. Moreover, the present study demonstrates that the effects of texting on driving are actually worse for older drivers. Given the increasing frequency of texting while driving within all age groups, these data suggest that 'No Texting While Driving' education and public service messages need to be continued, and they should be expanded to focus on older drivers as well.

Acknowledgements/Approvals: The authors are grateful to the EACPHS students, faculty and staff of who participated as subjects ... this study was approved by the WSU Behavioral IRB (#063413B3X).

Abstract No. 61 ()

Title

Predictors of excellent graduating GPA and NAPLEX performance among PharmD students at Wayne State University.

Affilliations

Department of Pharmacy Practice, EACPHS

Authors

Emily T. Martin, MPH PhD, Richard L. Slaughter PharmD

Abstract

OBJECTIVES: Student metrics such as admission score, entering GPA, PCAT, and graduating GPA can be used for early identification of students in need of additional support to achieve high performance in the PharmD program and on the NAPLEX exam. We evaluated potential metrics for predicting graduating GPA and NAPLEX score.

METHODS: Pre-Pharmacy GPA, PCAT composite scores, graduating GPA, and NAPLEX scores were collected for 2011 and 2012 PharmD graduates. Admission score was collected for the 2012 class. Analyses were conducted using receiver operating curves, sensitivity, specificity, and linear regression to determine the association between (1) pre-pharmacy factors and graduating GPA and (2) graduating GPA and NAPLEX scores.

RESULTS: Total admissions score performed significantly well as a predictor of excellent program performance, defined as a GPA ≥ ... 3.5 (AUC: 80 ... 95% C.I. 0.69, 0.90). Using a target admissions score cutoff of 75, our score had

poor sensitivity (42% 95% CI: 30%, 56%) and moderately good specificity (75% ... 95% C.I.: 60%, 86%). This indicates that our highest performing PharmD students entered into their P1 year with a wide range of pre-pharmacy GPA. Students with a high pre-pharmacy GPA consistently performed well ... a 1-point increase in pre-pharmacy GPA was associated with a 0.35-point increase in graduating GPA ($p=0.001$). A 1-point increase in graduating GPA was associates with a 21.8-point increase in NAPLEX score ($p<0.001$).

IMPLICATIONS: Pre-pharmacy GPA and graduating GPA are significantly correlated with future performance. These analyses are a first step in identifying metrics-based characteristics of students in need of additional support.

Abstract No. 62 (Faculty)

Title

Prevalence of pSK41 plasmid among patients with MRSA and VRE dual infection.

Affilliations

Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences and School of Medicine, Wayne State University

Authors

Emily T. Martin, John P. McRoberts, Poorva Divekar, Richard Evans, Brent Hill, Carolyn Archer, Keith S. Kaye, Michael J. Rybak

Abstract

Background: Two plasmids, pSK41 in MRSA and Inc-18-like plasmid in VRE, have been identified as key components of the transfer of the gene conferring vancomycin resistance, vanA, from vancomycin-resistant Enterococcus (VRE) to a methicillin-resistant Staphylococcus aureus (MRSA). The objective of our study was to evaluate the prevalence of the pSK41 plasmid among patients with MRSA and VRE dual infection.

Methods: Surveillance was performed at four hospitals at the Detroit Medical Center from May 2011- August 2012 to prospectively identify adult patients with MRSA and VRE clinical cultures obtained no more than 7 days apart. For all MRSA isolates, the traE gene, which is located on the pSK41 plasmid, was detected by PCR. Multi-locus sequence typing was performed for all traE(+) MRSA isolates. Patient data were abstracted from medical records.

Results: Seventy-four patients with MRSA and VRE infection were identified during the study period, 41 individuals had clinical data. Among these, average age was 56 years (range 19 to 96 years of age), 51% had a history of diabetes, 27% were admitted from a long term care facility, and 39% had antibiotic use within 30 days prior to admission. TraE was detected in MRSA isolates from 3/74 patients (4%). Patient 1 was an 82 y.o. male with diabetes with MRSA detected from sputum and VR-E. faecium detected from urine. Patient 2 was a 44 y.o. male with both MRSA and VR-E. faecalis detected from blood, a recent history of MRSA infection, and recent receipt of azithromycin. Patient 3 was a 78 y.o. female with MRSA and VR-E. faecalis isolated from urine and had recently received vancomycin and gentamicin. All MRSA traE+ isolates were resistant to clindamycin and erythromycin and one (Pt 2) was resistant to trimethoprim/sulfamethoxazole. Strain types for Patients 1 and 3 were ST5, the isolate from Patient 2 had 6/7 alleles in common with ST8 (data available for one allele). All traE+ MRSA isolates were categorized as hospital associated (isolated >72 hours post admission) and from individuals admitted from home. All VRE isolates recovered from patients with a traE+ MRSA isolate were negative for the Inc18-like plasmid.

Discussion: The pSK41 plasmid, detected using the traE gene, was identified in 4% of MRSA isolates and was not identified in conjunction

with Inc18-like plasmid-containing VRE isolates.

Abstract No. 63 (Faculty)

Title

Influenza & Obesity: A Prospective Study of Patient Outcomes and Antiviral Resistance

Affilliations

Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences and School of Medicine, Wayne State University ... Henry Ford Health System

Authors

Emily T. Martin, Carolyn Archer, Richard Evans, Caitlin Biedron, Vicki Collins, John P. McRoberts, Taylor Thurston, Janice Kulik, Samia Arshad, Paul Kilgore, Keith Kaye

Abstract

Objectives: Individuals with obesity were found to have increased disease severity and mortality during the 2009 Influenza A/H1N1 pandemic. The objective of this study was to identify outcomes of influenza illness and risk factors for severe complications, specifically lower pulmonary disease (LPD), among patients with obesity.

Method: We prospectively identified hospitalized patients with laboratory-confirmed influenza. Body mass index (BMI), demographics, medical history, and disease outcome were collected through chart abstraction and patient interviews. Obese patients were compared to non-obese patients for rates of LPD (defined as infiltrates or consolidation noted on chest x-ray and/or hypoxia) and severe outcome (defined as intensive care unit admission, intubation, or readmission within 30 days of discharge), controlling for chronic comorbidities and medical history.

Results: 58 patients were enrolled during the Fall 2011-Winter 2013 seasons. Of these, 29 (50%) had Class I through III Obesity, defined as a BMI of 30.0 or greater. Individuals with obesity had similar rates of LPD (Adjusted Odds Ratio (AOR): 1.27 ... p=0.68) and severe disease (AOR: 1.12 ... p=0.85) to non-obese individuals. Unexpectedly, non-obese individuals had a mean increase in hospital stay of 2 days, which was significant after controlling for medical history (p=0.01).

Implications: We did not find a marked increase in influenza disease severity in individuals with obesity hospitalized during the 2010/2011 and 2011/2012 influenza seasons. Previous findings of increased severity may be influenced by lifestyle and health status, or changes in circulating strain types since the pandemic may have a lesser effect on individuals with obesity.

Abstract No. 64 (Student_Undergrad)

Title

Changes in the Empiric Management of Pediatric Community-Acquired Pneumonia

Affilliations

Wayne State University
Children's Hospital of Michigan

Authors

Reta Malallah
PharmD class of 2015
Rand Sulaiman
PharmD class of 2015
Mayse Yousif
PharmD class of 2015
Ashley Builta
PharmD class of 2016
Leah Molloy

PharmD - Infectious Disease Specialist-Children's Hospital of Michigan

Abstract

Background: Cephalosporins have historically been selected for the empiric treatment of pediatric community-acquired pneumonia (CAP). In July 2011, new national guidelines recommended ampicillin (AMP) for otherwise healthy children >3 months old. This was incorporated into an institutional guideline at Children's Hospital of Michigan (CHM) and presented to the Emergency Department in July 2012.

Purpose: To examine the impact of national and institutional guidelines with education on empiric antibiotic selection for pediatric CAP, and compare outcomes between patients receiving AMP or CRO.

Methods: A retrospective cohort of children aged >3 months admitted to CHM for CAP during August and September of both 2011 and 2012 was studied. Eligible patients met criteria for AMP treatment per national and CHM guidelines and were previously healthy with immunizations up to date ... no empyema, loculations, or effusions per radiography ... with no life-threatening infection nor intensive care unit admission. Data describing patient demographics, treatment and outcomes were collected. Empiric antibiotic selection and duration of therapy was compared between 2011 and 2012, and clinical outcomes measured as escalation in therapy, length of stay (LOS), and 30-day follow-up were compared between patients receiving empiric AMP or CRO. Dichotomous and continuous data were described using Chi-square or Student's T-test as appropriate.

Results: Of 119 patients meeting inclusion criteria, 101 received empiric AMP or CRO. During study months in 2011, 2% received AMP compared to 44% in 2012 ($p<0.001$). No differences in escalation of therapy or 30-day outcome existed between patients receiving empiric AMP or CRO. Patients receiving empiric AMP had a modest but statistically significant prolonged LOS than those receiving empiric CRO (2.23±0.75 days vs. 2.55±1.22 days, $p=0.03$). Total duration of treatment was similar between 2011 and 2012 (9.31±3.86 days vs. 8.88±2.88 days, $p=0.584$).

Conclusions: Development of an institutional guideline with prescriber education led to a significant change in empiric antibiotic selection with no changes in clinical outcomes.

Abstract No. 65 (Student_Graduate)

Title

Bridging the Gap: Promoting Partnership and Health Engagement between Pharmacies, Community Organizations, and Healthcare Providers in Northeast Metro Detroit

Affilliations

Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, Michigan

Authors

Nada Farhat, PharmD Candidate, Paul Kilgore, MPH, MD, Anthony Pattin, PharmD

Abstract

Background: Research shows that interprofessional communication between healthcare providers is beneficial. Furthermore, existing studies suggest that partnerships with community organizations are an underutilized asset to patients and to the healthcare system. There are currently no published studies that illustrate how community organizations can interact with pharmacies and clinics to improve community health.

Purpose: The objective of this study is to describe a landscape and strategy for interaction

between pharmacies and surrounding community organizations, with assistance from neighboring clinics. This partnership must be sustainable to continue to provide healthcare resources for the community after the study is completed.

Method: Based on our knowledge of the local population, we identified the study areas of St. Clair Shores and Harper Woods, with very diverse populations, consisting of individuals from Hispanic, Albanian, Italian, and Middle Eastern descents. A listing of nearby pharmacies, community organizations, and clinics was compiled using the Google Maps function. Evaluation of the current system and the level of communication that exists between the three entities were most important to help formulate a plan on how to design and implement the most beneficial and cost-effective intervention. Pilot surveys were created to assess the current needs of the community. These surveys will either be administered using cluster sampling or focus groups, and the type of communication, whether formal or informal, must be determined. In order to increase involvement in this project and promote the idea of interprofessional communication, incentives will be provided to participants.

Results & Discussion: Several challenges were identified in the preliminary portion of the project, such as the ambiguity in organizations' current role in the community. Based on the information collected from the pilot surveys, the most important needs of the community will be evaluated, and the list of community organizations and nearby clinics will be narrowed down to reflect the survey results. In addition, barriers to pharmacists interacting with individuals, community organizations, and health care providers must be identified ... as well as ways to overcome these barriers. At the completion of the study, participants will also be required to complete additional surveys to evaluate the success of the partnership.

Conclusion: This study is the first of its kind to create a landscape for public-private partnerships with community organizations that can link together pharmacies, healthcare providers, and patients. Further work is now in progress to evaluate the outcome of this

collaborative approach.

Abstract No. 66 (Student_Graduate)

Title

The relationship between obesity and treatment outcomes in pneumonia, skin and soft tissue infection, and urinary tract infection

Affilliations

Wayne State University Eugene Applebaum College of Pharmacy and Health Sciences
Oakwood Hospital and Medical Center

Authors

Matthew Morelli, PharmD Candidate IV
Joseph Fava, PharmD
Lama Hsaiky, PharmD
Francine Salinitri, PharmD
Raymond Cha, PharmD

Abstract

Increased adiposity has been identified as a pro-inflammatory state causing altered immune cell function and impaired immune response. Given these findings, obesity has been studied as a risk factor for increased susceptibility to multiple infections. However, few studies have assessed the relationship between obesity and infection outcomes. The purpose of our study is to analyze treatment outcomes for pneumonia, skin and soft tissue infection (SSTI), and urinary tract infection (UTI) in the obese population to identify whether increasing body mass index (BMI) impacts antibiotic exposure.
This is a non-interventional, retrospective cohort study of subjects treated at a large community teaching hospital in metropolitan Detroit. The study protocol has been submitted to our affiliated investigational review boards. We will

evaluate infection outcome in different BMI categories (BMI of 25-29.9 kg/m2 = overweight, 30-39.9 kg/m2 = obese, and 40 kg/m2 or greater = severely obese) while assessing covariates (ex. degree of infection severity, pre-existing lung disease, antimicrobial therapy regimen, etc.). The study's goal is to include at least 90 subjects, approximately 30 subjects in each BMI category, in order to detect a 10% difference between endpoints with 80% power. Treatment outcomes will be analyzed by comparing subject data at time of infection diagnosis, infection resolution, and discontinuation of antimicrobial therapy. Measured outcomes include inpatient and 30-day all-cause mortality, inpatient length of stay, infection resolution, and readmission. Study subject demographics and clinical characteristics will be evaluated using Student T-Test for continuous variables and Chi-Square Test for categorical variables. For primary outcome analysis, multiple logistic regression will be applied, with the two main variables being BMI (independent) and treatment outcome (dependent).

Abstract No. 67 (Post_Doctoral_Fellow)

Title

Characterization of patients treated for Acute Bacterial Skin and Skin Structure Infections (ABSSSI) Documented or at Risk of Methicillin-Resistant Staphylococcus aureus (MRSA)

Affilliations

Wayne State University Eugene Applebaum College of Pharmacy and Health Sciences, Detroit Medical Center, Henry Ford Health Systems, St. John Hospital and Medical Center

Authors

Kimberly Claeys, PharmD ... Anthony M. Casapao, PharmD ... Jason Pogue, PharmD ... Nitin Bhatia, PharmD ... Ryan Mynatt, PharmD ... Suprat Saely, PharmD ... George Delgado, PharmD ... Christopher A. Giuliano, PharmD ... Susan L. Davis, PharmD ... Michael J. Rybak, PharmD, MPH

Abstract

Background: ABSSSIs represent one of the most common infections encountered in hospitals. Staphylococcus aureus represents approximately 44% of isolated pathogens, with 50% being MRSA. Vancomycin is commonly employed in ABSSSI because newer agents have not shown superiority. Ceftaroline fosamil is a novel bactericidal advanced generation broad-spectrum cephalosporin with activity against MRSA. Ceftaroline has demonstrated efficacy equal to vancomycin for ABSSSI. In addition, the use of rapid diagnostics for identifying MRSA has made a significant impact on patient outcomes. The use of these tests in MRSA ABSSSI, however, is lacking. There are currently opportunities to improve the care of patients who have or at risk for MRSA ABSSSI.

Methods: This is a prospective, open-label, multi-center, randomized trial comparing ceftaroline to vancomycin for the treatment of ABSSSI conducted in two acute trauma centers (Detroit Receiving Hospital, Harper University Hospital) and two community hospitals (St. John's Hospital, Sinai Grace). Patients admitted with ABSSSI between April 2012 and September 2013 were evaluated for inclusion. The study population was enriched for MRSA by enrolling patients with known MRSA by rapid diagnostic testing or high suspicion for MRSA by meeting criteria for vancomycin use. Patients were randomized 1:1 to ceftaroline or vancomycin ± Gram-negative and/or anaerobic coverage. Patients were excluded if they did not require at least 48 hours of intravenous (IV) antibiotics, did not meet FDA lesion criteria, had concurrent diagnosis of osteomyelitis, septic arthritis, gas gangrene, necrotizing infection, infective endocarditis, hardware infection, or required renal replacement therapy.

Results: Between April 2012 and September 2013 13,099 patients who received antibiotics were screened with 2,675 determined to have

ABSSSI. Of these, 82 were included. The most common reasons for exclusion were anticipating less than 48 hours of IV antibiotics in 24.2% of patients (n= 672) followed by inability to meet FDA size requirements in 14.8% (n= 384). Other exclusion criteria of note were osteomyelitis, gas gangrene, and receiving oral antibiotics. Regarding included patients, 40 were treated with ceftaroline and 42 with vancomycin. The majority, 81.7%, were treated for cellulitis (n= 67), followed by abscess in 13.4% of patients (n= 11). Cellulitis ranged in size greatly (mean = 509 cm2 +/- 411 cm2) with the size of abscess demonstrating less variability (mean = 7.6 cm +/ 2.7 cm). Of the clinically evaluable patients, defined as those who received > 48 hours of IV antibiotics, 75.5% (n=37/49) were diagnosed with cellulitis. One patient received concomitant Gram-negative coverage, and eight had anaerobic coverage. Twenty-seven patients had rapid diagnostics performed, obtaining bacterial characteristics within 1.5 hours. This compares to traditional microbiological methods wherein preliminary data took on average 38 hours, and final results on average 79 hours.

Conclusion: ABSSSI are a common cause for patients seeking medical care. Many patients treated for ABSSSI receive < 48 hours of intravenous antibiotic therapy. The presence of cellulitis is a likely driver for hospital admission and length of IV antibiotic therapy. The use of additional hospital sites and strategic screening based on specific patient characteristics will likely improve our ability to enroll patients.

Abstract No. 68 (Post_Doctoral_Fellow)

Title

Daptomycin versus Vancomycin for Bloodstream Infection caused by Methicillin-Resistant Staphylococcus aureus (MRSA) – Preliminary Results

Affilliations

Wayne State University Eugene Applebaum College of Pharmacy, Detroit Medical Center, Henry Ford Health Systems, Ohio State University Medical Center

Authors

Kimberly Claeys, PharmD, Anthony M. Casapao, PharmD, Debra A. Goff, PharmD, Keith S. Kaye, MD, MPH, Donald P. Levine, MD, Susan L. Davis, PharmD, Michael J. Rybak, PharmD, MPH

Abstract

BACKGROUND: Infections caused by MRSA continue to be a major concern with MRSA bloodstream infections (BSIs) associated with a high mortality. The use of vancomycin remains relatively high for MRSA infections since the majority of these strains have remained susceptible. This is in spite of the numerous investigations that have associated vancomycin treatment failure as high as 60 to 90% in MRSA BSIs in the setting of high vancomycin minimum inhibitory concentration (MIC) values still within the susceptible range. Recent data has demonstrated that daptomycin improved outcomes when vancomycin MIC was equal to 2mg/L by automated testing systems (ATS). Recent reports, however, have highlighted the discrepancy in the ability of ATS to find the true MIC, often overcalling vancomycin MICs up to 75% of the time. Therefore, a study comparing the “true” MIC via broth microdilution (BMD) would eliminate this confounding variable.

METHODS: This is a retrospective, open-label, non-randomized study of a cohort of patients with MRSA-BSI treated with vancomycin or daptomycin conducted at the Detroit Medical Center (DMC) and Ohio State University Medical Center. The clinically evaluable population was a matched cohort of vancomycin and daptomycin-treated patients. Patients are matched according to CLSI referenced BMD vancomycin MIC, age (+/- 10 years), Pitt bacteremia score < 4 or ≥ ... 4), site of MRSA

BSI, and intensive care unit (ICU) admission at the time of BSI with a goal sample size of 200 patients. Vancomycin MICs per ATS were obtained from electronic medical records at participating institutions. The Anti-Infective Research Laboratory determined vancomycin broth microdilution (BMD) MICs in duplicate per CLSI guidelines.

RESULTS: To date, a total of 188 patients with MRSA BSI have been collected from the DMC and 45.7% (86/188) matched. The majority of MRSA BSI was secondary to skin and soft tissue infections (n = 68, 36%), followed by bone/joint infections (n = 28, 15%). The majority of patients Pitt bacteremia scores were less than four (n = 133, 70.7%) and most patients were not in the ICU at the determination of BSI (n = 144, 76.5%). There were significantly more patients with high Pitt bacteremia scores in the ICU but no association between MIC per BMD and ICU status. The average time before patients in the daptomycin group were transitioned to this agent was 40.6 hours (+/- 25.7 hours). Of note, upwards of 90% of the ATS MICs of 2mg/L were determined by BMD to have an MIC of 0.5mg/L to 1mg/L. Infections accounting for BMD MICs of 2 were mostly Infective endocarditis, IV catheter-related, or hardware-related infections.

CONCLUSIONS: Patients identified as having MRSA BSI at the DMC have generally low Pitt bacteremia scores and ICU admission. MRSA vancomycin MICs per BMD do not show a correlation to these parameters of severity. There is also a high degree of MIC discrepancy between ATS and BMD. Higher vancomycin MICs per BMD tended to be in deep-seated infections. As the study progresses, clinical outcomes will be assessed.

Abstract No. 69 (Student_Graduate)

Title

Increased killing of SCCVII squamous carcinoma cells after the combination of Pc4 photodynamic therapy and dasatinib is associated with enhanced caspase-3 activation and ceramide synthase 1 upregulation

Affilliations

Department of Pharmaceutical Sciences, Eugene Applebaum college of Pharmacy and Health Sciences, Wayne State University, 259 Mack Ave, Detroit, MI 48201

Authors

Nithin B Boppana,BS ... Paul Breen,BS ... Duska Separovic,PhD ...

Abstract

Photodynamic therapy (PDT) is a non-invasive cancer treatment modality, which utilizes a light-absorbing photosensitizer, visible light and oxygen to generate reactive oxygen species that destroy malignant cellular targets. As tumors recur, PDT needs to be optimized to improve its therapeutic benefit. The combination of dasatinib, a multi-kinase inhibitor and photodynamic therapy with the silicone phthalocyanine photosensitizer Pc4 was assessed for increased cell killing of SCCVII mouse squamous carcinoma cells, a preclinical model of Head and neck squamous cell carcinoma, using apoptotic markers and colony-formation as experimental endpoints. As each of these treatments regulates the metabolism of the sphingolipid ceramide, their effects on mRNA levels of ceramide synthase (CerS), a ceramide producing enzyme, and the sphingolipid profile were determined.
PDT+Dasatinib induced an additive loss of colony formation (Clonogenicity). Unlike PDT alone or PDT+Dasatinib, dasatinib alone induced zVAD-fmk-dependent cell killing.PDT or dasatinib-induced caspase-3 activation was potentiated after the combination. In contrast to PDT alone, dasatinib induced upregulation of ceramide synthase 1 mRNA, and the effect was enhanced after the combination. Dasatinib induced a modest increase in C20:1- and C22-ceramide but had no effect on total ceramide levels. PDT increased the levels of 12 individual

ceramides and total ceramides, and the addition of dasatinib did not affect these increases. PDT alone substantially decreased sphingosine levels and inhibited the activity of acid ceramidase, an enzyme that converts ceramide to sphingosine. The data suggest that PDT-induced increase in ceramide levels do not correlate with ceramide synthase mRNA levels but rather with inhibition of ceramidase. Overall, cell killing was zVAD-fmk-sensitive after dasatinib but not after either PDT or the combination and enhanced cell killing after the combination correlated with potentiated caspase-3 activation and upregulation of ceramide synthase 1 mRNA but not production of ceramide. The data imply the translational potential of the combination for the treatment of cancer.

Abstract No. 70 (Student_Graduate)

Title

Increased killing of SCCVII squamous carcinoma cells after the combination of Pc4 photodynamic therapy and dasatinib is associated with enhanced caspase-3 activation and ceramide synthase 1 upregulation

Affilliations

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Authors

Nithin B Boppana,BS ... Paul Breen,BS ... Duska Separovic,PhD ...

Abstract

Photodynamic therapy (PDT) is a non-invasive cancer treatment modality, which utilizes a light-absorbing photosensitizer, visible light and oxygen to generate reactive oxygen species that destroy malignant cellular targets. As tumors recur, PDT needs to be optimized to improve its therapeutic benefit. The combination of dasatinib, a multi-kinase inhibitor and photodynamic therapy with the silicone phthalocyanine photosensitizer Pc4 was assessed for increased cell killing of SCCVII mouse squamous carcinoma cells, a preclinical model of Head and neck squamous cell carcinoma, using apoptotic markers and colony-formation as experimental endpoints. As each of these treatments regulates the metabolism of the sphingolipid ceramide, their effects on mRNA levels of ceramide synthase (CerS), a ceramide producing enzyme, and the sphingolipid profile were determined.
PDT+Dasatinib induced an additive loss of colony formation (Clonogenicity). Unlike PDT alone or PDT+Dasatinib, dasatinib alone induced zVAD-fmk-dependent cell killing.PDT or dasatinib-induced caspase-3 activation was potentiated after the combination. In contrast to PDT alone, dasatinib induced upregulation of ceramide synthase 1 mRNA, and the effect was enhanced after the combination. Dasatinib induced a modest increase in C20:1- and C22-ceramide but had no effect on total ceramide levels. PDT increased the levels of 12 individual ceramides and total ceramides, and the addition of dasatinib did not affect these increases. PDT alone substantially decreased sphingosine levels and inhibited the activity of acid ceramidase, an enzyme that converts ceramide to sphingosine. The data suggest that PDT-induced increase in ceramide levels do not correlate with ceramide synthase mRNA levels but rather with inhibition of ceramidase. Overall, cell killing was zVAD-fmk-sensitive after dasatinib but not after either PDT or the combination and enhanced cell killing after the combination correlated with potentiated caspase-3 activation and upregulation of ceramide synthase 1 mRNA but not production of ceramide. The data imply the translational potential of the combination for the treatment of cancer.

Abstract No. 71 (Student_Graduate)

Title

Diabetes and Risk of Surgical Site Infections: A Meta-Analysis

Affilliations

Eugene Applebaum College of Pharmacy, Wayne State University, Detroit, MI ... School of Medicine, Wayne State University, Detroit, MI

Authors

Caitlin Knott, PharmD Candidate 2015 ... Huong Nguyen, PharmD Candidate 2015 ... Maressa Santarossa B.Sc., PharmD Candidate 2015 ... Emily T. Martin, MPH PhD ... Linda Jaber, PharmD ... Keith Kaye, MD MPH

Abstract

Introduction
Diabetes has been shown in numerous trials to be a risk factor for surgical-site infections (SSI). However, this association has not been consistently found in all studies. In addition, many studies that do investigate this association only focus one surgery type. SSIs are associated with a high risk of morbidity and increased cost, due to extended length of stay, antibiotic usage, and patient care.

Objective
To examine the possible association between the development of surgical site infections and history of diabetes across various surgery types.

Methods
• Data Collection
We conducted a comprehensive search on PubMed using the search terms “risk factors” and “surgical site infections” from Dec 1985 to May 9th 2013. Our initial query resulted in 2,371 articles that were reviewed for inclusion according to seven eligibility criteria: (1) US study ... (2) human ... (3) adult population ... (4) used the CDC definition for surgical site infections ... (5) primary literature ... (6) included a diagnosis of diabetes ... and (7) provided measurable risk estimates of the association between diabetes and risk of SSI with 95% confidence intervals, or the study provided adequate information to calculate risk estimates and their 95% confidence intervals. Each study was individually reviewed and excluded if it did not meet these seven eligibility criteria. The investigators then extracted individual level data from each of the remaining eligible articles.

• Statistical Analysis
Case numbers, crude odds ratios and adjusted odds ratios and confidence intervals were abstracted from all eligible articles using a standardized abstraction tool. Unclear estimates were adjudicated by the study principal investigator. Meta-analysis estimates were calculated using a DerSimonian and Laird random-effects model for each estimate type. Funnel plots were generated to assess publication bias (Stata 11).

Results
Our initial search yielded 2,371 articles. After abstract review, we were able to exclude 2,196 articles. After further analysis, we were able to exclude an additional 42 articles. Our total abstracts to date are currently 70 articles.

Data from 23 studies were analyzed to calculate the unadjusted crude random-effects estimate of the association between diabetes and risk of SSI (Figure A). The summary OR was 2.05 [95% CI 1.78-2.36].
Data from 17 studies were analyzed to calculate the adjusted random-effects estimate of the association between diabetes and risk of SSI (Figure B). The summary OR was 2.10 [95% CI 1.74-2.54].
Data from 37 studies were analyzed to calculate the pooled random-effects estimate of the association between diabetes and risk of SSI (Figure C). The summary OR was 1.73 [95% CI

1.47-2.04].

The funnel plot shown in figure y, representing the crude data, showed no publication bias amongst the articles. However, the funnel plot representing the adjusted data in figure z, did show publication bias amongst the articles.

Conclusions
The association between diabetes and surgical site infections is statistically significant in both the unadjusted and adjusted pooled estimates. Our meta-analysis demonstrated a positive relationship between diabetes and SSI in various type of surgeries.

Abstract No. 72 (Student_Graduate)

Title

Incidence, Risk Factors, and Reversibility of Myelosuppression Among Children Receiving Linezolid

Affilliations

Wayne State University Eugene Applebaum College of Pharmacy and Health Sciences
Children's Hospital of Michigan

Authors

Insaf Mohammad ... Ashley Powell ... Alexander Garbarino ... Emily Martin, PhD ... Leah Molloy, PharmD

Abstract

Background: Linezolid is used in the treatment of a variety of Gram-positive infections among pediatric patients. Myelosuppression is a well-described adverse effect, with rates of 2% - 55% described in a recent Italian study of children receiving linezolid. Data describing these effects in the United States are limited to indications of pneumonia, otitis media, bacteremia, and skin infections.

Purpose: To evaluate the clinical use and hematologic changes among children receiving linezolid while admitted to the Children's Hospital of Michigan (CHM).

Methods: The incidence of myelosuppression, associated risk factors, and characterization of linezolid utilization was analyzed via a retrospective case-control study at CHM between January 2009 and December 2011.

Results: 129 patients (mean age 7.8 years, 55% male) received linezolid for a mean ± SD duration of 10.1 ± 8.9 days. Hematological baseline and nadir values were available for 87 patients, and declines from normal baseline values to values below the lower limit of normal (LLN) at nadir were observed in 39 patients (45%). Platelets were the most commonly affected parameter and fell from normal to below LLN in 22 patients. There was no significant difference in the incidence of myelosuppression attributed to sex, age, or duration of therapy. However, significantly more patients who experienced myelosuppression concomitantly received a beta-lactam (72%) than those who did not experience myelosuppression (46%), p=0.015. Reversibility of myelosuppression within 30 days of completion of therapy was achieved among 56% of the 22 patients for whom this could be evaluated.

Conclusion: Hematologic toxicity was observed in one-third of patients receiving linezolid, and concomitant use of beta-lactams appeared to increase this risk, warranting close monitoring for patients on these therapies if such combinations cannot be avoided.

Abstract No. 73 (Student_Graduate)

Title

Development of a Pharmacist-Driven Oral Chemotherapy Monitoring Program

Affilliations

Oakwood Hospital and Medical Center
WSU EACPHS

Authors

Melanie Smallwood, PharmD Candidate 2014
Corrine Reno, PharmD BCPS

Abstract

Oral chemotherapy agents are becoming the treatment of choice in select cancer patients due to their ease of use, decrease in administration cost, and in their convenience and flexibility. With an increase in utilization comes a rise in adverse effects with difficulty in monitoring by healthcare professionals, as patients are not in continuous direct contact. Non-adherence secondary to adverse effects, medication access, and medication costs poses a limitation to adequate drug therapy in this patient population. Pharmacists can play a pivotal role in connecting this gap by providing individualized medication management through patient education and follow-up drug monitoring calls.

In this ambulatory oral chemotherapy drug monitoring program, we will assess potential adverse effects and adherence barriers that have occurred after the patient has began chemotherapy with an oral agent. Adult patients with any form of cancer will have their medical record reviewed to assess if they are being actively treated with an oral agent. Follow-up phone calls will be made after patient has obtained medication from specialty pharmacy and has initiated therapy based upon coordination between pharmacy, nursing, and patient with start date recorded in chart. Phone calls will be guided by questionnaire with appropriate documentation on flowsheet. Significant findings and pharmacist recommendations will be forwarded to prescribing physician to ensure proper management of adverse effects.

Abstract No. 74 (Student_Graduate)

Title

ANTICOAGULATION STATUS AT 30 DAYS IN MAJOR BLEED PATIENTS ON DABIGATRAN OR WARFARIN

Affilliations

Authors

Authors: Lina Qasem, Shaun Saboo, Elizabeth Conger, Mike Forman, Jennifer Priziola, Janet Hoffman and Maureen Smythe.

Abstract

Introduction: Patients with atrial fibrillation at high thrombotic risk are often on life-long oral anticoagulant therapy. Major hemorrhage is the most concerning adverse effect of anticoagulant medications. The purpose of this study is to evaluate the impact of a single major bleeding event on anticoagulation status of atrial fibrillation patients at discharge and again at 30 days post discharge.

Methods: This study, conducted within a single health system, identified patients who experienced a major bleed on dabigatran or warfarin between October 2010 and September 2012. Patient identification occurred through 2 processes ... completion of an adverse event report or through a structured stepwise filtering approach of data. The stepwise approach involved cross-referencing patients on the antithrombotic agent with an ICD-9 code for atrial fibrillation, major hemorrhage and transfusion. Warfarin bleeders were further narrowed by identifying those with an INR > 1.8 within 30 days of the admit date for the major bleed. The goal was to identify all dabigatran bleeders and then to identify warfarin bleeders (unmatched) in a 2:1 numerical ratio. Retrospective chart review was completed to verify the bleeding event met the International Society on Thrombosis and Haemostasis criteria for a major bleed and that a temporal association was present between anticoagulant use and the

bleed. Once the bleeding event was confirmed, chart review was performed to determine anticoagulation status at discharge and at 30 days post discharge for those patients in whom therapy was held at discharge. Charts were reviewed out to a maximum of 60 days. A Chi Square test was used to evaluate differences in the rate of holding anticoagulation therapy between groups with the level of statistical significance set at $p< 0.05$.

Results: During the study period a total of 35 dabigatran major bleed patients were identified. With a goal of a 2:1 dabigatran to warfarin ratio, data were evaluated for 70 patients with warfarin major bleeding. Results are outlined in the table below:

	Warfarin (n=70)	Dabigatran (n=35)	p value
Anticoagulation held at discharge	**Total:** 45/65 (69.2%) 5 patients died in house	**Total:** 18/30 (60.0%) 5 patients died in house	0.48
Anticoagulation still held at 30 days	**Total:** 25/45 (55.6%)	**Total:** 9/18 (50.0%)	.78

Conclusion: Patients with atrial fibrillation who experience an anticoagulant major bleed are discharged without antithrombotic therapy 60% or more of the time. Approximately 50% of patients not discharged on antithrombotic therapy remain off therapy at 30 days and are at increased thrombotic risk. There was no difference in the rates of holding antithrombotic therapy between the dabigatran and warfarin groups either at discharge or at 30 days. Cessation of antithrombotic therapy and increased thrombotic risk is a frequent consequence of a major antihrombotic bleeding event.

Abstract No. 75 (Student_Graduate)

Title

Comparative study of prevalence of pSK41 in heterogeneous vancomycin-intermediate Staphylococcus aureus (hVISA) isolates against non-hVISA isolates.

Affilliations

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Authors

Poorva Divekar1, Anthony M. Caspao2 PharmD, Steven Firestine1-PhD, Michael J. Rybak2-PharmD, MPH, Emily Martin2-MPH, PhD

Abstract

Introduction: hVISA (heterogenous vacomycin intermediate S. aureus) are strains of S. aureus containing subpopulations of vancomycin-intermediate susceptible daughter cells, parent cells of which are VSSA (vancomycin-susceptible S. aureus). Patients with hVISA infections treated with vancomycin have been shown to have poor treatment outcomes. pSK41 is a prototypical multi-resistant plasmid from S. aureus. Studies have demonstrated that pSK41 facilitates the transfer of vancomycin resistance from vancomycin-resistant enterococci (VRE) to S. aureus. The combination of hVISA and psK41 could increase the risk for vancomycin resistant S. aureus. The objective of this study was to determine whether hVISA is likely to contain psk41.
Methods: Methicillin-resistant S. aureus (MRSA) isolates were collected from patients with BSI as part of two ongoing studies, including one matched cohort study and a surveillance study collecting hVISA only. Isolates were grown on tryptic soy agar and DNA was extracted from bacterial colonies by

boiled lysis. Seven marker genes of pSK41 (pre, nes, traG, traK, traL, traE and traM) were selectively amplified by PCR using previously published primers to detect the presence of pSK41. The presence or absence of amplified genes was confirmed by gel electrophoresis. Prevalence of pSK41 between hVISA and non-hVISA were compared using the chi-squared test with a $p< 0.05$ considered statistically significant.
Results: 145 samples (61 hVISA and 60 non-hVISA samples from matched cohort study and 24 hVISA samples from surveillance study) were screened for the presence of pSK41. 19 of the 85 (20%)_hVISA isolates and 10 of the 60 (17%) non-hVISA isolates were found to contain pSK41 ($p=0.40$). pSK41 was found at a higher prevalence in hVISA as compared to non-hVISA, however this was not statistically significant.
Conclusion: pSK41 was found in a high percentage of clinical strains of S. aureus, including hVISA strains. Further research is warranted to understand the relationship between the presence of pSK41 in hVISA and the potential for vancomycin resistance transfer from enterococcal species.

Abstract No. 76 (Student_Graduate)

Title

Development of CDF (Curcumin Difluorinated) – PLGA Conjugated Micelles for Pancreatic Cancer

Affilliations

Authors

Lakshmi deepika Cheemalakonda
Dr. Joshua J. Reineke

Abstract

Pancreatic cancer is a malignant neoplasm originating from transformed cells arising in pancreatic tissues. Pancreatic tumors have an extremely dense desmoplastic layer surrounding the tumor cells, which is a major barrier for drug penetration into the tumor. Curcumin, though a potential anti - cancer agent, has poor water solubility, stability and oral bioavailability. Oral bioavailability of curcumin was improved by fabricating it into various types of nanoparticle formulations, but tissue bioavailability still remains a concern. CDF, a curcumin derivative, which has 16-fold higher bioavailable and is equipotent to curcumin is used for this study. Our major goal is to make polymer drug conjugated micelles, which we hypothesize, will be able to target the tumor, penetrate fibrotic capsule and localize the release of chemotherapeutics. The aim of the present work was to prepare CDF (Curcumin Difluorinated) micelles with CDF –poly (lactic-co-glycolic) acid (PLGA) – S - S – polyethylene glycol (PEG). In the present study we made three formulations: (1) PLGA nanoparticles encapsulating CDF, (2) CDF –PLGA – S – S – PEG micelles, and (3) CDF – PLGA conjugated nanoparticles. PLGA nanoparticles encapsulating CDF were characterized by scanning electron microscopy and dynamic light scattering techniques. To make CDF micelles, CDF – PLGA & PEG –S –S – NH2 conjugates were prepared. They were confirmed using NMR and FTIR techniques. The final conjugate CDF –PLGA – S – S – PEG was made and confirmed by 1H NMR & FTIR techniques. The micelles were prepared by self-assembly with mPEG shell and PLGA core. CDF micelles will have enhanced fibrotic tumor penetration and accumulation. These micelles promote tumor specific release of PEG molecules followed by controlled degradation dependent release of CDF in the tumor.

Abstract No. 77 (Student_Undergrad)

Title

Piloting the use of the Family Quality of Life Survey for Caregivers of Persons with Dementia

Affilliations

Wayne State University Eugene Applebaum College of Pharmacy & Health Sciences

Authors

Tara Bouwman, Khurshid Hassan, Kristine Kempl, Shoshana Millman, Mary Shenouda, Rosanne DiZazzo-Miller, DrOT, OTRL, CDP, & Preethy Samuel, PhD, OTRL

Abstract

Purpose
Dementia has become an increasingly common disease among the elderly. As a result there is a rise in the need for caregivers, who are often times close family or friends. Quality of life for the family of the person with dementia is often compromised secondary to caregiving related stress and burden. In addition, there is a need for more educational services and resources, or "formal supports" for family members so that they can provide better quality care for persons with dementia and for themselves. Formal support can range from resources for health professionals, to knowledge of various benefits and programming for both care recipient and caregiver. Therefore the purpose of our study is to contribute to research on the impact of formal support on family quality of life (FQOL).

Methods
We used a semi-structured survey to collect cross-sectional data from 26 family caregivers of persons with dementia. Participants were recruited through advertisements on various media outlets, flyers, and website postings. Interested participants were screened for eligibility by the PI of the study and then assigned to trained interviewers, who administered the Family Quality of Life Survey-Adapted version-2011 (FQOLS-2011) via a 60-90 minute phone interview. SPSS version 21 was used to conduct statistical analysis at a univariate and bivariate level. Descriptive analysis was conducted on (1) the availability, use and need for support services (2) six dimensions of formal support: importance, opportunities, initiative, attainment, stability, and satisfaction (each of which were Likert type items), and (3) overall FQOL (mean of two Likert-type items designed to measure overall rating of FQOL and satisfaction with FQOL). Correlational analysis was conducted to examine the effect of these six dimensions on overall FQOL. Data collected from open-ended questions were thematically analyzed to illuminate the need and importance of the quantitative findings.

Results
Caregivers reported a low awareness of special disability and aging benefits. Caregivers also reported low initiative and attainment of formal service support, however 59% reported that they did not need any more support services. We found that satisfaction with formal services was significantly associated with overall FQOL ratings.

Conclusion
Due to the growing number of person's with dementia, awareness, availability and use of formal support services are critical to safety of the caregiver and care recipient and their overall FQOL. Our findings imply that increased knowledge and use of formal support services has the potential to significantly improve the family's satisfaction with services, which in turn has a significant impact on FQOL. Caregivers also need easy access to formal support services in order for them to take the initiative to use them. Respite, day programs, Psychologists, and special disability benefits are all formal support services that were reported significantly underused, and could positively impact the QOL of the persons with dementia and their caregivers and therefore their overall FQOL.

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Title

AquaLogix vs. "Standard" Aquatic Equipment in Cardinal and Multi-Planar (PNF) Patterns

With Patients Who Have Non-Descript Low Back Pain

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Abstract

Background:
Aquatic therapy programs are often used in the rehabilitation of low back pain to improve function and lower pain. There are many different forms of aquatic equipment that is used during therapy. This investigation sought to determine the efficacy of an aquatic therapy protocol using AquaLogix technology in order to improve function and reduce symptoms in patients with non-descript low back pain.

Methods:
Twelve individuals aged 18-65 years old completed eight sessions of an aquatic therapy protocol emphasizing cardinal and multi-planar movements of the upper and lower extremities using either standard foam dumbbell equipment or AquaLogix technology. Improvement in function and low back pain were assessed for each group using the Oswestry Disability Index (ODI) and the Numeric Pain Rating Scale (NPRS), respectively.

Results:
Improvement in function for the AquaLogix group was found to not be significantly different than the Dumbbell group ($p>0.05$), with a significance level of 0.079. The NPRS scores also showed no significant difference between the two groups. Conversely, a greater general trend toward improvement in function and reduction in pain symptoms was seen for the AquaLogix group when compared to the Dumbbell group.

Conclusions:
Implications of this study may be useful for understanding the benefits of aquatic therapy in reducing low back pain. These data indicate that both the AquaLogix group and the Dumbbell group are valid interventions for the treatment of low back pain. The data also reveals a relationship between the AquaLogix group and improvement in various functional activities as measured by the ODI and a reduction in pain symptoms. These preliminary results suggest that AquaLogix equipment can be an effective treatment method for low back pain, but further research may be necessary to further examine the effects.

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