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**CME CREDIT**

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## INTRODUCTION

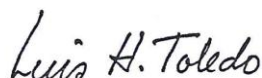
### ***RESEARCH, EDUCATION AND SCHOLARSHIP***

On this 32<sup>nd</sup> anniversary of Research Day, our institutions commemorate their commitment to maintaining the highest quality research and scholarship. Under the leadership and sponsorship of Western Michigan University Homer Stryker M.D. School of Medicine (WMed), we gather today to celebrate the extraordinary work being presented by faculty, residents, and students.

The commitment and participation of WMed faculty and the Kalamazoo scientific community continue with strong support. This year we had an overall submission of 124 abstracts of which 104 were accepted for inclusion in today's program. We appreciate the dedication and hard work of our academic participants.

Each research project was carefully reviewed by a group of seven judges. Several awards are given to the best research studies to celebrate the excellence of research, education, and scholarship that you will witness at this event.

On behalf of WMed, Western Michigan University, and Kalamazoo College, the Kalamazoo Community Medical and Health Sciences Research Committee welcomes you. We hope you enjoy this rewarding day.



Luis H. Toledo, MD, PhD  
Chair, 2014 Kalamazoo Community Medical and Health Sciences Research Committee

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#### **Members of the 32<sup>nd</sup> Annual Kalamazoo Community Medical and Health Sciences Research Day Committee:**

Leandra Burke	Elizabeth Phillips, MSN, PhD (WMU)
M. Abbigail Childs	Vinay Reddy, MD
Cheryl Dickson, MD	Richard Roach, MD
Laura Eller	Sandra Sheppard
Sue Jeska	Lyndsee Smith (Fetzer Center, WMU)
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Vicki McKinney, PhD	Luis Toledo, MD, PhD (Chair)
Emma O'Hagan	
Connie Peruchietti (Fetzer Center, WMU)	

## DISCLOSURES

The following oral presenters and group members have no relevant financial relationships to disclose:

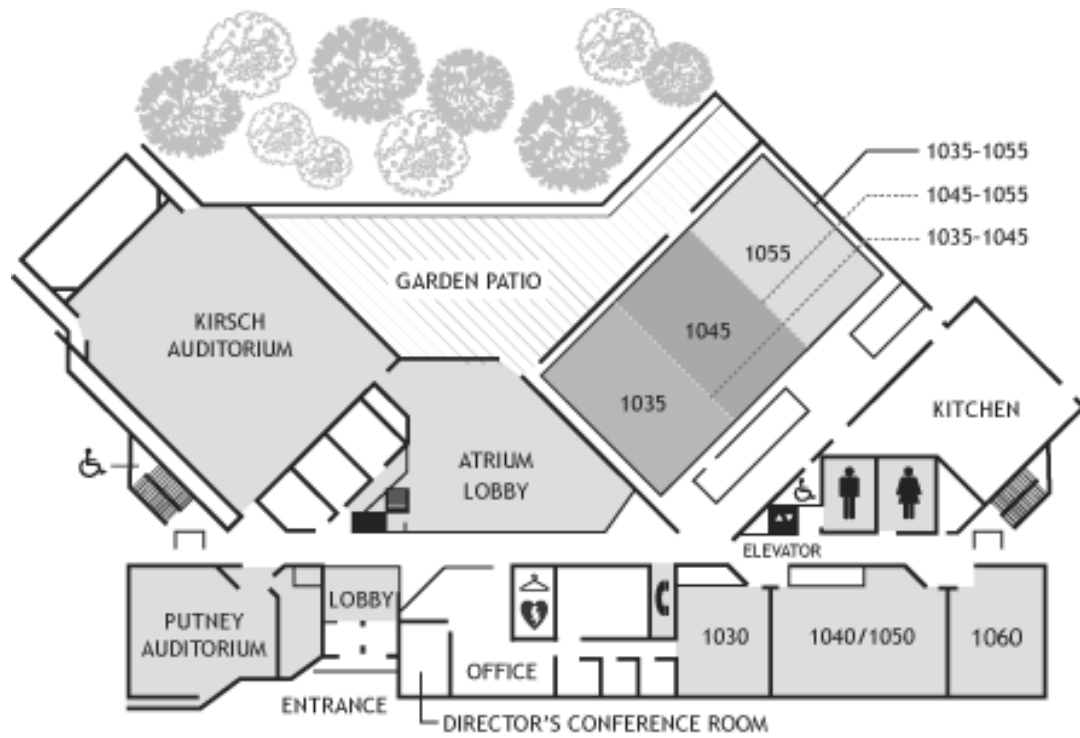
Amy Attaway, MD  
Shirley Bach  
Robert Butkiewicz  
Ethan Ebner, DO  
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Julia Hamilton  
Jane Hanneken, MD  
Ryan Jones, MSU, COM  
Nathan Kolderman, MSU, CHM  
Catherine Kothari, PhD  
Larry Lutwick, MD  
Devin Malik, MD  
David Prior, MD  
Amy Raubenolt, MD  
Shaina Riggs, MD  
Aaron Roberts, MD  
Andrew Schrottenboer, MSU, COM  
Matthew Siuba, DO  
Elbert Williams, MSU, CHM

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The following oral presenters and group members have financial relationships to disclose:

Mican DeBoer, BSN, RN, CEN – Borgess Foundation

# Fetzer Center Floor Plans



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## SCHEDULE

8:00 - 8:30 am	<b>Registration</b> Refreshments available in Rooms 1035/1045/1055	
8:30 - 10:05 am	<b>Oral Sessions</b> Session 1A Session 1B Session 1C Session 1D	Putney Lecture Hall Rooms 1040/1050 Rooms 2016/2018 Room 2020
10:05 - 11:00 am	<b>Break</b> <b>Poster Presentations</b> <b>Vendor Display Tables</b>	Rooms 1035/1045/1055
11:00 - 11:55 am	<b>Oral Sessions</b> Session 2A Session 2B Session 2C Session 2D	Putney Lecture Hall Rooms 1040/1050 Rooms 2016/2018 Room 2020
12:00 - 1:15 pm	<b>Lunch / Keynote Speaker</b> 2014 Dr. Robert P. Carter Research Lecture  <b>Making Healthcare as Common as a Coke<sup>®</sup></b>  <i>Eric G. Bing, MD, PhD, MBA</i> <i>Director of Global Health, George W. Bush Institute</i> <i>Professor of Global Health, Southern Methodist</i> <i>University</i>	Kirsch Auditorium
1:20 - 2:55 pm	<b>Oral Presentations</b> Session 3A Session 3B Session 3C Session 3D	Putney Lecture Hall Room 1040/1050 Room 2016/2018 Room 2020
3:00 - 3:30 pm	<b>Presentation of Awards</b> <b>Hal B. Jenson, MD, MBA</b> <i>Founding Dean</i> <i>Western Michigan University Homer Stryker M.D.</i> <i>School of Medicine</i>	Kirsch Auditorium

## KEYNOTE SPEAKER

### **The Dr. Robert P. Carter Research Lecture**

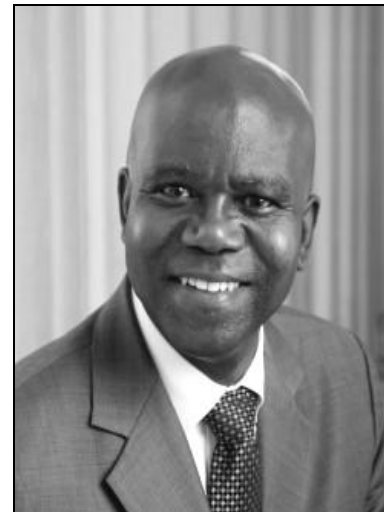
*This is the sixth year of this annual lecture supported by the Board of Western Michigan University Homer Stryker M.D. School of Medicine to celebrate the Research Day activities and to recognize Dr. Carter's commitment and support of research at our institution.*

# “Making Healthcare as Common as a Coke®”

## **Eric G. Bing, MD, PhD, MBA**

Director of Global Health  
George W. Bush Institute

Professor of Global Health  
Southern Methodist University



Millions are dying from diseases that we can easily and inexpensively prevent, diagnose, and treat. Why? Because even though we know exactly what people need, we just can't get it to them.

In their book, *Pharmacy on a Bicycle, Innovative Solutions for Global Health and Poverty*, Eric G. Bing and Marc J. Epstein lay out a solution: a new kind of bottom-up health care that is delivered at the source. We need microclinics, micropharmacies, and microentrepreneurs located in the hard-to-reach communities they serve. A new model that “scales down” to train and incentivize all kinds of healthcare providers in their own villages and towns, creates an army of on-site professionals who can prevent tragedy at a fraction of the cost of top-down bureaucratic programs.

*Pharmacy on a Bicycle* shows how the same forces of innovation and entrepreneurship that work in first-world business cultures can be unleashed to save the lives of millions.

Dr. Bing received his MBA from Duke University's Fuqua School of Business, his PhD in Epidemiology from the University of California's School of Public Health, his MD from Harvard Medical School and his BA in Psychology from Dartmouth College.

We welcome Dr. Bing to Research Day and to Western Michigan University Homer Stryker M.D. School of Medicine.

## ORAL PRESENTATIONS

<b>SESSION 1 A - Emergency Med, Internal Med, Infectious Diseases</b>	<b>Putney Lecture Hall</b>
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**Moderator: David Overton, MD – Emergency Medicine**

- 8:30 – 8:45    **Comparison of Standard CPR Versus CPR with an Intrathoracic Pressure Regulator Versus Active Compression Decompression CPR Plus an Impedance Threshold Device during Out-of-Hospital Cardiac Arrest.** Amy B. Raubenolt, Kevin M. Franklin, William D. Fales
- 8:50 – 9:05    **Does Gender Matter? Exploring Mental Health Recovery, Court Health and Legal Outcomes.** Catherine L. Kothari, Robert Butkiewicz, Jeff Patton, Emily Williams, Caron Jacobson, Diane Morse, Catherine Cerulli
- 9:10 – 9:25    **Benzodiazepines for Prehospital Seizure Management in Michigan.** Emily Cordes, Chris Jacob, Lucan Chatterley, Kevin Putman, Benedict Dormitorio, William D. Fales
- 9:30 – 9:45    **The Effect of External Beam Radiation upon Cd4 Cell Levels in HIV-Infected Males with Prostate Cancer.** Larry Lutwick, Jana Preis
- 9:50 – 10:05    **Compliance of Internal Medicine Clinic with Screening Recommendations for Abdominal Aortic Aneurysm – A Quality Improvement Study.** Devin Malik, Sourabh Aggarwal, Yashwant Agrawal, Richard Card, Mark Schauer

<b>SESSION 1 B - Psychiatry, Basic Sciences, Quality Improvement</b>	<b>Room 1040/1050</b>
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**Moderator: Perry Westerman, MD – Psychiatry**

- 8:30 – 8:45    **A Computer Application for Documenting Family Interaction Mapping Interviews.** Michael R. Liepman, William G. Naylor, Douglas J. Losey, John A. Kapenga
- 8:50 – 9:05    **Developing Curricula to Address Resident Challenges with Difficult Patients in the Psychiatry Outpatient Clinic.** David C. Dunstone, Chris A. Karampahtsis, John D. Lindo, Brandon G. Moore, Kathleen A. Gross, Sonia Motin, Maritza E. Lagos, Belal M. Hegazy, Michael R. Liepman, Suzie Suchyta-Haas, Robert D. Strung
- 9:10 – 9:25    **A Mental Health Professional Motivational Interviewing Training Study.** Justin A. Moore, Scott T. Gaynor
- 9:30 – 9:45    **Teaching Quality Improvement: Learn by Doing.** Mark Schauer, Aaron Roberts, Shannon McCormack, Christina Lang, Eric Yoder
- 9:50 – 10:05    **Postpartum Depression is Not Just a Problem Early On.** Catherine L. Kothari, James Wiley, Angie Moe, Michael R. Liepman, R. Shama Tareen, Amy Curtis

**SESSION 1 C - Orthopaedics, Basic Sciences****Room 2016/2018****Moderator: Dale Rowe, MD – Orthopaedic Surgery**

- 8:30 – 8:45 **Diagnostic Value of Shoulder Magnetic Resonance Arthrography: Primary Labral Tears and Failed Labral Repairs Compared to Arthroscopy as a Gold Standard.** Andrew G. Geeslin, Roman C. Bloch, Robert J. Oostveen, Mark J. Sytsma
- 8:50 – 9:05 **Load Transfer in Conventional and Locked Screw-Plate Constructs: A Finite Element Model.** Bipin Patel and Peter A. Gustafson
- 9:10 – 9:25 **Developing a Simulated Distal Radius Reduction and Informed Consent Training Program.** Vani J. Sabesan, Adam W. Lyon, Vinay K. Sharma, M. Abigail Childs, Dale E. Rowe
- 9:30 – 9:45 **Ability of Surgeons to Optimize Torque During Screw Placement into an Osteoporotic Bone Model and the Effects of Real Time Feedback: Preliminary Results.** David M. Prior, Peter A. Gustafson, Andrew G. Geeslin, Joseph L. Chess
- 9:50 – 10:05 **Statistical Rigor in Medicine and Aerospace Engineering: Lessons Learned in Multidisciplinary Collaboration.** Peter A. Gustafson, James R. Jastifer, John A. Kapenga, Joseph W. McKean

**SESSION 1 D - Internal Medicine****Room 2020****Moderator: Mark Loehrke, MD – Internal Medicine**

- 8:30 – 8:45 **30-Day Readmission Rate for Patients Discharged with Chronic Obstructive Pulmonary Disease (COPD): Analysis of 1,858,618 Admissions. Which Patients Are Most at Risk?** Devin Malik, Sourabh Aggarwal, Andrew Whipple, Yashwant Agrawal
- 8:50 – 9:05 **Medications that Leave Spots. Bullous Pemphigoid and Dipeptidyl Peptidase IV Inhibitors: A Case Report.** Amy Attaway, Tracey L. Mersfelder, Sakshi Vaishnav, Joanne Baker
- 9:10 – 9:25 **The Forgotten Adverse Effect of Steroids: Uncontrolled Hypertension Leading to Posterior Reversible Encephalopathy Syndrome (PRES) in a Lupus Patient.** Devin Malik, Sourabh Aggarwal, Sukhpreet Singh
- 9:30 – 9:45 **Kidney Leaked Urine Into Lung! Urinothorax as a Complication of Percutaneous Nephrolithotomy.** Arani Nanavati, Rachael Harris, Shrey Velani, Susan Bannon
- 9:50 – 10:05 **'Ping Pong Gaze' Secondary to Monoamine Oxidase Inhibitor (MAOI) Overdose: A Case Report and Review of Literature.** Amy Attaway, Laila Sroujeh, Tracey L. Mersfelder, Christopher Butler, Daniel Ouellette



<b>SESSION 2 A - Internal Medicine, Infectious Diseases</b>	<b>Putney Lecture Hall</b>
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**Moderator: Larry Lutwick, MD – Infectious Diseases Clinic**

- 11:00 – 11:15 **Compounding to the Rescue: Treatment of Thymidine Kinase Negative Mutants of Herpes Simplex 2 in HIV-Infected Patient.** Larry Lutwick, Hector Ojeda, Jana Preiss
- 11:20 – 11:35 **Adrenal Insufficiency as Initial Presentation of Widely Metastatic Stage 4 Cancer.** Amy Attaway, Sakshi Vaishnav, Rasha Abdulmassih, Gagan Preet, Ronald Snyder, Lee Bricker
- 11:40 – 11:55 **Rapidly Progressive Intracranial Giant Cell Arteritis: A Rare and Catastrophic Phenomenon.** Devin Malik, Sourabh Aggarwal, David Homa, Philip Veldernman

<b>SESSION 2 B - Medical Humanities</b>	<b>Room 1040/1050</b>
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**Moderator: Donald Greydanus, MD – Pediatric and Adolescent Medicine**

- 11:00 – 11:15 **From the Aztecs Towards Modernity: An Early History of Mexican Medicine.** Julia R. Hamilton, Luis H. Toledo-Pereyra
- 11:20 – 11:35 **Challenging Issues in Genomic Ethics.** Shirley Bach, Elaine Englehardt, Michael Pritchard
- 11:40 – 11:55 **Physician Complicity in Aktion T4; Nazi Germany's Secret Program to Murder Persons Afflicted with Mental Illness, Serious Chronic Disease and Other 'Incurable Illnesses'.** Robert Brown

<b>SESSION 2 C - Internal Medicine</b>	<b>Room 2016/2018</b>
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**Moderator: Mark Schauer, MD – Internal Medicine**

- 11:00 – 11:15 **Pott's Puffy Tumor: A Rare Complication of Frontal Sinusitis.** Karthik Kannegolla, Rakshita Chandrashekar, Mark Schauer
- 11:20 – 11:35 **Chronic Proton Pump Inhibitor use in a Resident Out-Patient Clinic.** Matthew T. Siuba, Christine Dugan, Gagan Preet, Nickolas Demark, Richard Semones, Sarah Polcher, Anand Navarasala, Lizbeth Giles, Brian Hays, Mark Schauer
- 11:40 – 11:55 **Impact of Smoking Ban on Cardio-Pulmonary Morbidity and Mortality: Lessons to Learn from Michigan.** Amy Attaway, Sourabh Aggarwal, Ravikanth Papani, Shrey Velani, Susan Bannon, Thomas Melgar

<b>SESSION 2 D - Sports Med/Orthopaedics, Ortho, Basic Sciences, Trauma</b>	<b>Room 2020</b>
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**Moderator: Robert Baker, MD – Family and Community Medicine**

- 11:00 – 11:15 **Inpatient Hospitalization and Intimate Partner Violence: Who Are We Treating?** Mican I. DeBoer, Rashmikant U. Kothari, Catherine L. Kothari, Amy J. Koestner, Thomas J. Rohs
- 11:20 – 11:35 **The Role of NF- $\kappa$ B in Liver Ischemia and Reperfusion.** Nathan C. Kolderman, Luis H. Toledo-Pereyra
- 11:40 – 11:55 **Incidence of Hip and Knee Dislocations in Extreme Sports.** Vinay Sharma, Tom Valikodath, Jeffrey Freyder, Vani J. Sabesan

**SESSION 3 A - Internal Medicine****Putney Lecture Hall****Moderator: Joanne Baker, DO – Osteopathic Medical Education**

- 1:20 – 1:35 **There is More to that Xanthoma than You Think: An Interesting Presentation of Myeloma.** Devin Malik, Sukhpreet Singh
- 1:40 – 1:55 **Splenic Rupture as a Complication of Diagnostic Colonoscopy.** Arani D. Nanavati, Mark Loehrke
- 2:00 – 2:15 **Lymphoma Trapped in Blood Vessels.** Gagan P. Garcha , Christine Dugan, Sreenivasa Chandana, Eric Feucht
- 2:20 – 2:35 **Proton Pump Inhibitor Induced Hyperchromograninemia: Is this Carcinoid?** Kwabena O. Adu-Gyamfi, Marcia K. Liepman
- 2:40 – 2:55 **Lupus Myocarditis Presenting as ST Elevation Myocardial Infarction.** Devin Malik, Sourabh Aggarwal, Sukhpreet Singh

**SESSION 3 B - Internal Medicine****Room 1040/1050****Moderator: Susan Bannon, MD – Internal Medicine**

- 1:20 – 1:35 **PICC Your Poison: Eustachian Valve Endocarditis in a Patient with SLE.** Anne-Marie Edwards, Abishek Seth, Ifeoluwapo Eleyinafe, Thomas Flynn
- 1:40 – 1:55 **In-Hospital Mortality and Disposition after Endotracheal Intubation Correlate Strongly with Age and Underlying Cause for Critical Illness: Analysis of 128,224 Intubation Procedures.** Amy Attaway, Sourabh Aggarwal, Shrey Velani, Chintan Shah, Jeffrey Wilt
- 2:00 – 2:15 **Show Me the Money: Can an Interactive Team-Based Conference be an Effective Tool to Promote Cost Conscious Care.** Ross Driscoll, Amy Attaway, Stephen McGinnis, Shrey Velani, Kristin Harjer, Andrew Whipple, Theotonius Gomes, Christine Honor
- 2:20 – 2:35 **Procalcitonin as a Valuable Marker to Detect Bacterial Infection in ESRD Patients.** Amy Attaway, Rasha Abdulmassih, Thomas Flynn, Anita Charochak, Matthew Zaccheo
- 2:40 – 2:55 **Drugs Are Bad: Severe Sprue-like Enteropathy Secondary to Olmesartan.** Amy Attaway, Mirjana Stancic, Richard Roach

**SESSION 3 C - General Surgery, Trauma, Basic Sciences****Room 2016/2018****Moderator: Saad Shebrain, MD – General Surgery**

- 1:20 – 1:35 **High Trauma Service Utilization by Victims and Perpetrators of Partner Violence.** Catherine L. Kothari, Rashmi U. Kothari, Thomas Rohs, Scott Davidson, Carrie Klein, Amy Koestner, Mican DeBoer, Rita Cox
- 1:40 – 1:55 **Cutaneous Metastases as Initial Manifestation of Lung Cancer.** Shaina L Riggs, Dwight J. Slater, Leandra H. Burke, Lisa A. Miller
- 2:00 – 2:15 **Equine Related Injuries in Southwestern Michigan.** Scott B. Davidson, Paul A. Blostein, Sheri L. VandenBerg, Andrew J. Schrottenboer
- 2:20 – 2:35 **Unusual Cause of Recurrent Right Upper Quadrant Pain.** M.R. Pryor, S. A. Shebrain
- 2:40 – 2:55 **Selectins in Liver Ischemia and Reperfusion Injury.** Ryan T. Jones, Luis H. Toledo-Pereyra

**SESSION 3 D - Family Medicine, Pediatrics, Internal Medicine****Room 2020****Moderator: Allan Wilke, MD – Family and Community Medicine**

- 1:20 – 1:35 **How Did the 2005 USPSTF Recommendations for Abdominal Aortic Aneurysm Screening Affect Mortality?** Sukhpreet Singh, Devin Malik, Sourabh Aggarwal
- 1:40 – 1:55 **Diabetes Self-Management Education (DSME) Access.** Jane Hanneken, Amy B. Curtis, Catherine L. Kothari, Diana Hassan, Cheryl Tenenbaum, Becky Emerson
- 2:00 – 2:15 **Case Report: Critical Hypercalcemia in a Term Newborn with Subcutaneous Fat Necrosis.** Ifeoluwapo Eleyinafe, E. Ethan Ebner
- 2:20 – 2:35 **Massive Thymolipoma Presenting as Abdominal Pain.** Elbert E. Williams, Sreenivasa R. Chandana, Jerry W. Pratt
- 2:40 – 2:55 **The Relationship of Socioeconomic and Racial Factors, both Individual and Community-level, to Infant Birthweight.** Catherine L. Kothari, Rajib Paul, James Wiley, Jane Hanneken, Kathleen Baker, Deb Lenz, Ben Dormitorio, Arthur James, Amy Curtis

**COMPARISON OF STANDARD CPR VERSUS CPR WITH AN INTRATHORACIC PRESSURE  
REGULATOR VERSUS ACTIVE COMPRESSION DECOMPRESSION CPR PLUS AN IMPEDANCE  
THRESHOLD DEVICE DURING OUT-OF-HOSPITAL CARDIAC ARREST**

Amy B. Raubenolt, Kevin M. Franklin, William D. Fales

Western Michigan University School of Medicine, Department of Emergency Medicine, Kalamazoo, MI

**INTRODUCTION:** This feasibility study, performed under FDA Investigation Device Exemption (21CFR812), focused on two new CPR methods to lower intrathoracic pressure in patients with out-of-hospital cardiac arrest compared to standard CPR. During cardiopulmonary resuscitation (CPR), augmentation of negative intrathoracic pressure following compressions lowers intracranial pressure, enhances cardiac preload, and increases cardiac and cerebral perfusion.

**MATERIAL & METHODS:** Standard (S)-CPR was compared with (1) S-CPR with an intrathoracic pressure regulator designed to lower airway pressures to -12cmH<sub>2</sub>O after positive pressure ventilation (S-CPR+IPR) and (2) active compression/decompression (ACD) CPR with a new adhesive-based device + impedance threshold device (ACD+ITD). Subjects were prospectively randomized and met final inclusion criteria if femoral arterial access was established in the field and 5 or more minutes of hemodynamic data were recorded. Subjects who presented in unwitnessed asystolic arrest were excluded. Systolic blood pressure (SBP) was the primary endpoint. Diastolic blood pressure (DBP) and end tidal carbon dioxide (ETCO<sub>2</sub>) were also analyzed. A one-way ANOVA was used for statistical comparison with p<0.05.

**RESULTS:** Of 48 initially enrolled patients, 15 met final inclusion criteria (3 S-CPR+IPR, 6 ACD+ITD, and 6 S-CPR). The time from 911-call to first measured pressures averaged 41 ± 13 minutes (range was 24-73 min), in part due to design of the study. SBP increased with S-CPR+IPR to 141 ± 11mmHg compared to 63 ± 8mmHg with ACD+ITD (p<0.01) and 59 ± 12mmHg with S-CPR (p<0.01). DBP was 52 ± 28 with S-CPR+IPR, 16 ± 5 with ACD+ITD, and 21 ± 7 with S-CPR (NS between groups). Peak EtCO<sub>2</sub>, a measure of circulation and perfusion during CPR, trended higher with S-CPR+IPR (48 ± 24mmHg) and ACD+ITD (42 ± 7mmHg) compared with S-CPR (38 ± 28 mmHg), but the differences were not significant. Interpretation is limited due to the low number of patients meeting final enrollment criteria.

**CONCLUSION:** In this feasibility study, use of S-CPR+IPR provided the highest SBP observed. Augmentation of negative intrathoracic pressure with both S-CPR+IPR and ACD+ITD provided higher blood pressure and ETCO<sub>2</sub> values than S-CPR alone. Further studies are needed to correlate improved BP and perfusion associated with these new devices with long-term clinical outcomes.

## **DOES GENDER MATTER? EXPLORING MENTAL HEALTH RECOVERY COURT HEALTH & LEGAL OUTCOMES**

Catherine L. Kothari, Robert Butkiewicz, Emily Williams, Caron Jacobson, Diane Morse, Catherine Cerulli

Western Michigan University School of Medicine, Emergency Department, Kalamazoo, Michigan

**INTRODUCTION:** Despite the well-established link between criminal justice involvement and poor health, particularly among women, few studies have considered the potential health benefits that problem solving courts may offer; by keeping participants away from the adverse health conditions associated with jail and prison, but also by addressing the conditions that so often mediate health (i.e., substance abuse, mental distress and violence) and by linking individuals to community resources that may provide current as well as future health support.

**RATIONALE:** The goal of this study was to examine the role of gender on health-related and criminal justice outcomes associated with participation in Kalamazoo Mental Health Recovery Court (MHRC).

**MATERIAL & METHODS:** This study utilized a quasi-experimental pre-posttest design without a control group. Data were extracted from the archived records of Kalamazoo Community Mental Health and Substance Abuse agency, the county jail and both county hospitals, 2008 through 2011. One hundred and thirty three female and male Mental Health Recovery Court participants were compared on pre-enrollment and program participation. The 30 female and 63 male participants who had completed MHRC were followed for a period spanning one year pre-enrollment through their entire post-program period. Generalized estimating equation regression was used to estimate the association of gender with each outcome (jail day rate, psychiatric day rate, emergency department visit, medical hospitalization day rate). Main and interaction effects were calculated for gender, pre-post MHRC period, and program completion. Data was analyzed using SPSS v.21.0, with two-tailed significance levels set at  $p < .05$ .

**RESULTS:** While just as high as men's before MHRC enrollment, women had steeper drops than males in emergency department utilization and inpatient medical-hospitalization-days after program participation compared to before: From an average of 5.5 emergency department visits to 2.0 visits (a 3.5 visit decrease) among women compared to an average of 6.4 visits to 4.3 visits (a 2.1 decrease) for men, and from an average of 2.2 medical hospital days to 0.1 days (a 2.1 day decrease) for women compared to an average of 0.9 medical hospital days to 1.8 days (a 0.9 day increase) for men. While women had fewer psychiatric hospitalization days regardless of program involvement (close to half as many as men), both genders experienced fewer days after MHRC compared to before (decreasing from an average of 6.0 days to 1.8 days). Gender had no measurable impact on jail days; only MHRC program completion status was related. Women were most likely to have a bipolar diagnosis, while men were most likely to have schizophrenia. Otherwise, women and men were similar on the pre-enrollment demographics (age, race, employment, marital status) and criminal charge leading to program enrollment. They were also similar on all measured MHRC-participation characteristics: treatment compliance, program participation length and graduation rate.

**DISCUSSION:** The unique opportunity provided by this MHRC study to examine the intersection of therapeutic justice, gender, and health among 30 women and 63 men revealed important gender-related differences. Study findings suggest that female participants may have differential health-related responses to MHRC than males, as indicated by the interaction of gender and MHRC participation. While just as high as men's before MHRC enrollment, women had steeper drops than males in emergency department utilization and inpatient medical-hospitalization-days after program participation compared to before. Considering that psychiatric diagnosis was one of the few characteristics that women and men varied on, it may be that the nature of women's psychiatric illness is a factor in a heightened health-related response to MHRC. Bipolar diagnoses have been associated with somatoform disorders and can be associated with iatrogenic harm. Somatization tends to be more common among women compared to men in general, especially women with drug and trauma histories. Reducing this distress, through mental health treatment, then, may have greater health benefit for women. The greater psychiatric hospitalizations by men overall, before and after MHRC may be linked to the higher rates of schizophrenia among male MHRC participants, a condition that is generally associated with greater psychiatric hospitalizations.

**CONCLUSION:** Findings suggest that women participants in MHRC experience greater reductions than men regarding health care utilization. Men had consistently greater program-associated gains regarding psychiatric hospitalization. However, program completion results in significantly reduced days incarcerated for both men and women.

## BENZODIAZEPINES FOR PREHOSPITAL SEIZURE MANAGEMENT IN MICHIGAN

Emily Cordes, Chris Jacob, Lucan Chatterley, Kevin Putman, Benedict Dormitorio, William Fales

Western Michigan University School of Medicine, Emergency Medicine, Kalamazoo, MI

**INTRODUCTION:** Benzodiazepines are known to terminate seizures and have been used in the prehospital setting effectively for seizure control. Benzodiazepine-associated respiratory depression (BARD) is a potentially life-threatening complication of these medications.

**RATIONALE:** The purpose of this study is to describe the incidence of BARD and the anti-convulsant efficacy of benzodiazepines in the prehospital setting. Additionally, the study is intended to identify factors contributing to BARD and medication effectiveness. No published study has reported the effectiveness and incidence of BARD in a statewide EMS system.

**MATERIAL & METHODS:** This is a retrospective study for the period 7/1/11 to 6/30/13. A statewide EMS information system was used for case identification under the approval of the state health department IRB. Cases were identified using a filter for clinical impression of seizure and the administration of diazepam or midazolam. Cases were excluded if the patient received both medications, if the patient received another benzodiazepine, or if the encounter was part of an interfacility transport. To identify potential BARD, this primary dataset was further filtered based on any respiratory rate <8 or procedures associated with respiratory depression (e.g., bag-valve mask use). These cases were then independently manually reviewed by 3 investigators to determine if BARD actually occurred. Cases were excluded from BARD when the low respiratory rate or ventilatory procedure occurred prior to the medication being administered. If the record could not clearly exclude BARD, the case was considered as BARD. To determine anticonvulsant efficacy and to identify any additional cases of BARD missed by the initial filter, 10% of the unfiltered records were randomly sampled and reviewed by single investigators. Based on the narrative report, the medication was classified as effective if the seizure stopped or was reduced, ineffective if the seizure continued, or indeterminate when the record was unclear as to the effect. Overall incidence of BARD was the combination of the incidence from the filtered plus the incidence from the random sample. Logistic regression was used to evaluate the effect of independent variables to the odds of respiratory depression at 0.05 level of significance. Simple descriptive and comparative statistics were also used for further analysis. Inter-rater reliability (IRR) was calculated. All analysis was performed using SAS 9.3.

**RESULTS:** During the study period, there were 1.8 million EMS records in the database of which 3,598 (0.2%) were included in the primary dataset as prehospital seizure cases receiving a study medication. The mean age was 38.8 years, 49.6% were male, and 1.2% were trauma related. There were 1,961 (54.5%) and 1,637 (45.5%) patients who received diazepam and midazolam, respectively. There were 1,011 (28.1%) patients who received more than one dose of medication. There were 94 cases identified as potential BARD that underwent manual review of which 31 were found to not have BARD and 59 were either confirmed as BARD or found to be indeterminate yielding a potential BARD incidence from the filter method of 1.6%. Of the 357 randomly selected cases that were manually reviewed, only 4 (1.1%) were found to have BARD, resulting in a total BARD incidence of 2.7%. The medications were effective in 82.2% of the randomly selected cases, ineffective in 11.2% and indeterminate in 6.6%. There was no statistically significant variable found to be associated with an increased risk of BARD. However, the incidence of BARD between diazepam and midazolam was 2.0% vs. 1.2%, respectively; odds ratio (95% confidence intervals) of 3.3 (0.7-16.0). There was substantial agreement between the 3 investigators performing the initial review (Kappa=0.737).

**DISCUSSION:** This study used a novel approach in analyzing data from a large multi-agency statewide database in which an automated data filter was complimented by manual review of a sample. No published studies have yet to report on the statewide safety and efficacy of benzodiazepines in the prehospital management of seizures.

**CONCLUSION:** Benzodiazepine use for seizures is infrequently used by EMS. Incidence of BARD was low and the medications were generally effective in controlling seizures. There was no significant difference between midazolam and diazepam in terms of BARD or effectiveness. Midazolam and diazepam appear to be safe and effective in prehospital care.

## THE EFFECT OF EXTERNAL BEAM RADIATION UPON CD4 CELL LEVELS IN HIV-INFECTED MALES WITH PROSTATE CANCER

Larry Lutwick, Jana Preis

Western Michigan University School of Medicine, Kalamazoo, Michigan  
SUNY-Downstate, Brooklyn, NY

**INTRODUCTION:** CD4 cell levels have been used in the management of HIV disease in decisions whether prophylaxis is required to prevent certain opportunistic infections and even if antiretroviral therapy should be instituted. It is known, however, that other issues other than HIV infection can affect this, ie, splenectomy (which can cause of CD4 cell level to rise) and certain infections and radiation (which can cause the CD4 cell level to fall).

**RATIONALE:** To retrospectively evaluate pattern of CD4 responses in male HIV infected veterans receiving external beam irradiation for prostate cancer.

**MATERIAL & METHODS:** The charts of three HIV infected patients with prostate cancer who received external beam radiation were retrospectively examined. All three had maximal viral suppression and had stable CD4 cell levels for 6 months prior to the onset of radiation. The treatment of the histologically proven prostate cancer had been chosen by the individual patient with guidance of his urologist. Routine clinic visit notes of ID clinic were examined for 6 months before the beginning of and 12 months after the end of radiation therapy.

**RESULTS:** All three individuals had a drop in CD4 cell levels measurable from the first ID visit after radiation was begun and continuing until the radiation ended. The percentage drop in CD4 cell levels was 68% (range 60%-72%) with parallel drops in CD8 cells. The CD4/CD8 ratio did not change. Two of the three veterans had CD4 levels had the CD4 level drop to <200 but PJP prophylaxis had not been reinstated. No change in HIV viral load was found. Over the post-radiation phase of followup, each patient's CD4 cell levels rose to pre-radiation levels in two and 85% of pre-radiation levels in the other. No opportunistic infections occurred during this period.

**DISCUSSION:** In this small observational study, reproducible decreases in CD4 (and CD8) cell levels occurred during the radiation period with slow resolution to pre-radiation levels over 12 months. Previous experience of one author (LL) suggested that a similar effect occurred in non-HIV individuals with radiation therapy and the effect was not seen in a previous patient who received locally implanted radiation beads.

**CONCLUSION:** Drops in CD4 cell levels occurred in HIV infected males with external beam radiation therapy for prostate cancer without any measurable change in viral load. No opportunistic infections occurred in this small cohort.

## **COMPLIANCE OF INTERNAL MEDICINE CLINIC WITH SCREENING RECOMMENDATIONS FOR ABDOMINAL AORTIC ANEURYSM - A QUALITY IMPROVEMENT STUDY**

Devin Malik, Sourabh Aggarwal, Yashwant Agrawal, Richard Card, Mark Schauer

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** An abdominal aortic aneurysm (AAA) is defined when aortic diameter at or below infra-renal artery is greater than 3.0 cm. Aortic aneurysms constitute the 14th leading cause of death in the United States; each year AAA rupture causing up to 9000 deaths. Abdominal ultrasonography (USG) is considered the screening modality of choice for AAAs because of its high sensitivity and a specificity of nearly 100 percent, as well as its safety and relatively low cost. The United States Preventive Services Task Force (USPSTF) makes the recommendation that men between the age of 65 to 75 years and who have ever smoked should be screened one time for AAA by abdominal ultrasonography. Despite the clear recommendations, many eligible people don't get a screening test for AAA. This study was designed to find the compliance of the Internal Medicine clinic at Western Michigan University School of Medicine with the screening recommendations for abdominal aortic aneurysm.

**MATERIAL & METHODS:** All the patients who meet screening criteria, i.e. males, with age ranging from 65 years to 75 years as of October 1, 2013 (date of protocol submission) who have ever smoked were identified through clinic records at WMed outpatient Internal medicine and Medicine/Pediatrics clinic. Chart reviews were done and information extracted for eligible patients who had any screening abdominal USG for AAA done and compliance percentage calculated.

**RESULTS:** A total of 121 male patients were identified between age group of 65 to 75 years of age and prior/current history of smoking. Eight patients had imaging studies of their abdominal aorta for non-screening purposes, including CT imaging of aorta. Out of remaining 113 eligible patients, 21 patients had screening ultrasonography ordered with compliance rate of 17.36%. Out of 21 patients, 5 patients did not get ultrasonography done with patient non-compliance rate of 23.81%. None of the patient with screening USG were found to have AAA and did not need any follow up imaging.

**DISCUSSION:** Our study showed the compliance rate of physician ordering abdominal USG to be 17.36%. Previous studies have shown compliance rate of up to 36% at an Academic Center in New York and up to 80.2% in a large epidemiological study in Europe. The study reveals that we have low compliance rate for USG screening for eligible patients in our clinic and there is large unmet need for educational intervention to promote awareness among physicians to improve compliance rate.



## **A COMPUTER APPLICATION FOR DOCUMENTING FAMILY INTERACTION MAPPING INTERVIEWS**

Michael R. Liepman, William G. Naylor, Douglas J. Losey, John A. Kapenga

WMed Psychiatry & WMU College of Engineering Computer Science Department, Kalamazoo, MI

**INTRODUCTION:** Addicted families experience recurrent relapses after the addicted member attends treatment or makes attempts to quit. Family Interaction Mapping has helped family therapists to understand the reasons for chronicity and to effectively intervene with these families. The purpose of this project was to develop a user-friendly computer application (App) to be used to assist family therapists in documenting family interactive sequences of recurring dysfunctional behaviors.

**METHODS:** A team of two computer science students, their instructor, and a family therapy trained psychiatrist met repeatedly to discuss the specifications and see the progress being made in developing the computer App. Successive meetings to tweak the App helped evolve it into its present form. On the screen one can create three enclosed shapes representing thoughts (rectangle), feelings (diamond) and actions/behaviors (ovals). Text can be entered with the shapes indicating the details. Each person in the family is assigned a different color of shapes. Arrows connect the shapes to indicate temporal sequences. The interaction between family members is incorporated into the sequences creating a Family Interaction Map. The application is flexible in permitting rearranging the sequence or adding intermediary steps. The App will be Web based so it is accessible most anywhere and can run on many platforms.

**RESULTS:** The App in its first draft has been completed and works as designed. It will be demonstrated using information made up for a pretend family fabricated based on the creator's clinical experiences with addicted families over his career.

**DISCUSSION:** Previous attempts to document this family assessment technique have been more cumbersome using chalk on blackboards, dry erase markers on white boards, markers on paper flip charts and sticky notes. This can be challenging, as the information typically does not emerge in an organized sequential manner. This App facilitates a Family Interaction Mapping interview by providing a much more user-friendly means for documenting the clues as they emerge in the interview, and editing is easy. Both the therapist and the family can observe the sequence as it develops on the computer screen, and the final map can be printed for the family to take home. The therapist can modify a copy of the map to guide homework assignments of behavioral changes for each family member, and this too can be printed for the family to take home. Changes in behavior at subsequent visits can also be edited into the map. This App has been developed to use with families suffering from addictive disorders, but it also may have utility if tried with families suffering from other episodic, relapsing conditions such as domestic violence, childhood temper tantrums, mood and psychotic mental disorders, anorexia and bulimia, self injurious behavior, and psychosomatic disorders such as migraine, irritable bowel syndrome, or behaviorally complicated non-adherence to medical regimens.

**CONCLUSION:** This App should make Family Interaction Mapping technique easier to use and widely available to other clinicians.

## DEVELOPING CURRICULA TO ADDRESS RESIDENT CHALLENGES WITH DIFFICULT PATIENTS IN THE PSYCHIATRY OUTPATIENT CLINIC

David C. Dunstone, Chris A. Karampahtsis, John D. Lindo, Brandon G. Moore, Kathleen A. Gross, Sonia Motin, Maritza E. Lagos, Belal M. Hegazy, Michael R. Liepman, Suzie Suchyta-Haas, Robert D. Strung

Western Michigan University School of Medicine, Psychiatry, Kalamazoo, MI

**INTRODUCTION:** Over the past three years, our residents and faculty have worked on developing a protocol for managing difficult patients. One example is the patient who presents with a psychiatric disorder complicated by a co-occurring substance use disorder. In this instance, challenges exist in: a) consistent identification and proper diagnosis, b) maintenance of empathy towards the demanding and non-adherent patient, c) lack of an adequate conceptual framework for understanding these patients' behavior, and d) inadequate crafting of comprehensive and effective treatment approaches. Patients with substance use disorders present challenges in medical settings across the spectrum of healthcare; however, emerging clinically relevant findings in neurobiology offer new perspectives and opportunities. What began as an exercise in the development of a diagnostic and treatment protocol became a larger project - the development of a clinical curriculum that incorporates relevant new neuroscience findings to reframe strategies for managing these patients.

**RATIONALE:** The purpose of this study is to explore the educational outcomes of this management protocol and related curriculum for our residents and their supervisors and to examine their patients' clinical outcomes.

**MATERIAL & METHODS:** For this study, participants included 4 PGY-3 psychiatry residents and their 8 faculty supervisors over the course of nine months. A simplified model describing the reward circuit was introduced to demonstrate the importance of integrating treatment modalities that target specific functional areas of the brain. Video-recorded sessions of residents with patients and residents with their supervisors were selected for case-based study in both faculty development and resident didactic sessions. Residents and faculty members completed, at one-month intervals over the course of the training year, a 25-question survey of their confidence in treating various types of patients. At the beginning of the study, they also completed one 30-question multiple-choice survey of general neuroscience knowledge and one 10-question multiple-choice/short answer survey of clinical knowledge related to substance use disordered patients. The residents' patient population also was studied for its clinical characteristics at the beginning of the year and after 8 months. Selected electronic health records and digital video recordings served as source documents for the project.

**RESULTS:** Preliminary data on measured changes in resident and faculty confidence in managing psychiatric outpatients with co-occurring substance use disorders shows much variability. Changes both in measured general neuroscience and substance use disorder specific knowledge are currently being evaluated. Clinical supervision in the psychiatric outpatient clinic increasingly utilizes a basic functional understanding of the reward circuit and of the neurobiology of addiction to explain treatment decisions: medications that reduce craving and block reward work in the midbrain; Motivational Interviewing that enhances and supports motivation for change works in the orbitofrontal cortex; psychotherapies and 12-step groups that support executive function (decision making) work in the prefrontal cortex; medications and psychotherapy that reduce anxiety, shame, depression and anger address the amygdala; and other approaches are used to modulate specific brain functions for both substance use and psychiatric disorders.

**DISCUSSION:** This is a project in evolution and still in its early phases. The number of residents followed is just four, so the number of participants is too small for statistical analysis. Our survey instruments are novel, relatively crude, and not validated, but they provide a qualitative perspective that is supported by positive anecdotal reports from faculty, residents, and patients and demonstrated improvement in clinical understanding.

**CONCLUSION:** This project has evolved from an attempt to create a simple clinical management protocol to a broader clinically-oriented curriculum development project. This has led to a paradigm shift in how faculty, residents, and patients conceptualize the pathology and management of these patients. Beginning from a somewhat negatively slanted clinical perspective on the treatment of challenging patients with co-occurring substance use disorders (in this example), our faculty and residents have been able to alter their collective conceptual framework, partly as a result of educating themselves in the relevant neuroscience and partly through a case-based group discussion process. As a result, more appropriate and effective treatment strategies are being prescribed, informed by emerging neuroscience. This model is one that may be adapted and applied to other psychiatric conditions and transferred to other specialties, particularly those within the realm of primary care.

## A MENTAL HEALTH PROFESSIONAL MOTIVATIONAL INTERVIEWING TRAINING STUDY

Justin A. Moore, Scott T. Gaynor

Western Michigan University Department of Psychology, Kalamazoo, Michigan

**INTRODUCTION:** Motivational Interviewing (MI) is a client-centered, yet directive approach that has been shown to be useful in promoting treatment retention and behavior change across a wide assortment of behavior problems in a variety of settings. As the evidence base for MI has grown, efforts have been made to disseminate MI, turning attention to the best ways to supervise and teach MI effectively.

**RATIONALE:** The purpose of this study was to examine the efficacy of a one day, 8-hour MI workshop training. Of particular interest were measures of MI knowledge acquisition, MI consistent responding to clinical vignettes, and participant rated workshop quality.

**MATERIAL & METHODS:** A pre-test post-test design was used in which all participants received the training. The training emphasized four foundational principles of MI (Express Empathy, Develop Discrepancy, Roll with Resistance, Support Self-Efficacy) and corresponding techniques designed to promote their application. The approach to training followed the Behavioral Skills Training model and involved: instruction, modeling, rehearsal/role play, and feedback. Knowledge acquired was measured with an MI questionnaire, MI consistent responding to vignettes was based on a motivational interviewing network trainers ratings, and workshop quality was rated on a survey. Follow-up data was collected 30 days post workshop.

**ANALYSIS OF RESULTS:** Across two trainings participants were 36 allied health professionals or professionals in training, 75% of whom were female and 22% male, with 3% not specifying their sex. Participants had a mean age of 35.56 (SD=11.20). Results suggested (1) high ratings of workshop quality ( $M = 4.11$  [.63] on 1-5 Likert scale), compared to a neutral score of 3,  $t(34) = 10.45$ ,  $p = .000$ , (2) Participants knowledge from pre-workshop scores ( $M = 9.14$ ,  $SD = 6.55$ ) was significantly different from post-workshop ( $M = 23.28$ ,  $SD = 5.114$ ),  $t(35) = 17.42$ ,  $p < .001$ , and 1-month follow-up,  $t(14) = 5.57$ ,  $p < .001$ , and (3) MI consistent responding to clinical vignettes increased significantly from pre-workshop ( $M = 8.69$ ,  $SD = 4.43$ ) to post-workshop ( $M = 15.28$ ,  $SD = 2.69$ ,  $t[28] = 8.82$ ,  $p < .001$ ). An additional training was conducted with 6 allied health professionals in training, in which 83% were female and 17% were male participants. These 6 participants were enrolled in a course which post workshop maintained exposure to MI content over the 1-month follow-up interval. Participants knowledge from pre-workshop scores ( $M = 14.17$ ,  $SD = 9.54$ ) was significantly different from post-workshop ( $M = 23.83$ ,  $SD = 5.64$ ,  $t[5] = -2.85$ ,  $p < .036$ ), and 1-month follow-up, ( $M = 24.17$ ,  $SD = 5.27$ ,  $t(5) = -2.95$ ,  $p = .03$ ).

**CONCLUSION:** The workshop was rated as being high quality and participants acquired some new knowledge and preliminary skills in MI consistent responding. The maintenance of these gains and the ability to implement MI consistent responding clinically constitute important directions for future research.

## TEACHING QUALITY IMPROVEMENT: LEARN BY DOING

Mark Schauer, Aaron Roberts, Shannon McCormack, Christina Lang, Eric Yoder

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** In 1999, the landmark publication *To Err Is Human* exposed the effect of medical error on healthcare costs and patient fatalities. The medical community responded by developing and implementing quality improvement (QI) and patient safety (PS) measures. The ACGME now requires residents to take part in QI learning as part of their education. There is currently no standardized method of incorporating this into the graduate medical education curriculum. It is up to the individual institutions to ensure that this is accomplished. The goal of our project is to propose a systematic and practical approach to QI training through active learning. We anticipate that through an active learning process, that not only residents, but faculty as well, will significantly enhance their knowledge of QI and be able to incorporate this knowledge into their daily clinical practice.

**RATIONALE:** It has been demonstrated that resident physicians benefit from active learning. Our project is unique in that we propose to simultaneously instruct the resident physicians and faculty of our Internal Medicine and combined Medicine-Pediatrics programs in a systematic and practical approach to QI. The goal of our "Learn by Doing" model is to enhance individual knowledge regarding QI concepts and to reinforce this via small group QI projects designed to improve clinical outcomes, efficiency, patient safety and patient satisfaction. We expect a statistically significant enhancement in QI knowledge as measured by pre- and post-intervention surveys. We also anticipate that participants will state their involvement in the small group QI projects possessed more educational value than the didactic lectures.

**MATERIAL & METHODS:** An initial survey regarding knowledge about QI was completed by participants pre-intervention and a similar survey was completed post-intervention. The pre-intervention survey was followed by didactic lectures and then assignment into six small groups (7-9 residents and 1-2 faculty per group). These groups were used for the entire eight month "Learn by Doing" process. Each group was responsible for selecting a QI project and following through to completion for presentation at WMed Research Day including obtaining IRB approval if applicable. The results of the surveys were compared with each other.

**RESULTS:** A comparison of the pre-intervention surveys (n=26) and post-intervention surveys (n=31) reveal a significant increase in resident and faculty understanding about QI concepts, increased involvement and comfort performing QI projects. It also revealed the largest barrier to involvement in QI projects was time limitations. The study is currently progressing and will reassess QI knowledge comfort and reevaluate barriers to QI involvement in an additional survey after the groups have completed their own QI projects.

**DISCUSSION:** Through a "Learn by Doing" model, residents and faculty can significantly enhance their knowledge of QI and patient safety principles. Our hope is that we may be able to implement this model in other residency programs at our institution and serve as a model for other institutions on how to implement QI into their graduate medical education. Limitations to our study include small sample size. More research needs to be done to evaluate the effectiveness of other QI teaching methods.

**CONCLUSION:** We conclude that implementing an active learning process via small group QI projects is an effective strategy to increase resident and faculty knowledge of quality improvement and patient safety principles.

## POSTPARTUM DEPRESSION IS NOT JUST A PROBLEM EARLY ON

Catherine L. Kothari, James Wiley, Angie Moe, Michael R. Liepman, R. Shama Tareen, Amy Curtis

Western Michigan University School of Medicine, Emergency Department, Kalamazoo, Michigan

**INTRODUCTION:** A strong body of evidence has documented increased incidence of depression during the early postpartum period (the first couple of months after delivery); an incidence that stems from first-time episodes as well as ongoing depression and recurrence among women with prior histories of depression. However, less is known about the onset of depression throughout the extended postpartum period and into early childhood.

**RATIONALE:** Given the potentially far-reaching consequences of depression and the availability of effective treatments, this is an important gap to address. This study examines the onset and course of depression over an extended postpartum period (up through eighteen months) among a community representative sample of women.

**MATERIAL & METHODS:** This was a prospective longitudinal telephone survey of 249 postpartum women, conducted at two weeks, two months, six months and eighteen months after delivery. Study subjects who met eligibility criteria (Kalamazoo County resident, medical clearance by nursing staff, maternal fluency in English or Spanish) were recruited from Borgess and Bronson hospital postpartum floors. Depression was measured using the Edinburgh Postnatal Depression Scale (EPDS), and onset was defined by the first survey screening depressed (EPDS score of 12+ on the 30-point scale); the early-onset group first screened depressed at the two week or two month survey, while the late-onset first screened depressed at the six month or eighteen month survey. Temporal trends were assessed using generalized estimating equation (GEE) regression, a linear model for the raw depression scores, a logistic model dichotomizing those above and below the depression threshold, and an ordinal logistic model for item-specific responses. Data analysis was completed using SPSS v.21.0, with two-tailed significance levels set at  $p < .05$ . IRB approval was obtained from both participating hospitals as well as Western Michigan University.

**RESULTS:** There was a significant trend for EPDS scores to be high at two weeks postpartum, low at two months and six months and high again at eighteen months (mean EPDS 5.5, 4.3, 4.2, and 4.9 respectively, GEE,  $p < .001$ ). Stratification by onset group (none, early, late) revealed that this trend was present among the no-depression group as well as the full sample. Postpartum onset was found to be 6.8%, 2.6%, 2.6% and 6.0% at two weeks, two months, six months and eighteen months respectively (GEE,  $p = .068$ ). The high scores of the early-onset group (mean 14.4 EPDS at two-weeks) contributed to the early depression spike, while the high scores of the late-onset group (mean 13.9 at eighteen-months) contributed to the late spike. Movement of individual women in and out of depression was substantial: of the 37 women (14.9%) with major depression at any point in time, only a third (13 of 37, 35.1%) screened depressed during both the early and the late period, and only two (5.4% of 37) screened depressed at all four time periods. As is typical of longitudinal research, study limitations included lost-to-follow up of higher risk participants. This is somewhat mitigated by the retention of a substantial number of women with similar risk characteristics.

**DISCUSSION:** The current study's findings that the sample as a whole experienced an increase at eighteen months suggests that this may be part of the normal course of late postpartum life. While for most women, this increase was not substantial and did not cross the depression threshold, this study also documented a group of late-onset women for whom the later postpartum period marked the beginning of a significant episode of depression. Among the study's community representative sample, 6.8% screened positive for depression at two weeks postpartum, with only a few additional women screening positive until the eighteen-month survey, when nearly as many (6.0%) new women screened positive.

**CONCLUSION:** Among a community representative sample, two peaks in depression, one early and one late, were identified. They appear to be the result of two processes: (1) elevated depression symptoms among the full sample that typifies women's postpartum experience in general, and (2) onset of major depression by two sub-groups of women, one at each time period. Screening for postpartum depression should be extended at least 18 months after delivery if not longer.

## DIAGNOSTIC VALUE OF SHOULDER MAGNETIC RESONANCE ARTHROGRAPHY: PRIMARY LABRAL TEARS AND FAILED LABRAL REPAIRS COMPARED TO ARTHROSCOPY AS A GOLD STANDARD

Andrew G. Geeslin, Roman C. Bloch, Robert J. Oostveen, Mark J. Sytsma

Western Michigan University School of Medicine, Orthopaedic Surgery, Kalamazoo, MI

**INTRODUCTION:** Shoulder injuries in the athlete and laborer population can lead to significant morbidity and limitation of performance. Magnetic resonance imaging (MRI) is commonly used to augment the clinical evaluation of the painful shoulder. Shoulder magnetic resonance arthrography (MRA) has gained popularity for the evaluation of shoulder labral pathology when compared to conventional MRI due to improved sensitivity and specificity.

**RATIONALE:** Limited information is available regarding the correlation of MRA with intraoperative arthroscopic findings for isolated or combined labral tears in a young, active population. Further, the MRA diagnosis of failed labral repair has not had detailed arthroscopic correlation. The purpose of this study was to determine the diagnostic value of MRA for detection of primary tears and failed labral repairs in a young patient group.

**MATERIALS & METHODS:** An IRB approved retrospective review of 46 patients that underwent arthroscopic labral repair (anterior, superior, and/or posterior) was performed. All had an MRA no more than three months prior to surgery. Forty-one patients underwent primary labral repair; the remaining five patients underwent revision surgery for failed labral repair. The MRA interpretation was compared to the gold standard of intra-operative findings (Figure). The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of MRA were determined for each tear location (anterior, superior, and posterior labrum).

**RESULTS:** The average age was 23 years (range 16-41); there were 36 males and 10 females. The average time from MRA to arthroscopy was 36 days (range 2-88). In the primary repair subgroup, there were 25 superior, 27 anterior, and 25 posterior labral tears. The sensitivity, specificity, PPV, and NPV were calculated (in %) for anterior (94, 95, 97, 90), superior (83, 95, 96, 80), and posterior (74, 95, 96, 70) labral tears, respectively. In the failed repair subgroup, there were 3 anterior, 3 superior, and 2 posterior labral tears; there was complete agreement with the exception of one missed SLAP tear in a patient with a concomitant anterior labral tear.

**CONCLUSIONS:** The clinical significance of this study is that it identified high specificity for all regions of the labrum and relatively poor sensitivity for posterior labral tears. This study also informs clinical decision-making by reporting the utility of MRA for the detection of failed labral repairs in a limited case series. Future study will investigate improved techniques for identification of posterior labral tears on MRA.

**FIGURE:** (A) MRA of right shoulder (axial) demonstrating a posterior labral tear (white arrow) and a posterior humeral avulsion of the glenohumeral ligament (HAGL, black arrow). (B) Posterior labral tear (white arrow) and (C) posterior HAGL (black arrow) are visualized through the anterior portal in the same patient.



## LOAD TRANSFER IN CONVENTIONAL AND LOCKED SCREW-PLATE CONSTRUCTS: A FINITE ELEMENT MODEL

Bipin Patel, Peter A. Gustafson

Western Michigan University School of Medicine and WMU College of Engineering, Kalamazoo, MI

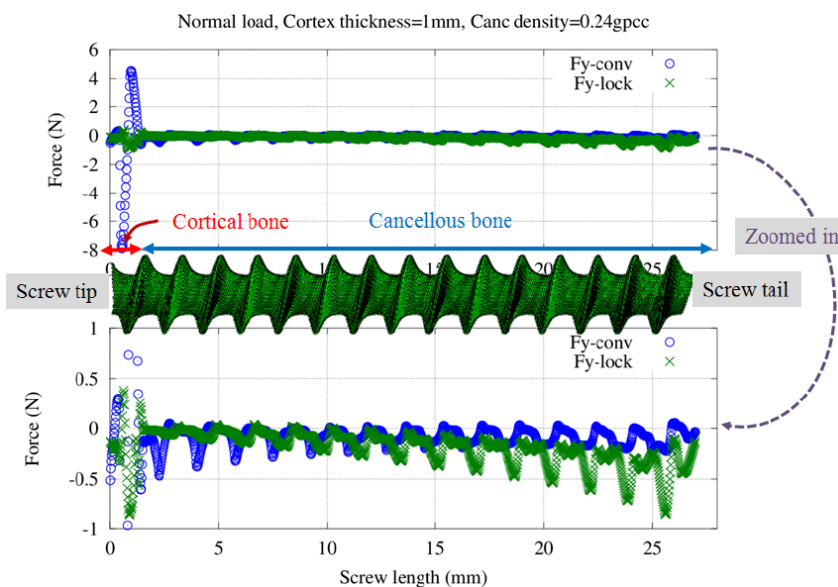
**INTRODUCTION:** Locked plate systems have been associated with improved stability in several biomechanical studies and have demonstrated advantages in several areas of fracture fixation. Several recent studies, however, have failed to consistently support the biomechanical superiority of locking plate and screw constructs compared to conventional plate and screw constructs in osteoporotic bone and bone surrogate.

**RATIONALE:** The detailed load transfer mechanisms from plate to screw to bone and from plate to bone are not widely understood, yet, these mechanisms ultimately govern the strength and stiffness of the plate construct. Finite element models offer a consistent and repeatable tool for evaluating the load transfer mechanisms. Validated models provide significant insight which can help the clinician during surgical decision making.

**MATERIAL & METHODS:** Finite element analyses were performed on locking and conventional screw constructs with a cancellous screw geometry to complement a set of experimental investigations. The objective of the finite element analysis was to isolate the influence of the screw-plate interface type on the constructs' strength with an identical screw design. Normal, oblique and shear loads were applied at the plate end. The boundary conditions of the experimental setup were incorporated to restrain the movement of the bone block against the applied load. The locking and conventional screw-plate interfaces were modeled with solid and connector elements. Analysis was performed with synthetic cancellous bone of densities 0.08 g cm<sup>-3</sup>, 0.16 g cm<sup>-3</sup>, 0.24 g cm<sup>-3</sup> and 0.32 g cm<sup>-3</sup> and 0mm (no cortex), 1mm and 2mm thick cortical bone layers. The construct's strength was evaluated based on the force distribution into the bone at screw-bone interface.

**RESULTS:** Analysis outcomes showed that the uniformity of force distribution at the bone-screw interface and the bone plastic strain distribution determined the construct strength behavior. The locking screw construct provided the greater strength under shear load and the conventional screw construct offered greater strength under the normal and oblique pullout loads for the analyzed cortex thicknesses, cancellous bone densities and screw diameter. Furthermore, the load transfer mechanism (the force distribution) at screw-bone interface was affected by the cortical bone thickness.

**CONCLUSION:** The finite element models predict the strength and stiffness of the constructs and discern the different load transfer mechanisms between locked and conventional screws. Uniformity of force distribution along the screw length represents the efficient load bearing through the bone. The load transfer mechanisms are complex and thus many factors must be considered in choosing an optimal screw-plate system.



## DEVELOPING A SIMULATED DISTAL RADIUS REDUCTION AND INFORMED CONSENT TRAINING PROGRAM

Vani J. Sabesan, Adam W. Lyon, Vinay K. Sharma, M. Abigail Childs, Dale E. Rowe

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Currently, junior orthopedic residents learn how to perform surgeries and communicate informed consent by observing senior residents and faculty, which while beneficial, is not objective and does not provide any means to assess skills competency. Our objective was to develop an objective simulation program that would improve resident training in the technical skills needed to perform distal radius reductions and for the informed consent process.

**METHODS:** Our prospective observational study consisted of a cohort of 9 orthopedic surgery and emergency medicine residents. The training program consisted of two sessions (S1 and S2), both with a distal radius reduction fracture lab (DRRL) and an informed consent lab (ICL). Upon completion of S1, residents watched a series of videos regarding the surgery and informed consent process. Residents then completed S2 after one month. Faculty physicians completed evaluations of residents for both sessions. Repeated measurement regression analysis was used to determine the relationship between session 1 performances and session 2 performances for both the DRRL and ICL.

**RESULTS:** There was a statistically significant improvement in overall DRRL performance scores from S1 (35.4/60) to S2 (42.7/60) ( $p < 0.001$ ). DRRL performance improved the most for Emergency Medicine residents (26%,  $p < 0.0001$ ) followed by PGYI/II orthopedic residents (12%,  $p < 0.001$ ) (Figure). There was a slight improvement in ICL performance scores from S1 (49.6/72) to S2 (52.5/72) ( $p = 0.36$ ). ICL performance improved the most for PGYI/II orthopedic residents (14%,  $p = 0.003$ ).

**DISCUSSION:** We were able to demonstrate a positive benefit in the use of simulation labs and video training tools based on improved resident performance in our distal radius reduction lab. Our results suggested that simulation sessions are more beneficial for younger novice residents. If effective, these types of simulation training tools could then be used for future resident training and education during orientation.



## ABILITY OF SURGEONS TO OPTIMIZE TORQUE DURING SCREW PLACEMENT INTO AN OSTEOPOROTIC BONE MODEL AND THE EFFECTS OF REAL TIME FEEDBACK: PRELIMINARY RESULTS

David M. Prior, Peter A. Gustafson, Andrew G. Geeslin, Joseph L. Chess

Western Michigan University School of Medicine, Orthopaedic Surgery, Kalamazoo, MI

**INTRODUCTION:** Screw torque optimization in cancellous bone is important component of fracture stability in many clinical settings. Previous studies have investigated screw torque in cancellous bone models and cadaveric specimens. In related work, our institution investigated surgeons' perception of screw torque in a cancellous bone model and found that tactile feedback alone was insufficient to reliably prevent screw stripping.

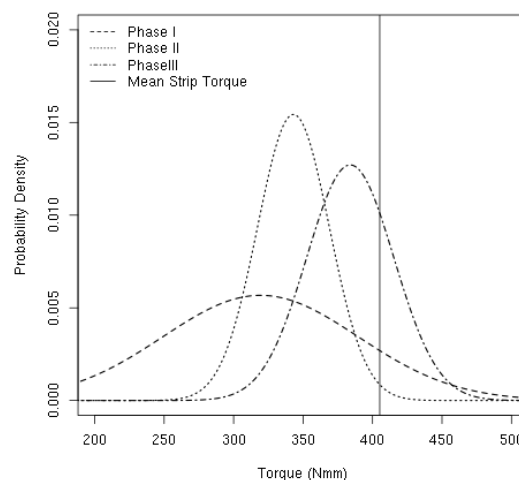
**RATIONALE:** The purpose of this study was to determine the ability of surgeons to detect stripping of cancellous screws in an osteoporotic bone model and to establish if their performance could be enhanced by utilizing real time visual feedback (graphical and numeric) of self-applied screw torque.

**MATERIALS & METHODS:** Preliminary data from a junior level orthopedic surgery resident was obtained. Ultimately, five senior level orthopedic surgery residents and five practicing orthopedic surgeons will be selected. Eight 30mm x 4.0mm cancellous screws were advanced in three phases through an 8-hole one-third tubular plate into a synthetic osteoporotic bone model. The subject was instructed to insert screws using standard operating technique to achieve what was felt to represent "maximum construct stability" and the maximum torque for each screw was measured. Each screw was advanced by the investigator to determine maximum torque. In phase I, the subject relied on tactile feedback to perceive screw stripping. In phase II, the subject visualized torque insertion through a real-time graphical display. In phase III, the subject completed one more trial without visual feedback (similar to phase I) in order to assess whether it was possible for a surgeon to "learn" from the feedback and improve upon their ability to detect stripping of screws when the feedback is removed.

**RESULTS:** In the first phase, the average maximum torque was 319 N-mm (+/-70) and the subject stripped 2/8 screws. In phase II, with visual feedback, the average maximum torque was 343 N-mm (+/-26) and the subject stripped 0/8 screws. In phase III, with visual feedback removed, the maximum torque was 384 N-mm (+/-31) and the subject stripped 5/8 screws.

**CONCLUSIONS:** Preliminary results suggest that visual feedback assists the surgeon in preventing screw stripping by narrowing the distribution of torques applied and by suggesting a maximum torque to apply. The use of visual feedback while advancing screws is a promising method of reducing the frequency of stripping. Further testing with the additional study participants is necessary to perform statistical analysis and obtain generalizable conclusions.

**FIGURE:** Approximate Gaussian distribution of applied torques tactile feedback only (Phase I), with the addition of visual feedback (Phase II), and after visual feedback is subsequently removed (Phase III).



## STATISTICAL RIGOR IN MEDICINE AND AEROSPACE ENGINEERING: LESSONS LEARNED IN MULTIDISCIPLINARY COLLABORATION

Peter A. Gustafson, James R. Jastifer, John A. Kapenga, and Joseph W. McKean

Western Michigan University School of Medicine and WMU College of Engineering, Kalamazoo, MI

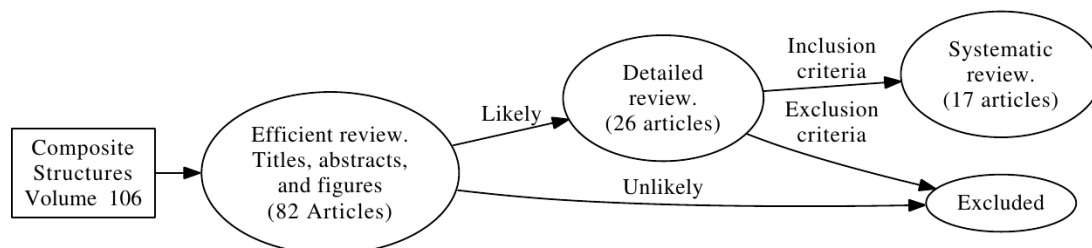
**INTRODUCTION:** The field of statistics is the established scientific discipline that includes interpretation of experimental data. Variation is an unavoidable consequence of experimentation and should be examined carefully in all experimental work. Multidisciplinary perspective strengthens the application of the use of statistics to experimental analysis.

**RATIONALE:** In medicine, consultation with a statistician is considered essential prior to commencement of any experimental study. However, anecdotal evidence suggests that such consultation is infrequently applied to composite materials testing in aerospace engineering. The cross-disciplinary research of the authors inspired a re-examination of experimental practices within their laboratory group. Specifically, the field of medical research was benchmarked for its rigorous application of statistical methods.

**MATERIALS AND METHODS:** A systematic review of one volume within the journal Composite Structures is presented to highlight current practices in aerospace engineering for planning and interpretation of experiments comparing groups. A brief review of useful statistical methods is presented including power analysis, ANOVA, t-test, p-value, and confidence intervals. These techniques have broad applications to all experimentation and are widely practiced in medicine.

**RESULTS:** The systemic review has indicated that a lack of statistical rigor is common in experiments in aerospace engineering composite materials research. Common errors include not completing a power analysis, not reporting the number of specimens, not controlling for bias, not applying appropriate statistical tests to the experimental outcomes, and not declaring conflicts of interest that may exist. Thus, the reported experimental conclusions may lack the strength they deserve or alternatively may be erroneous. It is observed that an insufficient number of specimens is being used to establish mean values. Imprecise language is used in describing the differences between groups (relative to the precise language of statistics). Some historical context is presented to explain these practices in aerospace composites research and a comparison is made to the field of medicine which generally practices more rigorous statistical methods. Additionally, several important statistical tests are briefly reviewed.

**CONCLUSION:** Due to the lack of rigorous statistical practice, a risk of misinterpretation exists in the published results within the reviewed journal. Historical context is discussed for the lack of reporting of robust statistics. The placebo effect, the randomized control trial, and the declaration of conflicts of interests are among the concepts that are discussed. Cross-disciplinary arguments are presented to encourage the use of robust statistics based on experimental challenges and common practices within the medical research community.



**30 DAY READMISSION RATE FOR PATIENTS DISCHARGED WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): ANALYSIS OF 1,858,618 ADMISSIONS. WHICH PATIENTS ARE MOST AT RISK?**

Devin Malik, Sourabh Aggarwal, Andrew Whipple Internal Medicine, Yashwant Agrawal Medicine-Pediatrics

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** COPD is a major cause of morbidity and is associated with a high 30-day re-admission rate (RR) and economic burden on health care. This study was done to determine demographic parameters associated with high 30-day RR secondary to COPD

**RATIONALE:** To identify patients at high risk for readmission in an attempt to mitigate factors that contribute to readmission.

**MATERIAL & METHODS:** Nationwide Inpatient Sample data was used to extract data of patients discharged with DM with complications for years 2009-2011 using clinical classification software (CCS). NIS represents 20% of all hospital data in US. All the patients who were discharged with primary diagnosis of COPD and readmitted within 30 days were identified and categorized based on admitting diagnosis. Patients were classified as readmissions secondary to COPD as a primary cause, readmissions with COPD as a secondary cause and non-COPD associated readmissions. Statistical analysis was done using SPSS.

**RESULTS:** We identified a total of 1,858,618 admissions for COPD nationwide during the study period with total 30-day RR of 21.06% and RR of 7.22% secondary to COPD as a primary cause (Table 1). Age group (45-64), males, patients under Medicaid, patients in low median income for zip code and in metropolitan areas had higher 30-day re-admissions secondary to COPD as a primary cause ( $P < 0.001$ ). Young patients (18-44 years of age), females, patients covered under Medicaid and living in Metropolitan areas had higher 30-day RR secondary to non-COPD related causes.

**DISCUSSION:** Strategies to reduce 30-day readmissions secondary to COPD should be focused on more susceptible population including males, aged 45-64 years old, under Medicaid, having low median income for zip code and staying in metropolitan areas.

**CONCLUSION:** Clinicians and medical staff including social workers and case managers need to identify those at high risk for readmission and help identify and solve potential mitigating factors.

## **MEDICATIONS THAT LEAVE SPOTS. BULLOUS PEMPHIGOID AND DIPEPTIDYL PEPTIDASE IV INHIBITORS: A CASE REPORT**

Amy Attaway, Tracey L. Mersfelder, Sakshi Vaishnav, Joanne Baker

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Bullous pemphigoid is a cutaneous autoimmune blistering disorder against the hemidesmosome, a part of the basement membrane that attaches the epidermis to the dermis. The etiology for what precipitates this disease is not entirely clear at this point, although it has been associated with certain medications. It most commonly occurs in the elderly, especially ages 70 years and over, and has increased risk for mortality as well as long term morbidity. Gliptins are a drug class that was first introduced into the market in 2006 to treat diabetes mellitus type 2. They work by competitively inhibiting the enzyme dipeptidyl peptidase IV (DPP-IV/CD26), which normally breaks down incretin hormones glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP) that are released in response to a meal. By preventing GLP-1 and GIP inactivation, they are able to increase the secretion of insulin and suppress the release of glucagon by the pancreas. Since their release into the market they have been linked to several skin reactions, most serious of which is Steven Johnson syndrome. The enzyme DPP-IV has been shown to be ubiquitously expressed in almost every organ system, including the skin.

**CASE REPORT:** We describe the case of a 70-year-old male with a past medical history of diabetes type 2, developmental delay, chronic iron deficiency anemia, stroke, and hypertension, who developed a diffuse bullae largely on his arms, neck, chest, and groin. Many of the bullae were still intact upon presentation to our facility two weeks following the onset. The patient also complained of significant urticaria and had excoriations on his extensor surfaces. There was no evidence of mucosal involvement. His home medications included acetaminophen, aspirin, citalopram, docusate sodium, levothyroxine, lisinopril, metformin, oxybutynin, and simvastatin. He had previously been on sitagliptin 50 mg daily for one year prior to onset of the rash, and it was discontinued by a physician four days before transfer to our facility. A complete blood count upon transfer consisted of a white blood count of 8.6 K/L, hemoglobin 10.5 g/dL, hematocrit 31.6 %, and platelets 281,000/mm<sup>3</sup>. His differential was significant for 9% eosinophils (normal range is 1-4%). Electrolytes and liver function tests were all within normal limits. His Hemoglobin A1C was 7.1%. A skin biopsy was performed and direct immunofluorescent staining revealed a linear staining pattern with complement C3 and IgG at the subepidermal basement membrane zone consistent with bullous pemphigoid. The patient was started on methylprednisolone 60mg IV every eight hours with good response and was transitioned to oral prednisone 60mg daily after 3 days. There was significant improvement of the rash after 2-3 days and he was discharged on a prednisone taper with plan to be followed outpatient by dermatology.

**DISCUSSION:** There have been a few reports that have explored the relationship between DPP-IV inhibitors (gliptins) and bullous pemphigoid, including a case report, a case series, and a report on sitagliptin associated allergic skin reactions submitted to the Adverse Event Reports System database of the FDA. According to the Naranjo ADR probability score there is a “possible” cause and effect relationship for this case. The enzyme DPP-IV is ubiquitously expressed in almost every organ system, including the skin. Inhibition of this enzyme has been found to promote eosinophil activation. Gliptins also disrupt the natural balance of cytokines in the skin, including TGF beta 1, which may promote imbalances in T helper mediated cell signaling that could precipitate a diffuse cutaneous eruption.

**CONCLUSION:** Our case further demonstrates a link between dipeptidyl peptidase-IV inhibitors and the development of bullous pemphigoid. The exact mechanism at this time is unknown but is believed to be multifactorial involving many aspects of the immune system. Due to the morbidity and mortality associated with bullous pemphigoid, this link can help providers make more informed decisions on their own patients’ medical regimens and avoid adverse drug reactions in at risk populations.

**THE FORGOTTEN ADVERSE EFFECT OF STEROIDS; UNCONTROLLED HYPERTENSION  
LEADING TO POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES) IN A LUPUS  
PATIENT.**

Devin Malik, Sourabh Aggarwal Internal Medicine, Sukhpreet Singh Family Medicine

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** Lupus is a multi-organ autoimmune disease which if not adequately controlled can cause life-threatening consequences. The mainstay treatment of lupus flares of any organ involved is high dose steroids. The often overlooked adverse effect of steroids is hypertension, which if left uncontrolled can lead to devastating sequelae.

**CASE REPORT:** A 20-year-old African American lady with lupus pneumonitis, nephritis and hemolytic anemia was admitted to the intensive care unit for impending respiratory failure. Pneumonitis was diagnosed by exclusion and pulse steroids were started, 1 gram solumedrol daily for 3 days. The anemia and nephritis did not resolve so patient received 60mg of prednisone daily for nearly 12 days when patient developed seizures. Lumbar puncture was negative and MRI revealed findings consistent with posterior reversible encephalopathy syndrome. Chart review showed that patient was consistently hypertensive during course of steroid therapy with BP in 180s. The patient did not have any history of hypertension prior to admission and the causative agent was suspected to be steroids. Her steroid dose was reduced which resulted in clinical improvement.

**DISCUSSION:** Steroids are the foundation for treating most rheumatologic conditions and have the potential to be used in excess if not tapered when clinically indicated. If prolonged high dose steroids are used, hypertension can develop leading to failed autoregulation in the brain causing hyperperfusion and PRES to develop. Therefore, whenever feasible, steroids should be tapered safely to avoid potential complications such as PRES.

**CONCLUSION:** Hypertension may develop from prolonged high dose steroids and may cause serious potential complications like in our patient who developed PRES. Clinicians must be aware that although short term steroids may seem benign, sometimes potential complications such as PRES can develop in the short course if high dose steroids are used.

## **KIDNEY LEAKED URINE INTO LUNG!!- URINOTHORAX AS A COMPLICATION OF PERCUTANEOUS NEPHROLITHOTOMY**

Arani Nanavati, Rachael Harris, Shrey Velani, Susan Bannon

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Urinothorax, the presence of urine in the pleural space, is a rare cause of pleural effusion. We report a case of urinothorax which was a complication of percutaneous nephrolithotomy performed for a renal calculus.

**CASE REPORT:** 37 years old female who was admitted for renal colic and had a 1 cm stone in renal pelvis and a 4 mm stone in the lower pole of left kidney. Percutaneous nephrolithotomy was performed and catheter was entered through posterior upper pole calyx. After one day of procedure, patient started developing left sided chest pain and shortness of breath. Chest X-ray confirmed the presence of left lower lobe infiltrate and left sided pleural effusion. Thoracentesis was performed and chemistry showed the evidence of transudative fluid with creatinine of 14. CT abdomen-pelvis confirmed the presence of urinothorax due to extravasation of urine from a defect in the upper pole of left kidney.

**DISCUSSION:** Urinothorax was first described in 1968 by Corriere et al when they studied ureteral obstruction in dogs. But now urinothorax cases are reported in humans as well. Diagnostic criteria include: (1) transudative pleural fluid, (2) pleural fluid-serum creatinine ratio greater than 1.0 and (3) low pleural fluid pH (usually less than 7.3). With a urinothorax, acidic urine migrates through the capsule of the obstructed kidney and moves through ipsilateral diaphragmatic defects into the pleural space, causing a transudate with a low pH.

**CONCLUSION:** Urinothorax should be suspected in all cases of pleural effusion occurring shortly after urologic procedures.



## ‘PING-PONG GAZE’ SECONDARY TO MONOAMINE OXIDASE INHIBITOR (MAOI) OVERDOSE: A CASE REPORT AND REVIEW OF LITERATURE

Amy Attaway, Laila Sroujeh, Tracey L. Mersfelder, Christopher Butler, Daniel Ouellette

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** While Monoamine Oxidase Inhibitor (MAOI) toxicity is well-known to cause serotonin syndrome, another manifestation is periodic alternating gaze or "ping pong gaze," which is a unique gaze disturbance defined as slow conjugate deviation of the eyes from one extreme to the other with fixed frequency and without pause. The etiology of the gaze is unknown, but is most often seen with irreversible structural brain damage and carries a grave prognosis. MAOI toxicity is unique in that the global cerebral dysfunction is transient and associated with complete neurologic recovery. We describe a case and reviewed the other four cases in the literature.

**CASE REPORT:** A 26-year-old Caucasian female had recently experienced a spontaneous abortion one-week prior and had been depressed since. She had a past medical history significant for depression and had good response with phenelzine in the past. She went to her PCP and asked to be restarted on this medication. Her PCP prescribed phenelzine 15 mg daily. She was later found down in her home having taken 45 pills of the medication. On presentation to the hospital, she was found to have 4 mm dilated pupils that were conjugately moving in characteristic "ping pong" fashion. Her exam was significant for severe muscular hypertonicity, clonus, diaphoresis, fevers, and tachycardia. She was intubated for airway protection and placed on midazolam drip. Sepsis was ruled out with negative cultures and a normal pelvic ultrasound. 4 hours later the patient spontaneously terminated her gaze and was moving all extremities purposefully. The following day her neurologic exam was benign other than residual hypertonicity in her lower extremities, and she was extubated without issue. She had no long-term neurologic sequelae, although she did require inpatient psychiatric admission for continued suicidal thoughts.

**DISCUSSION:** MAO inhibitors have historically been reserved as a third line agent for mood disorders due to the need to restrict tyramine content in the diet. However, recent research has shown that the concern over hypertensive crises associated with ingestion of tyramine is rare and only seen with very specific foods that are often not consumed. Newer agents have since been developed that do not require dietary restrictions. Certain MAO inhibitors such as selegiline have found favor in the treatment of Parkinson's disease as well.

**CONCLUSION:** MAO inhibitors are become increasingly utilized, and the potential neuro-cognitive toxicities, including PPG and serotonin syndrome, are important to know about in clinical practice.

	Age / gender	Medication(s)	Duration of gaze	Description of gaze	MAOI toxicity complications	Neurologic recovery
Watkins et al (1989)	55 yo male	Tranlycypromine	12 hours	Gaze cycled every 3-4 seconds	None	Yes
Erich et al (1995)	28 yo female	Phenylzine, amatadine, bethanechol	24 hours	4 mm dilated; gaze cycled every 3-4 seconds	1)Rhabdomyolysis	Yes
Erich et al (1995)	37 yo female	Isocarboxazid, alprazolam, trazodone	24 hours	9 mm dilated; gaze cycled every 2-3 seconds	1)Hypotension req. vasopressors 2)Rhabdomyolysis 3)Thrombocytopenia 4)Acute renal failure	Yes
Prueter et al (2001)	56 yo female	Tranlycypromine, thioridazine, clomipramine	24-48 hours	4 mm dilated; gaze cycled every 3-4 seconds	1) Rhabdomyolysis	Yes
	26 yo female	Phenylzine	10 hours	7 mm dilated; gaze cycled every 3-4 seconds	1) Rhabdomyolysis	Yes

**COMPOUNDING TO THE RESCUE: TREATMENT OF THYMIDINE KINASE NEGATIVE MUTANTS OF HERPES SIMPLEX 2 IN HIV INFECTED PATIENTS**

Larry Lutwick, Hector Ojeda, Jana Preis

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Cellularly immunocompromised hosts, especially those infected with HIV with low CD4 cell levels, are at risk for chronic mucosal and cutaneous infections with Herpes simplex virus (HSV), either type 1 or 2. The only oral medications available for management of this process (acyclovir, valacyclovir, famciclovir) depend on the thymidine kinase (TK) enzyme of HSV for antiviral activity. TK negative mutants of HSV are resistant to these medications but can be treated with a non-oral, systemic medication, either foscarnet or cidofovir. Additionally, trifluorothymidine (T4T) had anti-HSV activity but is only available in an ophthalmic form. All three of these medications have a method of action that differs from the acyclovir group. A compounding pharmacy can supply a medication in a non-FDA approved form such as a topical form or a product without preservative and such pharmacies have received much publicity (medical and lay presses) due to contaminated drug with subsequent infection.

**RATIONALE:** To investigate whether medications, not FDA-approved for cutaneous use, can be compounded and used for TK negative HSV disease

**MATERIAL & METHODS:** We investigated the use of compounded forms of the intravenous medications foscarnet (as a 3% cream) and cidofovir (as a 1% gel) and the use of topical trifluorothymidine (the 1% ophthalmic solution applied on gauze) in three separate HIV infected male patients on antiretroviral therapy with chronic HSV-2 infections that were TK negative mutants that had received acyclovir in the past with response but were no longer responsive.

**RESULTS:** Each patient responded dramatically to topical therapy with eventual healing and complete healing. Two of the patients had stable CD4 counts without further rise at the time of the treatment (one at about 300 and one at about 190). The third (who received the (T4T) had just begun on a new anti-retroviral regimen and his CD4 rose from 4 to 50 during healing. He relapsed at CD4 300 and was again successfully retreated. No side effects occurred.

**DISCUSSION:** The treatment of TK negative HSV disease with non-intravenous medications is not well established and requires more anecdotal and then controlled data.

**CONCLUSION:** Compounded, usually intravenously given, medications and medications given usually in an ophthalmic solution can be successfully used to manage TK negative mutant HSV disease.



## ADRENAL INSUFFICIENCY AS INITIAL PRESENTATION OF WIDELY METASTATIC STAGE 4 CANCER

Amy Attaway, Sakshi Vaishnav, Rasha Abdulmassih, Gagan Preet, Ronald Snyder, Lee Bricker

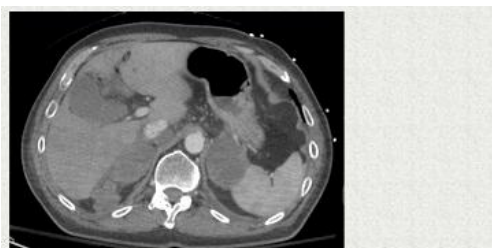
Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Adrenal insufficiency in patients with cancer is most often iatrogenic secondary to long-term steroid use. It can also be caused by extensive metastatic involvement of the adrenal glands. However, while adrenal metastases are common especially in melanoma, lung, breast, colon, and stomach cancer, it rarely causes clinically overt adrenal insufficiency. In order for this to occur, 90% of the glands must be destroyed.

**CASE REPORT:** We describe the case of a 59-year-old Caucasian male, past medical history significant for COPD and 40 pack years of smoking, who had been experiencing fatigue and 60-pound weight loss over 6 months. Imaging revealed a right lung mass as well as multiple pulmonary nodules. During his pre-operative evaluation for bronchoscopic guided biopsy of the right lung mass, he was noted to have hypotension as well as mild hyponatremia and hyperkalemia without renal insufficiency. He was transferred to the ED and admitted to the ICU. A CT chest, abdomen and pelvis confirmed a right lung mass, and revealed extensive mediastinal adenopathy as well as retroperitoneal and peritoneal metastases. He was also noted to have bilateral adrenal metastases with a 5.6 cm one on the right and 10 cm one on the left. A cosyntropin test would confirm adrenal insufficiency. Due to his poor prognosis, the patient did not want to undergo further staging of his presumed lung cancer. He was transferred to the palliative care service and started on dexamethasone. His blood pressure, hyponatremia, and hyperkalemia would all improve, and he was discharged home on hospice.

**DISCUSSION:** Adrenal insufficiency may be difficult to diagnose in patients with stage 4 cancers due to insidious onset and nonspecific symptoms like nausea, anorexia and fatigue. In addition, electrolyte abnormalities may be attributed to paraneoplastic syndromes, e.g. hyponatremia from SIADH. Previous small series have identified adrenal insufficiency in 0%, 3%, 13%, and 33% with bilateral adrenal metastases. One prospective series of pts with metastatic adrenal insufficiency noted that the baseline serum cortisol level was neither below or above the normal lab values for morning serum total cortisol. Typical assays for cortisol look at the total cortisol level, which may underestimate the free cortisol level when patients have hypoproteinemic state. Whether or not drawing a random level to help diagnose adrenal insufficiency in critical illness is an ongoing debate.

**CONCLUSION:** Adrenal metastases are a common site for many cancers, but 90% of the glands must be destroyed in order for it to cause overt adrenal insufficiency. Cosyntropin stimulation test and ACTH levels can help aid in the diagnosis.



**Images 2&3:** CT abd / pelvis revealed bil adrenal metastases (5.6 cm on the right and 10 cm on the left). The one on the right had displaced the right kidney inferiorly. There was extensive peritoneal and retroperitoneal metastases, heterogeneous enhancement of the liver consistent with metastases and metastases in the left gluteus maximus and left obturator internus muscle.



## **RAPIDLY PROGRESSIVE INTRACRANIAL GIANT CELL ARTERITIS; A RARE AND CATASTROPHIC PHENOMENON**

Devin Malik, Sourabh Aggarwal, David Homa, Philip Veldernman

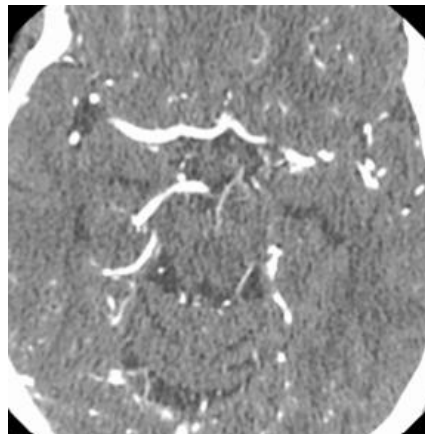
Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** Giant cell arteritis (GCA) is the most common primary vasculitis in the United States. GCA has a predilection for involving the extracranial branches of the carotid arteries leading to the typical symptoms of headache, amaurosis and jaw claudication by way of vascular insufficiency. Cerebrovascular accidents (CVA) have been reported in 3-4% of patients with GCA. Ischemic events are due to extracranial stenosis of carotid and/or vertebral arteries as opposed to an intracranial vasculitis causing ischemia. Literature review of biopsy proven GCA with intracranial involvement causing CVA is extremely rare. Literature review revealed a study reviewing the Mayo Clinic records over a 17 year period (1987-2003) and showed only 2 cases of intracranial vasculitis caused by GCA.

**CASE REPORT:** We describe a 79 year old lady with seronegative inflammatory arthritis that complained of frontal headaches andodynophagia. Labs revealed an elevated erythrocyte sedimentation rate (ESR) of 82mm/hr and computer tomography angiogram (CTA) was done to evaluate headaches and was unremarkable. Patient was referred to a rheumatologist for further evaluation. Labs at that time revealed ESR of 115mm/hr, ANA, ANCAs were negative and GCA was diagnosed by temporal artery biopsy. 60mg of prednisone was started with gradual improvement of symptoms. Prednisone was eventually tapered over 3 months to 30mg daily. While on 30mg of prednisone, patient developed right-sided weakness, dysarthria and word finding deficits. CTA of head was done for stroke symptoms and showed infarcts in left frontal deep matter and cerebral white matter. New multifocal stenosis was discovered on comparison to CTA done 5 months prior. New findings included stenosis of cavernous and paraclinoid internal carotids arteries bilaterally, proximal portions of left anterior cerebral, middle cerebral and left posterior communicating artery and distal cervical left vertebral artery all consistent with intracranial vasculitis as these were new lesions not attributable to atherosclerosis. Aspirin 81mg was started by neurology. Infectious etiology was ruled out by an unremarkable lumbar puncture. An echocardiogram showed no thrombus or endocarditis. The decision was made to start high dose steroids and cyclophosphamide, however both patient and family opted for hospice as she had not tolerated rehabilitation from her stroke.

**DISCUSSION:** GCA is a vasculitis that affects extracranial vessels as the disease involves arterial elastic tissue, which is thicker in extracranial arteries and minimal in intracranial arteries. Literature review revealed that intracranial vasculitis associated with GCA is resistant to steroid therapy, as it was for our case as well. Furthermore, there is a relationship between GCA and CVA, however, reviewed cases lack the documentation of both biopsy proven GCA along with histologic and/or angiographic presence of intracranial vasculitis.

**CONCLUSION:** This case shows a rapidly developing intracranial vasculitis caused by biopsy proven GCA as documented by multivessel stenoses on CTA as compared to a CTA done 5 months prior to stroke symptoms making this case extremely rare.



**FROM THE AZTECS TOWARDS MODERNITY: AN EARLY HISTORY OF MEXICAN MEDICINE**

Julia R. Hamilton, Luis H. Toledo-Pereyra

Western Michigan University (WMU), Lee Honors College, WMU School of Medicine, Clinical Research ,  
Kalamazoo, MI

**INTRODUCTION:** The entirety of Mexican history, including that of healthcare, finds its roots in the Aztec civilization. Aztec culture and daily routine revolved around religion, as did medicine. The Aztec god of gods, Quetzalcoatl, ruled supreme over the psyches of the people of Aztlan. The Tonalamatl, the religious calendar, dictated the fate of the individual, disease, prognosis, return to health, and length of life. Disease was thought of as a punishment from Quetzalcoatl and healing was considered forgiveness. There were gods and goddesses of medicines and herbs as well. Though the Aztecs did not grasp the biological causes of disease, they understood treatments as working alongside ritual and prayer. Aztec medicine had absorbed the knowledge of its conquered brethren, such as the Toltecs. There were two types of physicians in Aztec culture, both of which had religious roles: tepatiani, those who examined and treated patients with topical administrations; and nahualli, those who used horoscopes, religious sacrifice and prayer to cure patients. There is evidence in the ancient language of Nahuatl to suggest the specializations of phlebotomy, surgery, midwifery and pharmacy in the practice of ancient Aztec medicine.

**RATIONALE:** The purpose of this investigation is to determine the origins of Mexican medicine by addressing the history of practices of the ancient Mexican Aztec civilization.

**REVIEW OF LITERATURE:** This study was conducted through utilization of the library resources at Western Michigan University, including PubMed, Science Direct, and the National Center for Biotechnology Information. Translations of the Florentine Codex of Bernardino de Sahagun from Nahuatl to Spanish and English were thoroughly reviewed. As very few documents from before the arrival of Christopher Columbus survive today, the Badianus and Sahagun codices were the most primary of sources available.

**ANALYSIS OF RESULTS:** The Franciscan friar Bernardino de Sahagun was responsible for the Florentine Codex, which effectively translated Aztec herbal and medical documents into Spanish to be shared with the medical professionals of the world. The repeated observation of disease among the Aztecs led to a vast pathology that connected symptoms with regional syndromes and religious psychological influence. It is well known that Sahagun inserted religious undertones to his medical findings from Aztec knowledge. However, this text contributed a plethora of Nahuatl vocabulary useful for translation. In addition, he recorded several new medical discoveries. Sections of books ten and eleven describe human anatomy, native disease and medicinal plant remedies. The Aztec population had considerable knowledge of the human cardiovascular system, with particularly detailed drawings of the human heart as a result of repeated human sacrifice during which the heart was flayed. The practice of physician was usually passed from father to son in the form of an apprenticeship. New practitioners were obligated to pass an examination before they could begin the treatment of others. Badianus codex, compiled by Martin de la Cruz and Juan Badianus, translated information on medicinal herbs from native sources without the professional and religious bias of Sahagun's work. From this codex it is noted that nearly every native plant was used medicinally in some form, alongside prayer and ritual. The Aztecs were one of the first civilizations to use tobacco and employed the plant as an antidepressant and anti-irritant. It is also known that the juice of several plants, such as the *Baccharis arborescens* S. Watson, was applied topically as an analgesic. Several of the oils and resins used as antiseptics in the Aztec world are still employed today. The Badianus codex provided explicit instructions to the physician on herbal remedy preparation and use.

**CONCLUSION:** Unlike European medicine, which followed the studies of Hippocrates and Galen, Aztec medicine gained its knowledge from surrounding nations of indigenous people. The entirety of Mexican medical history finds its roots in the Aztec civilization. The translations of Bernardino de Sahagun and Juan Badianus brought Aztec herbal remedies and anatomical knowledge to the Latin and Spanish-speaking worlds. Much of what is known today about human physiology and pathology of disease is attributed to the accomplishments of this advanced ancient society.

## CHALLENGING ISSUES IN GENOMIC ETHICS

Shirley Bach, Elaine Englehardt, Michael Pritchard

WMU Ethics Center, Kalamazoo, Michigan

**INTRODUCTION:** Whole genome and exome sequencing have emerged as leading technological advances which provide tools to explain genetic contributions to many human diseases including certain cancers. Clinical developments as well as research in this rapidly growing field have also raised a number of challenging ethical issues which are being addressed by bioethicists and professional groups. We will consider several of these ethical issues.

**RATIONALE:** One area of concern, and of disagreement, involves deciding who should have access to recently discovered genetic information. Should testing laboratories share all information with the patient and the ordering clinician if the significance of the information is not yet known or if the newly uncovered information is likely to lead to considerable emotional distress for the patient? Another issue is whether the patient or the researcher ought to inform family members who are discovered to be at risk for a genetic problem which might be treated or avoided if that risk was known and acted upon. In some cases, genetic information may become available only years later, and the family member may not even be aware of the patient's participation in the research project. Yet it may turn out that some benefit might accrue to the relative if he could be contacted. In some cases, as part of informed consent to the research project, a participant may have agreed not to be contacted later. Depending on the nature of the findings, the researcher may believe that there would be a greater benefit to the participant or family member if the original promise of privacy and confidentiality is not met. Should the obligation to benefit the individual and avoid significant harm take precedence over the promise or expectation of confidentiality? This would be a departure from traditional research and clinical ethics, and not all ethicists are in agreement with this.

**ANALYSIS OF RESULTS:** As whole genome and exome research increases rapidly, the likelihood of incidental findings also increases. Incidental findings have been defined as "looking for one thing and stumbling upon another." One example evolved from the genetic research of Mayo Clinic researcher Gloria Petersen who, while studying patients with different pancreatic cancer variants, incidentally identified individuals who had an increased risk for other diseases, e.g. malignant melanoma. Since the original patients with pancreatic cancer were often deceased when the new findings became known, the researchers then had to deal with whether or not they had an ethical obligation to disclose the new findings to the newly discovered at-risk family members who might benefit from pre-symptomatic detection of pancreatic cancer and malignant melanoma.

**CONCLUSION:** Although not in complete agreement, several professional groups have made recommendations with regard to these ethical issues, particularly with regard to disclosing incidental findings. Among them are the Institute of Medicine, the National Human Genome Research Institute Task Force on Genetic Testing, the American College of Medical Genetics and Genomics, and the President's Commission for the Study of Bioethical Issues. The President's Commission, in particular, recently issued strong recommendations regarding the necessity for good education and communication in order to help patients, professionals, and the general public understand and deal with the ethical challenges associated with contemporary genetic research. They are currently working toward developing an ethical framework to handle these problems.

**PHYSICIAN COMPLICITY IN AKTION T4; NAZI GERMANY'S SECRET PROGRAM TO MURDER PERSONS AFFLICTED WITH MENTAL ILLNESS, SERIOUS CHRONIC DISEASE AND OTHER 'INCURABLE ILLNESSES'.**

Bob Brown

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Aktion T4 was the name of Nazi Germany's secret "uthanasia" program during which 70,273 people who were judged by physicians to be "incurably ill" were murdered. Thousands of physicians and other medical professionals were involved in the program. This study presents significant details about the program and the roles physicians played in carrying out what were later judged to be crimes against humanity.

**RATIONALE:** The role of physicians in society is an ever-changing one. In addition to treating illness and reducing suffering, physicians are asked to use their knowledge and experience to help formulate legislation, to guide regulatory processes and to shape society in general. Today's physicians and other medical professionals need to be aware of the ways in which the skills and expertise of physicians have been perverted in the past for purposes inimical to such basic guiding principles of medicine as compassion, respect for life, understanding, truthfulness, empathy and service.

**REVIEW OF LITERATURE:** Information for the study was collected from on-line and printed sources identified using keyword searches containing various combinations of the words: Aktion T4; Karl Brandt; Nazi Germany; Euthanasia; Eugenics; World War Two and related words.

**ANALYSIS OF RESULTS:** Aktion T4 started when Adolf Hitler signed an "euthanasia decree" in October 1939 that authorized Karl Brandt, Hitler's personal physician, to carry out a secret program to allow physicians to identify patients who were considered "incurable", so that they could be "granted a merciful death after a discerning diagnosis." Brandt ordered a survey of all psychiatric institutions, hospitals, and homes for chronically ill patients in the German Reich. Physicians at each facility were required to complete a standard form for each patient in the facility. A team of physicians reviewed the forms and decided which patients should be transferred to regional facilities to be killed. The killings were carried out in six mental asylums in Germany and Austria. Physicians and medical assistants at the killing centers killed their victims using a variety of methods including starvation, lethal injection and poison gas. In an attempt to cover-up the true nature of the program, physicians created false death certificates and other documentation indicating that the patients had died of common illnesses. The total number of physicians and medical assistants who participated in the program is unknown but it is estimated to number in the thousands and included virtually the entire German psychiatric community. In 1940 and 41 prominent German clergymen publicly protested the program. The program was officially terminated by Hitler in August of 1941 but the killing of "incurables" continued in Nazi death camps until the end of the Second World War. After the war Brandt and 22 other doctors and administrators were tried at Nuremberg for war crimes and crimes against humanity. Sixteen of the 23 were pronounced guilty and seven of them, including Brandt, were sentenced to death. Brandt was hanged on June 2, 1948.

**CONCLUSION:** Physicians today are asked to perform tasks that have significant ethical ramifications. They are asked to do everything from administering lethal injections to condemned prisoners, to deciding who should receive scarce organs for life-saving transplants. Reviewing the criminal and unethical behavior of physicians of the past can help physicians of today understand the facts and social conditions that contributed to those behaviors. Greater understanding of these factors can help today's physicians avoid committing similar mistakes and provide them with insights to help them evaluate the ethical components of complex decisions they are asked to make.

## POTT'S PUFFY TUMOR: A RARE COMPLICATION OF FRONTAL SINUSITIS

Karthik Kannegolla, Rakshita Chandrashekar, Mark Schauer

Western Michigan University School of Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Pott's puffy tumor is an extremely uncommon medical condition in the antibiotic era in which osteomyelitis of the frontal bone may lead to a collection of pus beneath the periosteum, causing swelling and edema over the forehead. Approximately 100 cases have been reported in the literature, usually occurring in children, rarely in adults. We describe an interesting case of Pott's Puffy Tumor in an adult male caused by *Streptococcus intermedius* which is a part of normal oral flora and commonly isolated in brain abscesses.

**CASE REPORT:** A 40 Year old African American male presented with progressive swelling and non-radiating dull pain in the frontal area for 1 week. He had chronic nasal congestion with recent facial pressure and had been treated for sinusitis 2 weeks prior with trimethoprim/sulfamethoxazole. He also reported a blunt trauma to his forehead without any external signs of injury 5 weeks prior. He denied any other complaints. His medical, surgical, family and social history were non-contributory. On examination, he was afebrile and vital signs were unremarkable. He had a 5 x 5 cm well defined swelling over the frontal area which was erythematous, fluctuant and tender on examination. His labs were remarkable only for leucocytosis with WBC count of 14,400/mm<sup>3</sup> (Normal range: 4500-11,000/mm<sup>3</sup>) with neutrophilic predominance. Incision and drainage of the swelling in the Emergency department revealed purulent material. CT scan of head and paranasal sinuses showed bifrontal subgaleal abscess, erosive changes in frontal bones suggestive of calvarial osteomyelitis, opacification of bilateral frontal, ethmoid, maxillary sinuses including osteomeatal complex. MRI and MRA brain also showed identical findings with local, frontal meningeal inflammation. No intracranial abscess nor venous thrombosis was identified. He was started empirically on intravenous Vancomycin, Cefipime and Metronidazole. Surgery was consulted and bilateral frontal, maxillary and sphenoid sinuplasty was performed with frontal stent placement. Intraoperative cultures grew gamma hemolytic *Streptococci* - *Streptococcus intermedius*. Our plan was to treat him with intravenous Ceftriaxone and oral Metronidazole for 4 weeks. The patient decided to leave against medical advice but did have a prescription for Augmentin.

**DISCUSSION:** Pott's Puffy Tumor is a rarely reported clinical entity. Described etiologies include frontal sinusitis, frontal blunt trauma, intranasal substance abuse, and post surgical complication. The spread of infection from frontal or ethmoid sinusitis can occur directly or hematogenously. Common causative organisms are the same as those of chronic sinusitis which include streptococci, staphylococci, and anaerobes. Serious suppurative complications such as epidural, subdural, and intracerebral abscesses and infectious orbital complications are common. Surgical drainage and antibiotic therapy remain the mainstay of treatment for this condition. The differential diagnosis of a swelling of the forehead in adults includes skin and soft-tissue infections, hematoma, infected hematoma, benign and malignant tumors of the skin, soft tissue, bone, and frontal sinuses. Although Pott's puffy tumor most commonly occurs in children, it should also be considered in the differential diagnosis of forehead swelling in adults. A delay in diagnosis and treatment of this condition can lead to serious orbital and intracranial complications.



## CHRONIC PROTON PUMP INHIBITOR USE IN A RESIDENT OUT-PATIENT CLINIC

Matthew T. Siuba, Christine Dugan, Gagan Preet, Nickolas Demark, Richard Semones, Sarah Polcher, Anand Navarasala, Lizbeth Giles, Brian Hays, Mark Schauer

Western Michigan University School of Medicine, Internal Medicine and Medicine-Pediatrics, Kalamazoo, MI

**INTRODUCTION:** Proton pump inhibitors (PPIs) are commonly prescribed to treat gastroesophageal reflux disease (GERD), atypical GERD, dyspepsia, peptic ulcer disease, and erosive esophagitis. Although widely used, PPI therapy is not without risk or adverse effects, such as community- and hospital-acquired clostridium difficile-induced diarrhea, pneumonia, B12 deficiency, and increased fracture rate. The American College of Gastroenterology (ACG) recommends a 6-8 week trial therapy for the treatment of GERD, atypical GERD, or ulcerative disease, followed by the cessation of therapy using intermittent or step down strategies.

**RATIONALE:** The purpose of the current study is to establish whether PPIs are over prescribed in the Western Michigan Internal Medicine and Medicine-Pediatrics Clinics. The overuse of PPIs is thought to be due to the inappropriate continuation of ICU stress prophylaxis, the lack of reassessment of GERD symptoms and subsequent cessation of therapy, and undocumented rationale for PPI therapy. We hypothesize that PPIs are over prescribed in our clinic and that our prescription pattern is inconsistent with ACG guidelines.

**MATERIAL & METHODS:** A retrospective chart review of the electronic medical record at WMED IM and Med-Peds clinics to calculate the percent of patients on chronic PPI therapy. Chronic use was defined as greater than 8 weeks of PPI therapy. The WMED health informatics team provided the total active clinic patients, the total chronic PPI patients, and the active problem list for the chronic PPI patients. The active problem lists were screened for diagnosis consistent with PPI therapy. A pre-educational assessment was created based on ACG guidelines and given to residents and attending physicians to assess knowledge base. An educational intervention of proper indications and risks of PPI therapy was then presented.

**RESULTS:** 705 of 2,561 active patients, or 27.5%, were chronically taking PPI therapy from Sept. 1– Nov. 2013. The active diagnosis for chronic PPI patients included GERD (17.8%), atypical GERD, including dyspepsia, chest pain, cough, dysphasia (4.2%), ulcerative disease (3.2%), Barrett's esophagus or stricture disease (0.7%). 73% of chronic PPI therapy patients were lacking a substantiating diagnosis. The mean pre-test score was 5 out of 10 questions answered correctly.

**DISCUSSION AND CONCLUSION:** Our chronic PPI therapy rate is higher than the 14% (for over age 65; 2% for all others) reported for other out-patient clinics. Furthermore, only 27% of our patients have a documented rationale for PPI therapy. Our high PPI prescription rate, lack of indication for those on PPI therapy, and low pretesting score indicate areas for improvement. Curbing the inappropriate use of PPI therapy in our clinic will protect our patients from adverse effects of PPI therapy and decrease health care costs for our patients. In the future we hope to document improvement based on our educational intervention.

## IMPACT OF SMOKING BAN ON CARDIO-PULMONARY MORBIDITY AND MORTALITY: LESSONS TO LEARN FROM MICHIGAN

Amy Attaway, Sourabh Aggarwal, Ravikanth Papani, Shrey Velani, Susan Bannon, Thomas Melgar

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Cigarette smoking is well known to increase mortality and morbidity. Smoking cessation has been found to be associated with substantial health benefits including improved all-cause mortality and disease-specific better outcomes in all age groups. Second-hand smoking (SHS) ranks third after active smoking and alcohol abuse as a preventable cause of death in United State.

**RATIONALE:** Smoking bans or smoke-free laws are public policies which prohibit tobacco smoking in workplaces and other public spaces and some form of smoking bans. Michigan State's "Smoke Free Air Law" restricting indoor public smoking came into effect in May 2010. However, its clinical impact on acute cardio-pulmonary morbidity and mortality events is unknown.

**MATERIAL & METHODS:** We queried Healthcare Cost and Utilization Project's Nationwide Inpatient Sample (NIS) for acute myocardial infarction (MI) (ICD9 codes 410.00-410.92), congestive heart failure (CHF) exacerbations (ICD9 codes 428.0, 428.23, 428.33, 428.43), chronic obstructive pulmonary disease (COPD) exacerbations (ICD9 codes 490, 491.0, 491.21-491.21, 491.22, 494.1), asthma exacerbations (ICD9 codes 493.02, 493.12, 493.22-493.22, 493.92) and acute ischemic thrombotic stroke (AITS) (ICD codes 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.91). The NIS represents 20% of all hospitals data in US. All the relevant data for state of Michigan was extracted. Data for 2009 was compared with 2011 to analyze the clinical impact of smoking ban.

**RESULTS:** There was a statistically significant reduction in cardio-pulmonary morbidity and mortality with total hospitalizations for above-mentioned parameters decreasing from 105,020 to 102,502 (83.22 per 1000 total hospitalizations to 79.34 per 1000 total hospitalizations, p value <0.0001) and in-hospital mortality during these admissions decreasing from 2.71 per 100-events to 2.49 per 100 events (p value 0.002). There was also a significant reduction in hospitalizations from CHF exacerbations (p value <0.0001), asthma exacerbations (p value <0.0001) and non-significant reduction in AITS and MIs. There was also significant reduction in in-hospital mortality for MI (p value 0.0001) and non-significant reduction in in-hospital mortality from CHF exacerbation, COPD exacerbation and AITS.

**DISCUSSION:** This, to the best of our knowledge, is the first ever reported study determining acute impact of state-wide public smoking ban on cardio-pulmonary outcomes. There is no nation-wide federal policy for public indoor smoking ban and currently it is only a state directed policy. Our study highlights the acute clinical benefit of smoking ban on cardio-pulmonary morbidity and mortality. Further studies will be needed to determine the long term clinical and economic impact through decreased cost of hospitalization.

**CONCLUSION:** Our study provides concrete evidence of the clinical benefit of public policy and lays the foundation for implementation of similar policies at the federal level.

		2009	2011	P value
Myocardial infarction	Total patients	23243	23508	
	Total patients (per 1000 total hospitalizations)	18.42	18.2	0.186
	Mean Length of stay (in days)	4.9	4.7	
	Total mortality (per 100 MI patients)	5.4%	4.63%	0.0001
CHF exacerbation	Total patients	28542	26912	
	Total patients (per 1000 total hospitalizations)	22.62	20.83	<0.0001
	Mean Length of stay (in days)	5.3	5.3	
	Total mortality (per 100 CHF exacerbations)	2.76%	2.55%	0.12
COPD exacerbation	Total patients	25913	26597	
	Total patients (per 1000 total hospitalizations)	20.58	20.59	1
	Mean Length of stay (in days)	4.6	4.4	
	Total mortality (per 100 COPD exacerbations)	1.00%	0.95%	0.55
Asthma exacerbation	Total patients	13718	11903	
	Total patients (per 1000 total hospitalizations)	10.87	9.21	<0.0001
	Mean Length of stay (in days)	3.6	3.7	
	Total mortality (per 100 Asthma exacerbations)	0.23%	0.32%	0.188
Stroke	Total patients	13544	13582	
	Total patients (per 1000 total hospitalizations)	10.73	10.51	0.087
	Mean Length of stay (in days)	4.8	4.7	
	Total mortality (per 100 AITS)	3.74%	3.59%	0.51
Total	Total hospitalizations (MI, CHF ex, COPD ex, asthma ex, AITS)	105020	102502	<0.0001
	Total patients (per 1000 total hospitalizations)	83.22	79.34	
	Total mortality	2843	2552	
	Total mortality (per 100 events)	2.71	2.49	0.002



## INPATIENT HOSPITALIZATION AND INTIMATE PARTNER VIOLENCE: WHO ARE WE TREATING?

Mican I. DeBoer, Rashmikant U. Kothari, Catherine L. Kothari, Amy J. Koestner, Thomas J. Rohs

Borgess Trauma Services, Kalamazoo, MI

**INTRODUCTION:** To date, the majority of research into health care utilization of intimate partner violence (IPV) has focused on female victims, and primarily their emergency department use. There is little data on injury-related hospitalization rates for female victims, and even less for male victims and perpetrators.

**RATIONALE:** The purpose of this study was to determine the annualized rates of inpatient injury-related hospitalization amongst individuals involved as either victims or defendants in intimate partner violence (IPV).

**MATERIAL & METHODS:** This was an observational retrospective study linking data from two Level-1-Trauma-Centers and the county-prosecutor's office, from 2000-2010 in Kalamazoo County, Michigan: (1) Hospital data included inpatient (IP) injury-related admissions (ICD-9 codes 800-959.9), (2) Prosecutor data contained all charging requests for crimes between intimate partners. Annualized rates were calculated for the year prior to the IPV crime and for the year after, using the following algorithm:  $(\#hospitalizations)/(\#population) \times ("per" 10,000)$ . Confidence intervals and two-sided statistical significance were calculated at the 95% confidence level

**RESULTS:** During the study period 21,179 IPV-crimes were committed, involving 12,913 individual defendants and 14,797 victims. During this period, there were 30,301 injury-related hospitalizations. Compared to national hospitalization rates of 3.2 per 10,000 people for injury/poisoning (ICD-9 800-999), IPV-victim annual admission rates were 31.9, defendants 90.4 and bidirectional individuals 339.1 per 10,000 people, in the 2 years surrounding the crime. Males, regardless of crime role, have higher injury-related hospitalization rates in this period than females (male=115.6, female 41.8). Males (victims or defendants), and bidirectional participants of either gender had rates that were significantly higher the year after, than the year before the crime.

**DISCUSSION:** Findings from this study add to the literature by documenting the magnitude and temporality of injury hospitalization by IPV-involved individuals, as well as the importance of IPV crime role and gender in trauma service utilization. Over an extended period encompassing years before, during and after prosecutor-identified IPV incidents, victims and perpetrators generated injury-related hospitalizations that were ten times greater than age-matched national rates. This utilization rate increased even further when narrowing the timeframe to the two-years immediately surrounding the IPV crime; with the highest levels in the year-after the crime. Injury admission rates varied dramatically by crime role, with the highest rates among individuals involved in bidirectional-violence, and the lowest rates among victims. Victims' hospitalization rates are one-tenth those of bidirectional individuals. This study, the first to document perpetrator trauma service utilization, found that male perpetrators were more than twice as likely to be admitted for trauma related injuries compared to victims. This study suggest that there may be a crisis (especially for men) temporally surrounding an IPV event in the year before and after an IPV incident that puts them at higher risk for an injury related hospitalization. Recognition of these patterns and identification of these participants early by health care providers may allow for psychiatric or social services intervention to de-escalate the situation.

**CONCLUSION:** IPV involved individuals have a ten-fold higher injury-related hospitalization rate as compared to age-matched national rates. Admission rates vary by gender, crime role, and time frame, with males and bidirectional participants having the highest rates.

## THE ROLE OF NF-KB IN LIVER ISCHEMIA AND REPERFUSION

Nathan C. Kolderman, Luis H. Toledo-Pereyra

Western Michigan University School of Medicine, Research Department, Kalamazoo, MI

**INTRODUCTION:** The nuclear factor kappa B (NF- $\kappa$ B) has been shown to be directly involved in the upregulation of pro-inflammatory cytokines during liver ischemia and reperfusion (I/R). Paradoxically, NF- $\kappa$ B also plays a hepatoprotective role during liver I/R, mediating the upregulation of anti-apoptotic and anti-inflammatory genes (Bradham et al., 1997; Fan et al., 2004; Chandel et al., 2000). Therefore, understanding the NF- $\kappa$ B pathway in liver I/R injury is critical to the understanding of the lesion as well as the development of pharmacological interventions aimed at minimizing liver I/R injury.

**RATIONALE:** Modulating the activity of NF- $\kappa$ B may prove to be beneficial by decreasing the morbidity and mortality currently associated with liver I/R injury.

**HYPOTHESIS:** Will decreased activation of the NF- $\kappa$ B pathway through various therapies decrease the morbidity and mortality of liver I/R injury?

**ANALYSIS OF DATA:** A comprehensive PubMed review of the literature and cross-referencing revealed over 50 articles from 1997-2014 which studied NF- $\kappa$ B activation with various methods during liver I/R. This information was supplemented with pertinent molecular biology textbook analysis, including from Robbins & Cotran's Pathologic Basis of Disease. Illustrating NF- $\kappa$ B's paradoxical role, inhibiting NF- $\kappa$ B activation attenuates the inflammatory response in several studies while others showed increased inflammation and cell death. **RESULTS:** There have been several methods used to block the activation of NF- $\kappa$ B including the inhibition of NF- $\kappa$ B pathway regulators TLR4 (Ben-Ari et al. 2012), the IKK complex (Li et al., 1999; Rudolph et al., 2000; Tanaka et al., 1999; Beraza et al., 2007), and cytokine receptors (Franco-Gou et al.; Mahmoud et al., 2012) as well as preventing the breakdown of the NF- $\kappa$ B inhibitor I $\kappa$ B through proteasome inhibitors (Yao, et al., 2007, Padrisa-Altes et al., 2012) or all-trans retinoic acid (ATRA) (Rao et al; 2012). Li et al. and Rudolph et al. blocked NF- $\kappa$ B activation in mice through gene knockout of NF- $\kappa$ B activators IKK beta and IKK gamma, respectively. Both resulted in early embryonic death of the mice. However, in 2005 Luedde et al. demonstrated that partial NF- $\kappa$ B inhibition through hepatocyte-specific IKK beta knockout, reduced liver injury, demonstrated by reduced AST (P<0.02), ALT (P<0.05) and PMNs (P<0.001) 3 and 6 hrs. after reperfusion. In 2010, Li et al. examined the direct inhibition of NF- $\kappa$ B using decoy oligodeoxynucleotides (ODNs). Compared to control, the decoy ODN treated group showed a reduction in NF- $\kappa$ B binding activity (P<0.01), TNF-alpha mRNA (P<0.01), IL-6 mRNA (P<0.01), serum ALT (P<0.01), and total bilirubin (P<0.01) in rat livers undergoing I/R. These studies revealed that with partial NF- $\kappa$ B inhibition, pro-inflammatory cytokines and liver damage were reduced in liver I/R. However, with complete NF- $\kappa$ B inhibition, mice died early in life, theorized to be due to loss of NF- $\kappa$ B's cell-protective role (Beraza et al., 2007). Further studies, which focused on NF- $\kappa$ B activation in specific cell types (Llacuna, et al., 2009; Kuboki et al., 2009, Sakai, et al. 2011), revealed that NF- $\kappa$ B activation in hepatocytes is cell-protective/anti-inflammatory while NF- $\kappa$ B activation in Kupffer cells is pro-inflammatory. Kuboki et al. examined mice with the gene knockout of the hepatocyte-specific isomerase Pin1, which plays an essential role in NF- $\kappa$ B activation. Pin1 gene knockout reduced NF- $\kappa$ B activation (P<0.05) and increased ALT levels (P<0.05), but did not show a significant difference in serum TNF-alpha compared to control. Similarly, in 2011 Sakai et al. increased the activation of NF- $\kappa$ B in hepatocytes by administering receptor activator of NF- $\kappa$ B ligand (RANKL) in mice subjected to partial hepatic I/R. Compared to control, the RANKL treated group showed a reduction of ALT (P<0.05) and total necrosis (P<0.05) with an increase in expression of the anti-apoptotic gene Bcl-2 (P<0.05).

**CONCLUSION:** The critical role of NF- $\kappa$ B in hepatic I/R injury is evident in several different studies. Although still unclear, NF- $\kappa$ B appears to primarily induce the upregulation of anti-apoptotic genes in parenchymal hepatocytes, contrary to nonparenchymal cells, in which NF- $\kappa$ B induces the expression of pro-inflammatory genes. When stimulated or inhibited in the proper cell type, NF- $\kappa$ B resulted in decreased liver injury, inflammatory cytokines, and ROS. Therefore, the proper use of pharmacological interventions that target a particular aspect of NF- $\kappa$ B activation may be promising methods of minimizing liver I/R injury.

## INCIDENCE OF HIP AND KNEE DISLOCATIONS IN EXTREME SPORTS

Vinay Sharma, Tom Valikodath, Jeffrey Freyder, Vani Sabesan

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** During the past couple decades; there has been an increase in participation with extreme sports. Although hip and knee dislocations are uncommon injuries in the US population, these types of injuries may be more common among extreme sport participants due to the inherently high-energy and risk seeking nature of the sports.

**RATIONALE:** The purpose of this study was to describe the epidemiology of hip and knee dislocations in nine extreme sports over a six-year span from 2007 to 2012.

**MATERIAL & METHODS:** The National Electronic Injury Surveillance System (NEISS) was used to acquire data for nine sports collected in one-year intervals from January 1, 2007 to December 1. Hip and knee dislocation data was collected from the NEISS database for each sport per year. The sampling weight is assigned to each injury case through the NEISS and national estimates for different injuries were calculated by summing the sampling weights. Incidence rates were calculated for extreme sports using data from Outdoor Foundation Participation Reports.

**RESULTS:** Based on sampling weights national estimates for the nine sports analyzed in this study, resulted in a total estimate of 9,296 knee dislocations (1,549 per year) and 720 hip dislocations (120 per year) over the six-year period. Overall there was an 11.6 times higher risk of knee dislocation compared to hip dislocation based on calculated incidence rate ratios. There was no significant difference between the occurrence of knee or hip dislocations between males and females in the nine extreme sports ( $p=0.63$ ,  $p=0.55$ ). The highest incidence of hip and knee dislocations in extreme sports occurred in those who were ten to nineteen years old, with a weighted estimate of 3,155 (34%) knee dislocations injuries and a weighted estimate of 458 (63%) hip dislocations. The calculated incidence rate of a knee dislocation resulting from any activity in the US population was 134.7 dislocations per 1,000,000 person-years while the incidence rate of a hip dislocation in the US population was 47.7 dislocations per 1,000,000 person-years, resulting in a calculated incidence rate ratio of 2.82.

**DISCUSSION:** This study presented estimated incidence of hip and knee dislocations in the U.S. extreme sports population, with use of a larger CPSC and Outdoor Foundation database with validated weighting. Overall, extreme sport participants are 11 times more likely to dislocate their knee than their hip. A better understanding of injury rates and incidence especially with a growing participation and more youth involvement could result in improved safety advocacy and prevention programs. Similar programs have been shown to be successful with helmets and they might need to be developed to prevent lower extremity dislocations. Timely medical attention can be difficult for some extreme sports activities, and in the case of hip and knee dislocations, several studies have shown that proper treatment within six hours can greatly improve long-term outcomes.

## **THERE IS MORE TO THAT XANTHOMA THAN YOU THINK: AN INTERESTING PRESENTATION OF MYELOMA**

Devin Malik, Sukhpreet Singh

Western Michigan University School of Medicine, Internal Medicine and Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Xanthomas are a common manifestation of lipid metabolism disorders and can be associated with both hyperlipidemia and normal lipid panel. Diffuse plane normo-lipemic xanthomatosis (DPNX) is a very rare cutaneous entity that is associated with underlying hematologic malignancies. We present a very interesting case of DPNX.

**CASE REPORT:** We describe a 66 years old gentleman with a history of cutaneous lupus well controlled by topical steroid cream, who presented to primary care office for a new rash of 3 months duration. The patient denied any pruritus or pain from the rash. He denied any fever, sick contacts or recent travel. There was no personal or familial history of hyperlipidemia or xanthoma. Exam revealed flat, yellowish plaques in bilateral axillae as well as inguinal fold without any adenopathy, xanthelasma palpebrarum, or tendon involvement. Laboratory investigation revealed total cholesterol of 172mg/dL, triglycerides of 37mg/dL, HDL of 70mg/dL and LDL of 95mg/dL. Complete blood count, complete metabolic profile including kidney function test, liver function test and thyroid profile were normal. Erythrocyte sedimentation rate was elevated at 63mm/hr. C reactive protein, complement level and cryoglobulins were unremarkable. A punch biopsy revealed mononuclear cell infiltrate with numerous foamy histiocytic cells consistent with xanthoma. Further testing with immunofixation demonstrated an IgG monoclonal protein with lambda light chains. Patient was referred to oncology where a bone marrow biopsy showed 20% plasma cells with no signs of end-organ damage was present therefore a diagnosis smouldering multiple myeloma was made.

**DISCUSSION:** DPNX is a very rare entity and presents as a yellowish maculo-papular lesion symmetrically found in flexural folds of skin. It is usually associated with hematological disorders, mainly leukemias and paraproteinemias and rarely can be first sign of an underlying malignancy. The novelty that surrounds the diagnosis is the absence of hyperlipidemia. It is postulated that there is an interaction between paraproteins and lipoproteins which are cleared by macrophages to form complexes and deposit in the skin. The monoclonal antibody interacts with LDL forming an abnormal Ig-LDL complex that is scavenged by macrophages and are deposited in skin, causing xanthomas. Macrophages are believed to have predilection for abnormal LDL complex as opposed to normal LDL allowing the latter to be degraded as per the usual metabolic pathway resulting in normal lipid profile in these patients.

**CONCLUSION:** In a patient with xanthomas and normal lipids, a serum protein electrophoresis should be done to exclude an underlying myeloma, with close monitoring for overt disease manifestations such as renal failure, and bone lesions. This case demonstrates the importance of investigating xanthomas in the absence of hyperlipidemia, as it can often be the first manifestation of hematological disease, therefore physicians should be aware this rare entity.

**SPLENIC RUPTURE AS A COMPLICATION OF DIAGNOSTIC COLONOSCOPY**

Arani D. Nanavati, Mark Loehrke

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Splenic rupture is a rare but life threatening complication of colonoscopy. We are presenting a case where splenic rupture complicated a diagnostic colonoscopy and presented as bloody diarrhea due to ischemic colitis.

**CASE REPORT:** 72 year old female was admitted in the hospital for dysphagia and 40 pound weight loss. She underwent esophago-gastro-duodenoscopy for evaluation of her dysphagia and colonoscopy for evaluation of her weight loss. Patient was found to have some gastritis. She was started on proton pump inhibitor and was discharged home once she was stable. Patient presented to the ER on the next day with sudden onset abdominal pain and bloody diarrhea. On presentation, her blood pressure was 70/40, heart rate 110. Her lactate was 8.6 and creatinine was 3.0. Patient was in hemorrhagic shock. Due to her diffuse abdominal pain, a perforation was suspected as a complication of the colonoscopy. CT abdomen pelvis was performed and she was found to have splenic rupture with complete disruption of the anatomy. The colonoscopy was not a technically difficult study as per the gastroenterologist and there was no major trauma expected. Patient was managed in the ICU and her clinical state was deteriorating rapidly. Surgical intervention was planned but the patient became unresponsive and on CT head she was found to have developed diffuse cerebral edema. Ultimately she was made comfortable.

**DISCUSSION:** Splenic rupture is a rare complication of colonoscopy and it occurs either due to direct trauma or due to traction on the lenocolic ligament. It should be suspected when a patient presents with acute abdominal pain soon after colonoscopy. Depending on the grade of injury the treatment is then chosen.

**CONCLUSION:** Splenic rupture can often mimic intestinal perforation upon presentation but should always be suspected especially if presenting after any gastrointestinal procedures.

## LYMPHOMA TRAPPED IN BLOOD VESSELS

Gagan P. Garcha , Christine Dugan, Sreenivasa Chandana , Eric Feucht

Western Michigan University School of Medicine, Bronson, Kalamazoo, Michigan

**INTRODUCTION:** Lymphomas are known to be great imitators. Intravascular B-Cell lymphoma (IBCL) is an extremely rare type of Non-Hodgkin's Lymphoma (NHL). Diagnosis of IBCL is very challenging and usually made at autopsy.

**CASE REPORT:** A 52-year-old Caucasian female presented with fatigue and diffuse abdominal pain for 4 weeks accompanied by 30-pound unintentional weight loss over 2 months duration. Her past medical, social and family history were non-contributory. On examination, she had hypotension (BP 70/50mmHg), tachycardia (100 beats/min) and hypoxia (94% oxygen saturation on 4L/min oxygen). She was cachectic, had decreased breath sounds in lung bases and generalized abdominal tenderness. Initial labs revealed hemoglobin 11.6mg/dL, WBC 5,000/mm<sup>3</sup>, platelets 15,000/ $\mu$ L, anion gap of 23 with lactic acidosis (9.1mmol/L), LDH 2147 U/L, haptoglobin 98mg/dl (normal 41-165 mg/dL) and ferritin 5127 ng/ml (Normal 13-300 ng/mL). She had worsening respiratory distress on admission which required intubation. Fluid resuscitation was initiated, empiric broad spectrum antibiotics given and vasopressors started for hemodynamic support. CT scan of chest, abdomen and pelvis revealed bilateral pleural effusion, ascites and splenomegaly. An exhaustive work up including pan-culture, fungal serology, broncho-alveolar lavage, hepatitis panel, HIV, DIC panel, rheumatological workup (ANA, anti-dsDNA), transthoracic echocardiogram, colonoscopy, peripheral smear and flow cytometry were unremarkable. Despite all supportive measures, her clinical condition deteriorated fairly rapidly. She developed multi-organ failure and died within 7 days from the day of admission. Autopsy revealed extensive infiltration of small and medium sized vessels with large malignant lymphocytes. The lymph nodes were largely unremarkable. Immunohistochemistry was strongly positive for CD20, consistent with the diagnosis of IBCL.

**DISCUSSION:** IBCL is an extremely rare type of NHL characterized by selective clonal proliferation of lymphocytes, within the lumina of small blood vessels, particularly capillaries, without an extra-vascular tumor or nodal involvement. These lymphocytes lack CD29 and CD54 cell-surface proteins which are required for trans-vascular migration, hence malignant cells remain trapped in small-vessel lumina. Patients present with varied symptoms and are challenging to diagnose. Based on the presence of severe thrombocytopenia, anemia, elevated LDH, our patient did fit in to the category of IBCL associated with hemophagocytosis which is very rarely described in Caucasian population. Peripheral blood smears and flow cytometry can be normal as in our patient. Biopsy of the involved organ is the diagnostic test of choice with literature supporting random biopsy of even normal skin to confirm diagnose if no obvious lesions are present and suspicion is high. IBCL is a very aggressive tumor with grave prognosis and early diagnosis with intensive chemotherapy is crucial for better outcomes.

**CONCLUSION:** Clinicians should be aware of this entity and should have high index of suspicion in appropriate patients.

**PROTON PUMP INHIBITOR INDUCED HYPERCHROMOGRANINEMIA; IS THIS CARCINOID?**

Kwabena O. Adu-Gyamfi, (Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI),  
Marcia K. Liepman, (West Michigan Cancer Center, Kalamazoo, MI)

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** Plasma Chromogranin A(CgA) is a primary marker in the diagnosis and follow up of neuroendocrine tumours (NET). Its reliability in this role is a growing concern. Published literature has identified causes of elevated chromogranin A in the absence of a NET including chronic gastric acid suppression with proton pump inhibitors(PPI). This may cause a diagnostic dilemma.

**CASE REPORT:** A 55 year old man reported a few month's history of episodic flushing, diarrhea and pre-syncope. His past medical history was significant for reflux esophagitis on chronic omeprazole therapy, follicular lymphoma Stage 1 and chronic kidney disease stage 3. Examination was essentially normal without orthostatic hypotension. Work up revealed CgA of 3210ng/ml(Normal range <93ng/ml), which repeated a month later was 5120 ng/ml with ongoing symptoms leading to suspicion of carcinoid syndrome. Thyroid function, serotonin, urine 5-hydroxyindoleacetic acid, plasma free metanephrines and vitamin B12 all returned normal. A PET/CT scan showed no evidence of a NET. Omeprazole was stopped, following which CgA normalized (61ng/ml) within 5months, with cessation of symptoms.

**DISCUSSION:** Hypergastrinemia in the setting of PPI use may have a trophic effect on CgA-producing gastric enterochromaffin-like cells explaining the elevations in CgA. In the follow up of disease-free NET patients, published literature has illustrated this phenomenon of hyperchromograninemia in the setting of PPI use subsequently reversible to varying extents after cessation of PPI's. However this case demonstrates the highest reported level of apparently artifactual hyperchromograninemia.

**CONCLUSION:** We are not aware if such levels have been described with symptoms suggestive of a carcinoid or carcinoid-like syndrome. This interesting finding may require further investigation. PPI's are widely used and physicians should be aware of this phenomenon.

## LUPUS MYOCARDITIS PRESENTING AS ST ELEVATION MYOCARDIAL INFARCTION

Devin Malik, Sourabh Aggarwal Internal Medicine, Sukhpreet Singh Family Medicine

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Systemic lupus erythematosus (SLE) is an autoimmune connective tissue disease that affects many organ systems. Rarely, SLE can involve the myocardium causing myocarditis and a variety of complications including myonecrosis and cardiogenic shock.

**CASE REPORT:** We describe a 62 yo Caucasian gentleman who presented to the hospital with chest pain. Social history was negative for alcohol, tobacco, or drug use. There was no family history of any cardiac problems or early death EKG revealed anterolateral ST elevation myocardial infarction. His troponin was elevated to 19ng/ml and immediately underwent catheterization, which showed non obstructive coronary artery disease. His ejection fraction was very low at 10%. He was significantly hypotensive and developed cardiogenic shock requiring inotropic and vasoactive agents. Records from an outlying hospital a week earlier showed an echocardiogram with an ejection fraction of 55%. Work up revealed a positive ANA with titer of 1:160, and positive double stranded DNA, low complement levels and negative Ro/La antibodies. Rheumatology was consulted started 1g solumedrol for 3 days, then 60mg solumedrol daily. Patient had a repeat echocardiogram done which showed improvement of ejection fraction to 40% 10 days after steroid therapy. Biopsy was considered but not done since patient was improving on steroids.

**DISCUSSION:** Lupus myocarditis can present as ST elevation myocardial infarction because of the transmural involvement of myocyte inflammation. It can lead to prolonged ischemia leading to infarction and cause cardiogenic shock with refractory heart failure. Although a myocardial biopsy was not done, our patient was deemed to have lupus myocarditis because his non obstructive coronary lesions and his ejection fraction improved with steroid therapy.

**CONCLUSION:** Lupus myocarditis should be considered when a patient presenting with cardiogenic shock has non obstructive coronary lesions and a positive ANA.



**PICC YOUR POISON: EUSTACHIAN VALVE ENDOCARDITIS IN A PATIENT WITH SLE**

Anne-Marie Edwards, Abishek Seth, Ifeoluwapo Eleyinafe, Thomas Flynn

Western Michigan University School of Medicine, Internal Medicine, Pediatrics, Kalamazoo, MI

**INTRODUCTION:** Eustachian valve (EV) endocarditis is a rare complication occurring primarily in intravenous drug users, patients with central catheters and in patients with congenital heart disease.

**CASE REPORT:** A 53 year old woman re-presented to the ED with hypertension and vague fatigue but with a new lab finding of elevated creatinine. Physical examination was unremarkable, there was no rash or peripheral edema. She was admitted to the floor with a diagnosis of hypertensive emergency. Blood pressure proved difficult to control over the next few years with development of oliguria and increasing serum creatinine. With high suspicion for a nephritis of autoimmune etiology, appropriate labs (ANA, anti-dsDNA, anti-Smith, anti-Ro/SSA, anti-La/SSB...) were ordered. Her lab results coupled with a renal biopsy confirmed the diagnosis of Lupus Nephritis WHO class II, with a component of MCD. Treatment was started with high dose corticosteroids and her clinical response was monitored in the hospital. Just prior to discharge, she began to develop intermittent tachycardia initially thought to be due to atrial irritation by a peripherally inserted central catheter (PICC). Despite retraction of the PICC, the tachycardia persisted with development of a new grade 3 pansystolic murmur. Blood cultures were positive for Methicillin Sensitive Staphylococcus Aureus and transesophageal echocardiogram showed a large 1.6X1.6 cm vegetation attached to the Eustachian Valve! With the diagnosis of bacterial endocarditis confirmed, nafcillin was initiated and her blood cultures became negative within 48 hrs. She was discharged to a long term care facility with 4-6 weeks of IV Nafcillin.

**DISCUSSION:** The eustachian valve lies at the junction of the right atrium and the IVC. It is a vestigial valve whose function in fetal life is to shunt oxygenated blood from the right atrium away from the right ventricle and into the left atrium. One review of EV endocarditis listed only 16 known cases. The PICC alone puts the patient at risk for an intra-atrial thrombus that is then prone to bacterial seeding. The presence of rare EV bacterial endocarditis is made even more interesting by a cotemporal SLE. While not specific risk factors for EV endocarditis, SLE, lupus nephritis and medications associated with their treatment do cause immune suppression. SLE has been associated with an increased predisposition for valvular lesions and valvular dysfunction especially in the presence of elevated anticardiolipin and antiphospholipid antibodies.

**CONCLUSION:** In this case, it would appear that EV endocarditis developed on the basis of SLE, lupus nephritis, immunosuppressive lupus medications and the presence of a PICC. Our patient's course illustrates the need for increased suspicion of endocarditis in patients with new fever and SLE.

**IN-HOSPITAL MORTALITY AND DISPOSITION AFTER ENDOTRACHEAL INTUBATION  
CORRELATE STRONGLY WITH AGE AND UNDERLYING CAUSE FOR CRITICAL ILLNESS:  
ANALYSIS OF 128,224 INTUBATION PROCEDURES**

Amy Attaway, Sourabh Aggarwal, Shrey Velani, Chintan Shah, Jeffrey Wilt

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Emergent endotracheal intubation remains a vital cornerstone to critical care. However, the decision to intubate and mechanically ventilate a critically ill patient is often complicated secondary to long term prognosis of underlying illness and extent of aggressive treatment a patient would desire in the intensive care unit. Intensivists are often limited by data for in-hospital mortality and disposition status of intubated patients while making crucial decision. Only one previous single center study with a small number of patients has analyzed intubation status in the emergency department and correlated it with in-hospital mortality and overall disposition.

**RATIONALE:** The present study was initiated to determine impact of age and etiology of critical illness necessitating intubation on in-hospital mortality and disposition status of patients.

**MATERIAL & METHODS:** We used the data from the Nationwide Inpatient Sample (NIS) data set. The NIS is a nationally representative survey of hospitalizations conducted by the Healthcare Cost and Utilization Project in collaboration with the participating states. It is the largest all-payer inpatient data set in the United States and includes a sample of US community hospitals that approximates 20% of all US community hospitals. We queried the database for the procedure code of 96.04 which corresponds to insertion of endotracheal tube. Inclusion criteria was limited to non-neonatal and non-maternal discharges and the data with incomplete information on age and disposition were excluded. All the relevant data for the year 2011 was extracted from the NIS database. Chi square was used to compare categorical variables and p value < 0.05 considered statistically significant for the purpose of study.

**RESULTS:** A total of 94,173 discharges were analyzed for age variable. The all cause in-hospital mortality of patients more than 18 years of age who were intubated in hospital was 37.74%. Age was significantly associated with mortality with increase in associated with higher mortality (p < 0.05). In particular, those aged 65-84 had in-hospital all-cause mortality of 50.55%, and those aged 85+ had a mortality rate of 63.29%. Only 9.77% of those aged 65-84 and 3.71% of those aged 85+ had a routine discharge, with the rest requiring short-term hospital stay, rehab, nursing home, or home health care. When the data was analyzed for underlying cause of endotracheal intubation, 76,937 non-neonatal, non-maternal discharges were analyzed. The most common cause for intubation was septicemia, which represented 19,686 discharges, with the second most common cause acute cerebrovascular disease at 7,645. Pharmacologic-related category including “poisoning by psychotropic agents”, “poisoning by other medications and drugs,” and “substance-related disorders,” represented a major proportion of intubations with total of 16,782 discharges. Cardiac arrest and ventricular fibrillation had the highest percent of in-hospital death at 84.39%, followed by acute myocardial infarction at 61.74%, acute cerebrovascular disease at 60.67%, and septicemia at 56.12%. The highest rate of leaving against medical advice was seen in alcohol-use disorder at 7.25%, followed by substance-related disorders at 5.98% and “poisoning by other medications and drugs” at 5.47%.

**DISCUSSION:** Our study has few limitations. This is a retrospective analysis of data. The data for intubation involves both pre-hospital and in-hospital intubations and sub-analysis of both differently could not be done. So we cannot comment on prognostic differences of pre-hospital intubation versus in-hospital intubations as previous studies have done. Our findings also does not include long-term morbidity or mortality at 30 or 90 days. However, the disposition of these patients gives clues to the long-term morbidity associated with these critical illnesses.

**CONCLUSION:** Our study re-confirms that the elderly overall have high rates of in-hospital mortality when they are treated for respiratory failure with endotracheal intubation. Those who are intubated for cardiac arrest and ventricular fibrillation, acute myocardial infarction, or acute cerebrovascular disease had high rates of in-hospital mortality regardless of age. This data can help clinicians weigh the risk and benefits of aggressively treating certain populations of critically ill patients with endotracheal intubation.

## **SHOW ME THE MONEY: CAN AN INTERACTIVE TEAM-BASED CONFERENCE BE AN EFFECTIVE TOOL TO PROMOTE COST CONSCIOUS CARE**

Ross Driscoll, Amy Attaway, Stephen McGinnis, Shrey Velani, Kristin Harjer, Andrew Whipple, Theotonius Gomes, Christine Honor

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** The United States spends more than any other developed country on health care. It is estimated that more than 700 billion dollars is wasted annually in the United States; 87% of this, or 609 billion dollars, is due to wasteful spending by physicians. Previous studies on cost conscious care have shown that interactive learning works well to help educate physicians about healthcare spending and is superior to an informational, non-interactive presentation.

**RATIONALE:** To make physicians more cost conscious about ordering tests in order to reduce wasteful spending and maximize high value care by enhancing clinical reasoning and awareness of the costs of labs and imaging.

**MATERIAL & METHODS:** A pre and post survey on cost conscious care was administered during an educational conference with attending physicians, residents, and medical students. Each group was provided with the costs of common labs and diagnostic imaging. Then, an interactive real life clinical scenario was presented, and teams were challenged to arrive at the diagnosis of the case using the least amount of healthcare dollars. Student's t test was used to analyze the survey results that were in Likert scale format. The Likert scale ranged from 1 to 9 with 1 meaning "least agree" and 9 meaning "most agree." The t test was two-tailed. The groups sometimes had equal or unequal variance depending on the amount of people in the group and the test was adjusted for this accordingly. Chi square was used to analyze results that were Yes / No questions (Fisher's test).

**RESULTS:** The results of the session were largely positive. On a scale of 1 to 9, participants ranked an average of 6.65 (SD 1.18) when asked if the session had increased their awareness of the costs of lab tests / imaging. Results from the survey showed that 63.2% of participants had no prior training on cost conscious care. Attendings and senior residents were more likely to have had previous training when compared with medical students and PGY1 ( $p = 0.0007$ ). 63% of participants felt that the session in cost conscious care would change the way they order tests. Interestingly, there was no difference between the level of training of the participant and the decision whether or not the session would change how they order tests. In terms of the interactive learning exercise, the attending team spent the largest amount of healthcare dollars (\$6985) to arrive at the diagnosis compared with the two resident teams (\$1430 and \$3415). However, the resident teams were less likely to follow accepted clinical guidelines such as ordering an MRI for a patient with stroke-like symptoms.

**DISCUSSION:** Our QI project brings up several interesting points about cost conscious care. While the level of training is more strongly associated with prior education about cost conscious care, the group with the most training (ie the attending group) ended up spending the most on labs/imaging to arrive at the correct diagnosis. The majority of participants felt that educational sessions on cost conscious care are beneficial. However, a significant minority of participants (37%) did not feel that the exercise would change how they order tests. This echoes concerns that physicians have raised about the costs of a test biasing their decision-making process and limiting their ability to diagnose a problem.

**CONCLUSION:** Physician orders for inappropriate or unnecessary lab tests and imaging are responsible for the greatest increase in health care spending in the United States. Despite this, there is little to no dis-incentive to individual physicians for ordering these tests. Interactive educational cost conscious awareness sessions like the one used in this study are one of the best ways to teach physicians to be more responsible stewards of limited health care resources. Introducing this reasoned approach earlier in medical education and training may help limit students and residents from adopting excessive and unnecessary ordering practices often modeled by physicians without this training.

## PROCALCITONIN AS A VALUABLE MARKER TO DETECT BACTERIAL INFECTION IN ESRD PATIENTS

Amy Attaway, Rasha Abdulmassih, Thomas Flynn, Anita Charochak, Matthew Zaccheo

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Procalcitonin (PCT) is a peptide composed of 116 amino acids, normally produced by C cells of the thyroid gland. Studies have shown that LPS and various proinflammatory cytokines (IL6, TNFa, IL2) have pronounced stimulatory effects on expression of PCT mRNA, and that during severe bacterial infection and sepsis it is synthesized by other cells including leukocytes, macrophages, monocytes in the liver, and neuroendocrine cells of the lungs and intestines.

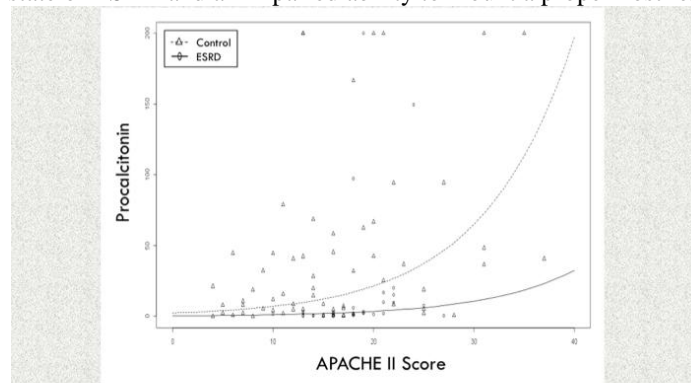
**RATIONALE:** To date, PCT has emerged as a valuable aid in diagnosing bacterial sepsis in newly admitted, critically ill patients, and when used with clinical algorithms has shown to decrease the use of antibiotics without increasing risk for patients.

**MATERIAL & METHODS:** From January to September 2012, 33 ESRD patients (both hemo and peritoneal dialysis) presented to Bronson or Borgess hospital in Kalamazoo, MI, who met criteria for sepsis and had a clear infectious source. Their APACHE II score was calculated according to their admission vitals, labs, and past medical history. The control group included 63 patients without underlying immunodeficiency who met criteria for sepsis as well as had positive blood cultures.

**RESULTS:** The average PCT score for the control was 42.2, and average APACHE II was 15.9. For the ESRD group, the average PCT was 17.1, and average APACHE II was 17.4. APACHEII scores were found to correlate significantly with the degree of elevation of PCT in both groups (control  $p=0.0002$ ; ESRD  $p<0.0001$ ). These values were graphed by scatter plot, and estimated regression analysis found that relationship between the two to be logarithmic in both the control and ESRD groups.

**DISCUSSION:** Previous studies have shown that the baseline PCT level in a non-infected patient with ESRD to be higher secondary to the chronic inflammation of uremia. The effect of uremia on the immune system is felt to be complex, and leads to an overall immune deficient state and an impaired ability to mount a proper host response. It should be noted that there is a correlation between renal impairment in chronic kidney disease and ESRD patients at baseline due to decreased excretion of PCT. This has also been shown in pre and post hemodialysis patients who show a decrease in the level of PCT. Finally, our control group had confirmed blood stream infection while not all of our ESRD had culture positive blood stream infection. This could have skewed the severity of illness in the control group towards a higher number. However, APACHE II should have controlled for the severity of illness.

**CONCLUSION:** To date, there has not been a study that compared procalcitonin in patients with ESRD in sepsis to a control population also in sepsis. While non-infected ESRD patients may have a higher baseline PCT, our study shows that those in sepsis have a significantly lower PCT compared to controls. Possible explanation for this is the overall immune deficient state of ESRD and an impaired ability to mount a proper host response.



**Figure 2:** Procalcitonin levels graphed according to APACHE II score divided into the ESRD and control group. The degree of elevation of PCT was found to be significantly higher in the control group when compared to the ESRD population. The logarithmic ratio between the groups was calculated and, given the same APACHE score, a person in the ESRD group had  $\exp^{-1.8} = 0.1647856$  times PCT level compared to the control.

**DRUGS ARE BAD: SEVERE SPRUE-LIKE ENTEROPATHY SECONDARY TO OLMESARTAN**

Amy Attaway, Mirjana Stancic, Richard Roach

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Olmesartan, a type of angiotensin receptor blocker (ARB), has been reported to cause severe sprue-like enteropathy in a case series published by Mayo Clinic Proceedings in 2012. Since then there have been two additional case reports reporting this rare side effect. Diagnosis of this entity can be elusive due its indolent presentation.

**CASE REPORT:** Our patient is a 73-year-old Caucasian female with past medical history of hypertension treated with olmesartan (40 mg) for three years. She had experienced 8 months of abdominal pain for which she had had an EGD showing gastritis and biopsy findings of “foveolar hyperplasia.” H. pylori was negative. She experienced worsening pain and refractory nausea, vomiting and diarrhea and was admitted. Celiac panel was negative with low IgA. Her olmesartan was stopped due to low blood pressures from dehydration. Repeat EGD and colonoscopy showed chronic active duodenitis and villous atrophy. There was involvement of the ileum and colon as well. The pathologist felt these findings were consistent with olmesartan-induced enteropathy. The patient was started on high dose IV steroids and improved. She was subsequently discharged after almost a month in the hospital.

**DISCUSSION:** The underlying mechanism for olmesartan induced sprue-like enteropathy is currently unclear. The long delay in development of enteropathy suggests a cell-mediated immune process. Moreover, ARBs have been shown to inhibit TGF beta, which is an important cytokine in the maintenance of gut homeostasis. It is not yet known if this represents a class side effect of all ARBs or is limited to olmesartan.

**CONCLUSION:** In addition to the report in Mayo Clinic Proceedings in 2012, this represents the third case of olmesartan induced sprue-like enteropathy reported. It is important for clinicians to know about this potential side effect due to the severity of its clinical presentation as well as the difficulty in diagnosis.

## HIGH TRAUMA SERVICE UTILIZATION BY VICTIMS AND PERPETRATORS OF PARTNER VIOLENCE

Catherine L. Kothari, Rashmi U. Kothari, Thomas Rohs, Scott Davidson, Carrie Klein, Amy Koestner, Mican DeBoer, Rita Cox

Western Michigan University School of Medicine, Kalamazoo, Michigan

**INTRODUCTION:** To date, the majority of research into health service utilization of intimate partner violence (IPV)-involved individuals has focused upon female victims and has been shown to be quite high. Early evidence suggests that male IPV victims have trauma service utilization that is as high as females, and that perpetrators' utilization may be as high as victims'.

**RATIONALE:** Little is known about trauma system utilization by IPV perpetrators or by IPV-involved males. The goal of this study was to identify the relative volume of emergency department (ED) visits and injury-related hospitalizations generated by IPV victims and perpetrators of both genders.

**MATERIAL & METHODS:** This study utilized an observational cross-sectional design to identify the annual prevalence and incidence of emergency department visits and injury-related hospitalizations for IPV-involved individuals in Kalamazoo County Michigan in 2010. Datasets were exported from administrative records within Kalamazoo County Prosecutor's Office, Borgess Medical Center and Bronson Methodist Hospital. The study population of IPV-involved individuals was the 2,937 individuals who were named as a victim or a perpetrator in one or more IPV-related criminal charging requests submitted to Kalamazoo County Prosecutor's Office in 2010. All emergency department visits and all injury-related admissions (ICD-9 codes 800-959.9) within either hospital system during 2010 were also exported. Datasets were linked using LinkPlus, a software that utilizes probabilistic record linkage for matching alpha-numeric identifiers across datasets. Data analysis was completed using SPSS v.21.0, with two-tailed significance levels set at  $p < .05$ .

**RESULTS:** Of the 2,937 IPV-involved individuals, 131 had bi-directional crime roles (they had been both a victim and a perpetrator in a crime), 1,419 had only ever been victims, and 1,387 had only ever been perpetrators. Regardless of crime role, IPV-involved individuals had ED-visit rates that were 4.1 times higher and injury-related hospitalizations that were 4.0 times higher than age-adjusted national norms. Bi-directional individuals, although a small group, had the highest rates, 8.4 times higher emergency department visits than national norms and 22.5 times higher injury-related hospitalizations. Female victims had the greatest volume of ED-visits (2,891 of the total 5,285 visits generated by this population), but males, both victim and perpetrator, had the greatest proportion of injury related visits and hospitalizations.

**DISCUSSION:** In a broad examination of trauma system utilization, one that crosses crime-role lines as well as gender lines, this study found that those experiencing bi-directional partner violence had the highest levels of emergency department visits and injury-related hospitalizations, regardless of their gender. Individuals involved in the remaining uni-directional cases, which constitute the vast majority of IPV criminal incidents, had elevated rates of emergency department visits across the board, with the highest emergency department volume by female victims. A different picture emerges with injury hospital admissions, where uni-directional perpetrators, predominantly males, have substantially more hospitalizations than victims, both in sheer number and in comparison with age-matched national rates. Despite these differences, IPV-involved individuals share several commonalities in addition to their increased injury related care: Relatively few visits on the same day as the known crime, the majority of emergency department visits for non-injury reasons, and very few injuries requiring hospitalization.

**CONCLUSION:** Trauma service utilization among IPV-involved individuals is substantially higher than national norms. Within this population, however, visit volume and presenting complaint varies by gender and by crime role.

## CUTANEOUS METASTASES AS INITIAL MANIFESTATION OF LUNG CANCER

Shaina L Riggs, Dwight J. Slater, Leandra H. Burke, Lisa A. Miller

Western Michigan University School of Medicine, Surgery, Kalamazoo, MI

**INTRODUCTION:** Cutaneous metastases is a less common site of occurrence from lung cancer as compared to metastases to other organs and is even much less common as the initial manifestation. The most frequent sites of metastases involving primary lung cancers include the liver, bone, brain, adrenal glands, and the contralateral lung. Common clinical presentations include cough, dyspnea, new onset wheezing, and hemoptysis, especially in patients with a history of smoking over age 40. Patients who present with symptoms at time of diagnosis are associated with a worse stage and prognosis.

**CASE REPORT:** A 77 year-old male presented to a community facility with complaint of rapidly enlarging skin lesion on his right flank. This lesion had been present for approximately six weeks and upon presentation a 3.5 x 4.5 x 1.5 cm ulcerated and bleeding lesion was clinically evident along with a newly formed left jaw lesion that was similar in appearance to the initial stages of the back lesion. At this time, patient denied any recent fevers, chills, or weight loss. He had a past medical history of diabetes, HTN, CKD, and CAD. He denied any history of radiation or cancer. Patient did have a significant smoking history of 50+ pack years. The patient underwent excisional biopsies of the lesions in which pathology revealed well-differentiated squamous cell carcinoma and patient was referred to Oncology for further treatment of his skin cancer. No more than two weeks post-operatively, the patient presented to the emergency room with massive hemoptysis, upon further evaluation, a diffuse left mainstem bronchus tumor was found during bronchoscopy revealing the primary squamous cell carcinoma of the lung.

**DISCUSSION:** Cutaneous metastases are rare occurrences but important to recognize as a possible manifestation of underlying primary malignancy. Besides primary lung cancer, other primary internal malignancies associated with skin manifestation include breast and colorectal. The most common areas of skin lesions are associated with the site of primary malignancy, such as the thorax in lung and chest in breast cancer. Prognosis is poor for patients presenting with skin manifestations at the time of diagnosis and usually represents advanced disease with involvement of other organs being common. The mean survival of these patients is usually a few months, and in our case, the patient survived approximately one month after diagnosis.

**CONCLUSION:** We present a rare case of primary lung cancer with initial manifestation of cutaneous metastases.

**EQUINE RELATED INJURIES IN SOUTHWESTERN MICHIGAN**

Scott Davidson, Paul Blostein, Sheri VandenBerg, Andrew Schrottenboer\*

Trauma Burn and Surgical Critical Care Program, Bronson Methodist Hospital, and WMED\*  
Kalamazoo, MI

**BACKGROUND:** The size (~1100 lbs.), the speed (up to 40 mph) and unpredictable nature of horses presents a significant risk for injury in equine related activities. Leisure and sporting activities have increased in popularity. Bronson's Level I Trauma Center includes rural communities and has treated many equine related injuries. Our objective was to examine the mechanism of injury, body regions injured, severity, frequency and complexity of surgical intervention, occupational and/or physical therapy requirements, complications, safety equipment utilization, charges, insurance, and discharge disposition in this population in an effort to identify opportunities for education, injury prevention, and potential need for transfer to a tertiary referral center.

**METHODS:** Patients of all ages who were admitted to Bronson after sustaining an equine related injury from January 2002 through December 2011 were identified through a query of the trauma registry. Inclusion criteria encompassed all equine related activities and any patient whose injury was sustained by falling, being kicked, bucked, thrown, trampled, crushed, pinned, or bitten by a horse and included ICD-9 codes E828 and E906. Charts were retrospectively reviewed for the following data points: gender, age, length of stay, injury severity score, mechanism of injury, diagnosis, safety equipment worn, years of riding if applicable, surgical procedures, complications, occupational and/or physical therapy, hospital charges, insurance status, and discharge disposition.

**RESULTS:** Ninety patients met inclusion criteria; 63 females (70%) and 27 males (30%), aged ( $\% \pm SD$ )  $37.33 \pm 19.45$ , range 3-76 years. Length of stay was  $3.67 \pm 4.5$ , range 1-33 days, and injury severity score  $12.89 \pm 8.4$ , range 1-41. The majority (83/90) of patients were on or near the horse for recreational purposes, 4 were working with or nearby, 2 were cowboys in a rodeo, and 1 a sulky driver. Mechanism of injury (MOI) included; fall from horse (46.7%), thrown from horse (28.9%), kicked by horse (23.3%), with multiple patients sustaining more than one MOI. Body regions injured included; chest (23%), brain/head (21.5%); cervical, thoracic, and/or lumbosacral spine (14.1%), abdomen (12.6%), face (9.6%), pelvis (8.9%), lower extremity (6.7%), and upper extremity (3.7%). Thirty-four patients had two or more body regions injured. Thirty patients (33%) required 57 surgical procedures including complex pelvic reconstruction (14), face (12), brain (10), spine (8), lower extremity orthopedic (6), abdomen (5), and chest (2). Injury severity score in surgical patients was  $16.47 \pm 9.48$  vs.  $11.1 \pm 7.24$  in non-surgical patients. Minor complications were seen in four patients. Occupational therapy was required in 20% of patients and 33.3% required physical therapy while hospitalized. Ninety percent of patients were discharged directly home following hospitalization with 3.3% requiring rehabilitation. One patient sustained a cord injury resulting in T-12 paraplegia. Of the six patients (3.7%) who expired in our study, two were kicked by the horse and the remaining four fell from the horse, all sustaining extensive head injuries. Safety equipment was not used in 91.9% of patients. Helmets were worn in only 7 subjects with riding boots and chaps used by one patient each. Riding experience was only documented in two patients. Mean hospital charges were  $\$29,653.56 \pm 34,424.15$ . Commercial insurance was carried by 46.7%.

**CONCLUSION:** Equine related injuries in southwest Michigan occur due to falls and kicks sustained while pursuing recreational activities consistent with rates seen in current literature. Our patients experienced more severe injuries to the trunk and head compared to previous studies that documented higher rates of extremity injuries. Similarly, surgical intervention for pelvic, facial, and brain injuries were higher than that previously reported. Infrequent use of helmets and other safety equipment contributes to the risk of severe injury and provides opportunities for educational and injury prevention strategies for anyone participating in equine related activities. Our data also support the need for complex surgical intervention by multiple specialties and as such are often best treated by transfer to Level I and II Trauma Centers.



## UNUSUAL CAUSE OF RECURRENT RIGHT UPPER QUADRANT PAIN

M. R. Pryor, S. A. Shebrain

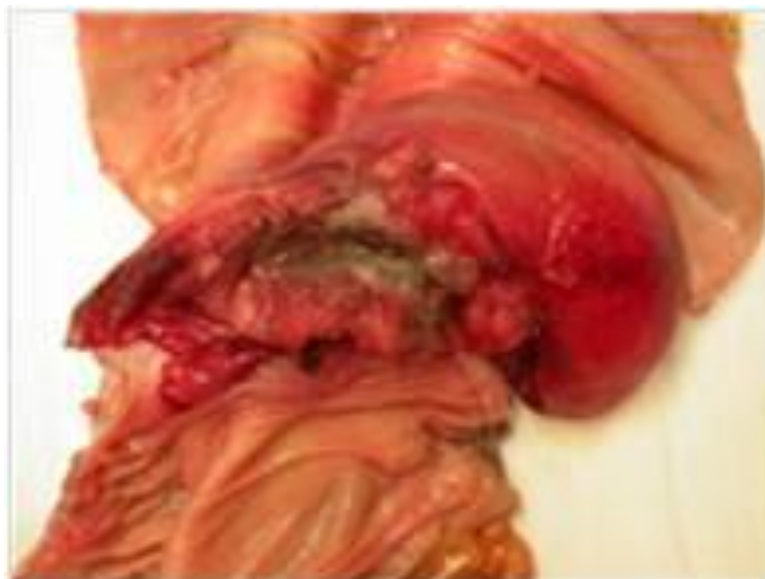
Western Michigan University School of Medicine, Department of Surgery, Kalamazoo, MI

**INTRODUCTION:** Ninety percent of intussusception cases in adults occur in the small or large bowel and require surgical intervention. Cancer is the cause of intussusception in 70% of large bowel cases and 30% of small bowel cases. The clinical presentation is usually nonspecific, and can include nausea, vomiting, and intermittent moderate to severe abdominal pain. Here we present a case of intussusception with an unusual presentation.

**CASE REPORT:** The patient is a 39 year-old female who presented with several months' history of recurrent, intermittent right upper quadrant (RUQ) abdominal pain associated with nausea but no emesis. The patient denied fevers, chills, chest pain, or shortness of breath. The patient had been evaluated multiple times for this problem. Her work-up included an ultrasound of the RUQ of the abdomen as well as a HIDA scan; both were negative for obvious pathology. On physical exam in the Emergency Room, the patient's abdomen was soft and non-distended, with minimal tenderness over the lower abdomen, but more pronounced at the right upper and lower quadrants without guarding. There was no palpable mass or organomegaly. Her laboratory tests were within normal range. A CT scan of the abdomen and pelvis showed intussusception in the hepatic flexure of the colon with cecum mildly distended. Gastrografin enema showed irregular narrowing of the ascending colon, concerning for underlying colonic mass. A colonoscopy was performed and showed a large ascending colon mass; biopsy of which revealed invasive colorectal adenocarcinoma. A laparoscopic right hemicolectomy was performed; the tumor was the leading point of the intussusception. Final diagnosis was T3N1Mx colon adenocarcinoma.

**RESULTS:** The patient recovered uneventfully from surgery and was discharged from the hospital on postoperative day 7 with subsequent adjuvant chemotherapy several weeks after.

**CONCLUSION:** Although recurrent RUQ pain is a common symptom, and is typically of biliary origin, episodes of unexplained cause require further evaluation to avoid delay in diagnosis of underlying cancer.



## SELECTINS IN LIVER ISCHEMIA AND REPERFUSION INJURY

Ryan T. Jones, Luis H. Toledo-Pereyra

Michigan State University College of Osteopathic Medicine, Western Michigan University School of Medicine  
Department of Research, Kalamazoo, MI

**INTRODUCTION:** Selectins are a group of calcium dependent lectins that mediate the early stages of leukocyte response to liver ischemia/reperfusion (I/R) injury. Three different types, P-, L-, and E- are known and vary in expression timing and cellular host. Inflammatory mediators including interleukin-1 (IL-1), tumor necrosis factor alpha (TNF- $\alpha$ ), and reactive oxygen species (ROS) alter gene transcription and increase the production of selectin molecules upon reperfusion. Selectins in turn increase leukocyte rolling and initiate structural changes to facilitate eventual migration into tissue. Ligand-selectin binding also initiates intracellular signaling cascades increasing the production of chemokines and further inflammatory mediators. Together this results in a selectin-mediated inflammatory model that increases the immunological response in liver I/R injury.

**RATIONALE:** Selectin blockade and/or expression reduction may reduce the inflammatory response of leukocytes to liver tissue in I/R injury. With decreased ligand-selectin binding the inflammatory response and loss of tissue could be reduced or even prevented.

**HYPOTHESIS:** Does selectin molecule blockade or alteration reduce the inflammatory response and incidence of tissue loss in liver Ischemia Reperfusion injury?

**ANALYSIS OF DATA:** An extensive PubMed literature search resulted in peer-reviewed, published articles from 1998 to present that examined the expression, roles, and inflammatory pathways selectins mediate. This review confirmed that all three selectin types play an important role in the mediation of the inflammatory response in liver I/R injury. P-selectins found on endothelial cells initiate the rolling phase of leukocyte extravasation and facilitate further production of pro-inflammatory molecules in the immunological response. For example: Martinez-Mier et al (2000) demonstrated that P-selectin deficient animals have a lower expression of both chemokines macrophage inflammatory protein alpha (MIP-1 $\alpha$ ) ( $p < 0.05$ ) and macrophage inflammatory protein-2 (MIP-2) ( $p < 0.05$ ). L-selectins, expressed only upon leukocytes, also facilitate the initial rolling phase upon endothelial cells. L-selectin-ligand binding also initiates intracellular signals to increase chemokine production and conformational changes in structural actin. Articles by Wedepohl et al (2012) and Ivetic and Ridley (2004) described a pathway of L-selectin binding that leads to intracellular changes allowing for conformation changes of structural actin inside leukocytes and enhanced adhesion molecule binding. This is thought to allow for increased margination and eventually migration of neutrophils into tissue. E-selectins are expressed upon cells only in pro-inflammatory conditions/situations. Nuclear factor kappa B (NF $\kappa$ B) and c-Jun N-terminal kinase (JNK) are suspected mediators in E-selectin gene expression and eventually translation. Rahman et al (1998) demonstrated that blockade of the TNF- $\alpha$ -NF $\kappa$ B pathway resulted in a maximum reduction of 90% E-selectin mRNA versus control. Laviola et al (2013) found that increased p66Shc phosphorylation in the JNK pathway lead to increased E-selectin mRNA expression ( $p < 0.05$ ). Upon expression, E-selectins function to decrease the rolling velocity of leukocytes, allowing for increased adhesion molecule interaction. Sreeramkumar et al (2013) also found mice deficient in two E-selectin ligands had 80% ( $p < 0.001$ ) less neutrophils responding to inflammation.

**CONCLUSION:** The successful blockade of these receptor-ligand interactions and/or signaling pathways would reduce the inflammatory response and improve tissue preservation in liver I/R injury. With decreased selectin activation less leukocyte attraction and rolling would occur, along with the decreased production of further inflammatory mediators and structural changes in involved molecules and cells. This would improve liver tissue protection and outcomes in liver I/R injury.

## HOW DID THE 2005 USPSTF RECOMMENDATIONS FOR ABDOMINAL AORTIC ANEURYSM SCREENING AFFECT MORTALITY?

Sukhpreet Singh - Family Medicine, Devin Malik, Sourabh Aggarwal - Internal Medicine

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** The United States Preventive Services Task Force recommended in 2005 that all men between the ages of 65 to 75 years who have ever smoked should be screened once for Abdominal Aortic Aneurysm (AAA). However, the clinical impact of these recommendations in the United States population are unknown.

**RATIONALE:** To determine whether the USPSTF screening guidelines changed mortality

**MATERIAL & METHODS:** We queried Nationwide Inpatient Sample (NIS) data for AAA rupture using ICD9 code 441.3. The NIS represents 20% of all hospitals data in the US. Total hospitalizations and in-hospital mortality for pre-screening years (2000-2004) was compared with post-screening years (2006-2010) AAA-rupture.

**RESULTS:** A total of 63,526 hospitalizations secondary to AAA rupture were analyzed. Hospitalizations from AAA-rupture decreased from 9.51 to 7.03 per 10,000 total hospitalizations ( $p < 0.001$ ) with mortality decreasing from 49.9% to 44.6% ( $p < 0.001$ ). On sub-analysis decrease in hospitalizations was reciprocated in 65-84 age group (70.08 to 64.94 per 100 AAA-rupture admissions,  $p < 0.001$ ) and males (73.23 to 71.7 per 100 AAA-rupture admissions,  $p < 0.001$ ). However, hospitalizations increased in age group 45-64 (14.41 to 15.43 per 100 AAA-rupture admissions,  $p < 0.001$ ), age 84+ (15.21 to 19.2 per 100-AAA rupture admissions,  $p < 0.001$ ) and females (26.28 to 28.28 per 100 AAA-rupture admissions,  $p < 0.001$ ). In-hospital mortality from AAA-rupture decreased significantly in all age and gender sub-groups independently.

**DISCUSSION:** Our study reveals that post screening recommendations, hospitalizations from AAA-rupture decreased in males and age group 65-84, with increase in other age sub groups and females.

**CONCLUSION:** Thus, our study makes the case to consider extension of recommendations to include other susceptible groups including younger men and perhaps to start including women in the screening protocol. Further prospective studies might be needed to support the data.

## DIABETES SELF-MANAGEMENT EDUCATION (DSME) ACCESS

Jane Hanneken, Amy B. Curtis, Catherine L. Kothari, Diana Hassan, Cheryl Tenenbaum, Becky Emerson

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, Michigan

**INTRODUCTION:** In addition to proper medical treatment, growing evidence supports the importance of self-management, through diet and physical activity, to prevent diabetes-related complications. Ten hours of diabetes self-management education (one hour for assessment and nine hours for education) is recommended for people with diabetes in the first year following diagnosis, and follow-up DSME services include two hours per calendar year in subsequent years. For DSME services to be covered, a referral is required from the treating physician for the services. Diabetes education is underutilized, with the Centers for Disease Control Healthy People 2000 and 2010 reporting 42% and 40% of people with diabetes do not attend classes.

**RATIONALE:** To evaluate, in an urban, community, patient centered medical home Family Medicine Residency Practice in Kalamazoo County, Michigan the rates of DSME, and the factors and characteristics associated with diabetes self-management education referral and attendance.

**MATERIAL & METHODS:** This is a retrospective study linking medical data with DSME billing data for a sample of Western Michigan University School of Medicine Family Medicine patients diagnosed with diabetes. Data was collected and exported into spreadsheets from the participating medical facilities (Western Michigan School of Medicine, Borgess Medical Center and Bronson Methodist Hospital), and was abstracted through medical record review at Western Michigan School of Medicine. The study sample of 699 patients was comprised of Family Medicine patients who were adults age > 19 who had a visit during the period 12/1/2006 to 12/1/2009 containing the diabetes-related ICD-9 code '250'. Medical record review identified our sub-sample of 141 of patients who were newly diagnosed with diabetes during this time. Patients were excluded if no additional visits were documented after the new diagnosis visit. Western Michigan School of Medicine Information Technology Department produced the sample list. Pearson Chi Square test was used to calculate statistical significance, with two-sided significance levels set at  $p < .05$ .

**RESULTS:** Of our sub-sample of 141 individuals with new onset diabetes, 65 (46.1%) attended DSME within a year of diagnosis and 76 (53.9%) did not. There was no race or gender differences between the groups (67.7% non-Hispanic White and 67.7% female), but the mean age at diagnosis was 49.1 for those who attended DSME, and 54.5 for those with no education ( $p = .027$ ). Of our 76 new onset patients who did not attend DSME, 29 (38.2%) had referrals documented, and 47 (61.8%) did not. A total of 94 (65+ 29) or 66.7% of the 141 had referrals to DSME. There was no race or gender difference between this group that had referrals and ones with no referrals. Of the 557 who had existing diabetes, 129 (23.5%) had subsequent DSME. Among this pre-existing-diabetes group, there were no racial or age-related differences between those who attended DSME and those who did not, but 26.2% were female and 18.4% were male ( $p = .034$ ).

**DISCUSSION:** In the Family Medicine Residency practice, the rate for not attending DSME was 53.9% for patients with a new diagnosis of diabetes, which is higher than the CDC recorded rates. The younger the patient at time of diagnosis of diabetes, the more likely to attend DSME. In patients with pre-existing diabetes, females were more likely to attend subsequent DSME. Only 23.5% attended any subsequent DSME throughout the years of the study.

**CONCLUSION:** Interventions could target referrals and tracking of referrals for completion for every patient with new onset diabetes and for established diabetics who could benefit from subsequent DSME.

## **CASE REPORT: CRITICAL HYPERCALCEMIA IN A TERM NEWBORN WITH SUBCUTANEOUS FAT NECROSIS**

Ifeoluwapo Eleyinafe, E. Ethan Ebner

Western Michigan University School of Medicine, Department of Internal Medicine/Pediatrics, Kalamazoo, MI

**INTRODUCTION:** Subcutaneous fat necrosis (SCFN) is an uncommon complication of therapeutic cooling, hypoxia at birth, and birth trauma that can cause significant hypercalcemia and subcutaneous nodule formation. SCFN is an inflammatory condition characterized at first by necrosis of adipose tissue, and later by nodular calcium deposition in these same areas of necrosis. It is seen primarily in newborns that undergo therapeutic hypothermia for hypoxic ischemic insults to the CNS, however it may also arise after birth trauma. Various causes of hypoxia predispose to SCFN, including perinatal asphyxia, meconium aspiration, cord accidents, hypothermia-cold exposure, hypoglycemia and lactic acidosis. SCFN manifests usually in the first few weeks of life, with nodules arising in the face, torso, back, and proximal extremities. It often causes significant recurrent hypercalcemia as well, necessitating ongoing monitoring.

**CASE REPORT:** We report a 7 week old female who was admitted with recurrent critical hypercalcemia. She was born at 41 and 3/7 weeks after an uncomplicated pregnancy, weighing 3460 grams. Labor progressed uneventfully and she was delivered via normal spontaneous vaginal delivery. Amniotic fluid was ruptured for 25 minutes, and was noted to be meconium stained. Perinatal aspiration of this meconium led to a hypoxic ischemic event (HIE). APGARS were 0, 3, and 6, with no spontaneous respiratory effort noted. Poor tone and a poor heart rate were also noted. She was initially intubated and received chest compressions for 13 minutes. After 4 doses of epinephrine she did have return of spontaneous circulation. In order to minimize the neurological damage induced by HIE, the patient was treated with therapeutic hypothermia for 72 hours, cooled to 33 degrees celsius. She was stabilized and remained in critical condition. Within 10 days of therapeutic hypothermia, she had developed subcutaneous nodules on the cheeks, torso, bilateral arms, and right sided peri-genital region. It stood to reason that these lesions represented areas of subcutaneous fat necrosis, which is a known complication of therapeutic cooling. The areas of subcutaneous fat necrosis then developed significant calcification, leading to the indurated, hard nodules found on physical exam. Upon discharge the patient was to follow up with her primary care physician for regular monitoring of her calcium levels. At the time of presentation at 7 weeks of life, only the bilateral cheeks and right sided peri-genital region showed any residual evidence of subcutaneous calcium deposits and yet her calcium at that time did rise as high as 14.4. She received IV fluid hydration and lasix followed by a corticosteroid burst. By the third day of hospitalization, calcium levels had decreased to 10.4. She was sent home with instructions to obtain close follow up and repeat basic metabolic profile the next day.

**DISCUSSION:** Subcutaneous fat necrosis is an uncommon but not rare sequelae of adverse birth events including birth trauma, perinatal asphyxia, meconium aspiration, cord accidents, hypothermia-cold exposure, hypoglycemia and lactic acidosis. In the modern era it is most commonly encountered as a complication of therapeutic cooling, and it may result in persistent and often critical hypercalcemia. Subcutaneous fat necrosis is billed under the ICD code 709.3, or degenerative skin disorder. According to the nationally available Healthcare Cost and Utilization Project Database (HCUP), in the United States in 2009, 128 patients had this diagnosis listed at the time of discharge. In 1997, there were 114 patients, in 2000 there were 80 patients, in 2003, 89, and in 2006, 92.

**CONCLUSION:** Subcutaneous fat necrosis is an uncommon clinical entity that can cause significant and critical hypercalcemia. Thus it is important for practitioners who deliver and care for newborn infants to be aware of the presentation and potential complications of this condition, especially in the context of neonatal hypoxia, injury, and therapeutic cooling.

## MASSIVE THYMOLIPOMA PRESENTING AS ABDOMINAL PAIN

Elbert E. Williams, Sreenivasa R. Chandana, Jerry W. Pratt

Michigan State University College of Human Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Thymolipomas are unusual thoracic tumors that sometimes accompany autoimmune disorders or myasthenia gravis. They are very rare, usually presenting in younger patients with an incidence of 1.2 per 1,000,000. These tumors are benign in nature but have the potential to grow to giant proportions. We present one such case of an asymptomatic, massive thymolipoma.

**CASE REPORT:** A 60-year-old male presented to the emergency department with complaints of generalized weakness and abdominal pain. His past medical history is positive only for hypertension and ischemic stroke 2-years prior. In the ED, after a chest x-ray revealed a right chest mass, he received a CT scan of the abdomen, chest, and pelvis. This revealed a 13.2 x 19.3 x 14.8 cm fatty mass above the right hemidiaphragm compressing the right lower lung margins. Also present on CT were small, non-specific mediastinal lymph nodes. Concern for liposarcoma resulted in a fine needle biopsy as well as a referral to hematology/oncology. Upon oncologic consultation, the patient complained of occasional heartburn, mild pain of his right chest, and shortness of breath with strenuous activity. The patient has no previous surgical history. He has a remote history of cocaine abuse and is a former 1 pack per day smoker who has cut back to 3 cigarettes per day. Physical exam revealed decreased breath sounds in the right lung base without wheezes, rhonchi, or crackles. The biopsy revealed fatty tissue consistent with lipoma, however, he was referred to cardiothoracic surgery for resection to definitively rule out liposarcoma. Via a right posterolateral muscle sparing thoracotomy the chest was entered, revealing a large lipomatous mass occupying the lower half of the thorax. There were no attachments to the diaphragm or lung. However, the mass was attached to the pericardium with blood supply branching towards the right internal mammary artery. The blood supply was divided and the mass was removed en bloc with the pericardium, being careful to preserve the largely obscured phrenic nerve. The pericardial defect was repaired with a piece of extracellular matrix bio-scaffold and the chest was closed, leaving a 28-French Blake drain and 32-French Argyle chest tube. Estimated blood loss for the entire procedure was 100 mL and the patient left the operating room in stable condition. He was discharged home several days later without event. Pathology revealed a 25 x 22 x 17 cm thymolipoma, demonstrated by adipose tissue with fibrous bands surrounding strips of thymic tissue lobules including both epithelium and lymphocytes. Hassall's corpuscles were apparent in several foci. No evidence of liposarcoma was noted.

**DISCUSSION:** Thymolipomas are unusual benign tumors composed of variable proportions adipose and thymic tissue elements. These tumors comprise fewer than 10% of all thymic neoplasms with an incidence of 1.2 cases per 1,000,000 people per year. Most frequently, thymolipomas present in young adults in their first 4 decades of life without gender bias. Thymolipomas are sometimes associated with immune disorders or myasthenia gravis. The tumor is frequently found in the anterior mediastinum ranging in size from 4 to 36 cm in extreme cases. Only 30-50% of patients are symptomatic with symptoms most commonly consisting of dyspnea, coughing, chest pain, hoarseness, and cyanosis. Our patient presented only with vague abdominal pain and weakness without any signs of respiratory distress or vascular compromise. Essentially, the mass was discovered incidentally which is surprising given the size of the tumor. Because of concern for liposarcoma and further potential for thoracic compression, resection was warranted. Given the benign nature of thymolipomas, complete surgical resection is curative.

**CONCLUSION:** In conclusion, thymolipomas are extremely rare tumors with variable presentations. When presented with a large lipomatous mass, clinicians need consider a broad differential of lipoma, thymolipoma, well-differentiated liposarcoma, and thymic hyperplasia. Given the variable amount of thymic tissue in these tumors, resection is advised for complete diagnosis and cure.

## THE RELATIONSHIP OF SOCIOECONOMIC AND RACIAL FACTORS, BOTH INDIVIDUAL AND COMMUNITY-LEVEL, TO INFANT BIRTHWEIGHT

Catherine L. Kothari, Rajib Paul, James Wiley, Jane Hanneken, Kathleen Baker, Deb Lenz, Ben Dormitorio, Arthur James, Amy Curtis  
Western Michigan University School of Medicine, Emergency Department, Kalamazoo, Michigan

**INTRODUCTION:** Health inequities, particularly birth outcomes, have been tied to race; large, urban studies have documented neighborhood effects for concentrated minority residents (primarily of black race) upon birth outcomes. Contributing factors identified have been social stress from discrimination, social-political inequities, environmental safety, inadequate healthcare, health literacy and individual health behaviors.

**RATIONALE:** Rarely are individual-level effects and socioeconomic status (SES), primary confounders, considered in these studies. The goal of this study was to examine the relative association of maternal race and SES, at the individual-level and at the neighborhood-level, upon infant birthweight.

**MATERIAL & METHODS:** The study was a cross-sectional design utilizing two secondary datasets of Kalamazoo County, Michigan: (1) Y2010 birth certificate records and (2) Y2010 census tract characteristics. The final individual-level sample (N=2,861) consisted of singleton births to women self-reporting as black or white race. Study participants were nested within fifty-seven census tracts, a commonly-used proxy for neighborhood. The setting for this study was a community with a nationally representative maternal population (regarding racial and income demographics), but a sizeable black-white disparity in infant mortality (black infant mortality rate (IMR) 3.5 times higher than white), and a black IMR substantially higher than the national rate (18.7 Kalamazoo County versus 11.6 nationally). Infant birthweight (measured in grams) was the outcome measure. Individual-level variables were dichotomized into black or white (maternal race) and Medicaid-paid birth or not (maternal SES). Neighborhood-level variables were dichotomized from originally continuous measures (percent black residents and percent poor residents) using a cut-off of 20% to indicate concentration of black race and poverty (this cut-off has been validated for the poverty measure and was adopted for the race measure for consistency). Individual-level birth records were geo-coded using maternal address, and then linked to census tract through an ArcGIS10.0 spatial join. Birthweight was modeled using Bayesian regression with spatial random CT effect:  $Y_{ij} \sim \text{Normal}(X_i \beta + \alpha_j, \sigma^2)$ . A Proper CAR prior was specified for the spatial random effect,  $\alpha_j \sim \text{N}(0, \tau^{-1})$ . Bayesian credible intervals for the regression coefficients were used to assess this effect. Data was analyzed using SPSS v.21.0 and R, with two-tailed significance levels set at  $p < .05$ .

**RESULTS:** Across the county, mean birthweight was 3,330 grams, with 6.6% of births falling into the low-birthweight category (<2,500 grams). LBW prevalence ranged from 0 to 18%, with a mean of 6.7% across the census tracts. Within the maternal-birth sample, 19.2% were black and 47.7% were low-income. Across the county, 33.3% of census tracts met criteria for concentrated poverty (twenty percent or more residents at or below the federal poverty level) and 31.6% met study criteria for concentrated black residents. Two low-birthweight hot spots were mapped; one at the urban core, with concentrations of poverty and black residents, and one south of the core, in an area with unmarked by poverty or racial segregation. Individual-level factors consistently outweighed community-level factors predicting birthweight. Race and SES were each significant predictors of lower birthweight: being black was associated with a 1.7 increase in odds of having an LBW infant, and, among the over-LBW births, with an 82 gram decrease in birthweight (CI -104.7,-54.4grams); being poor was associated with a 1.7 increase in odds of having an LBW infant, and, among the over-LBW births, with an 115 gram decrease in birthweight (CI -144.2,-76.6grams). Living with concentrated black residents or concentrated poverty did not add predictive power.

**DISCUSSION:** Racial segregation in Kalamazoo is strongly associated with socioeconomic status; concentrations of black residents occur in the poorest neighborhoods. In large urban settings, this combination has had significant adverse health effects upon maternal-infant health. In Kalamazoo County, a mid-size community with a mix of urban and rural neighborhoods, living in a poor, high-black neighborhood does not appear to have the same impact, certainly not outweighing the individual effect of actually being both black and poor. Study findings that being black is associated with poor birth outcomes, regardless of SES, and that being poor is equally strongly associated, regardless of race, highlights the double-impact of being poor and black in Kalamazoo.

**CONCLUSION:** Maternal race and SES equally and independently predict birthweight, regardless of neighborhood factors regarding concentrated black residents or concentrated poverty. Interventions to promote maternal child health should focus upon the individual, and should address both race-related and poverty-related health factors.

**POSTER PRESENTATIONS**

Rooms 1035/1045/1055

1. **Air Medical Curricula in Emergency Medicine Residencies.** Paul B. Savino, Joshua D. Mastenbrook, Paul M. Mazurek, Jan L. Eichel, William F. Selde, William D. Fales, Glenn S. Ekblad
2. **An Innovative and Inexpensive Adaptation of an Airway Management Manikin to Create a Pulmonary Edema Intubation Simulator.** Joshua Mastenbrook, Neil Hughes, William Fales
3. **Maximum Helicopter Flight Distance that Allows Timely Percutaneous Coronary Intervention for ST-Segment Elevation Myocardial Infarction Patients.** Daniel W. Robinson, Matthew L. Heffelfinger, Glenn Ekblad
4. **Pediatric Prehospital Dosing Errors: A Qualitative Study.** John D. Hoyle, Jr., Rebecca Henry, Debby Sleight, Todd Chassee, Brian Mavis, William D. Fales
5. **Effectiveness of Initiating Targeted Hypothermia in Post-Cardiac Arrest Patients by an Air Medical Team .** Joshua G. Rookus, Jonathan J Gochnour, Millind R. Chinoy, Sara K. Sturgeon, DeWayne R. Miller, Glenn S. Ekblad
6. **Implication of Missed/Near Missed Foreign Body Ingestions: Case Reports and Review of the Literature.** Ranti S. Bolaji, Martin Alswang, Jessica McCoy
7. **Comparison of Stroke Time Targets for In-Hospital versus Emergency Department Patients.** Deborah Lee-Ekblad, Eugene S. Kim, Nan Meyers, Kelly Becker, Milind Chinoy, Jeffrey Wilt
8. **A Mysterious Case of Hepatitis: A Case Report.** Kimberly Gygi, Lindsey Henderson, Sneh Patel, Julius Ramirez
9. **Nodular Sclerosing Classical Hodgkin.** Kimberly Gygi, Lindsey Henderson, Sneh Patel, Julius Ramirez
10. **Hypopituitarism Secondary to Ipilimumab Therapy in a 66 Year-Old Patient with Metastatic Melanoma.** Paul J. Simpson, Kristi L. VanDerKolk
11. **A Case Report of Sturge Weber Syndrome with Complications of Hypothermia and Altered Mental Status.** Kimberly Gygi, Sonia Haque, Kanika Jaggi, and Shazia Malik
12. **Venous Thromboembolism as Initial Presentation of Philadelphia Chromosome Positive ALL.** Kunal Agarwal, Neha Gupta, Sonia Haque
13. **A Primary Care Perspective on Male Breast Cancer: A Case Report.** Susan E. Jevett, Elizabeth S. Giles, Mark G. Tagett
14. **Spontaneous Post-Partum Pneumomediastinum in a Parturient: A Case of Hamman.** Kwabena O. Adu-Gyamfi, Rakshita Chandrashekar, Gregory P. Tionson
15. **Rhabdomyolysis Caused by Hypothyroidism.** Neha Gupta, Sukhpreet Singh, Kristi VanDerKolk
16. **Breast Cancer Associated with Rearranged During Transfection Gene (RET Proto-Oncogene); A Coincidence or Novel Finding?** Sukhpreet Singh, Devin Malik
17. **When Decreased Visceral Fat is a Bad Thing; A Case Superior Mesenteric Artery Syndrome.** Sukhpreet Singh, Devin Malik



- 18. Self-reported Sleep Dysfunction and Medical Errors among Medical Residents.** Kunal Agarwal, Benedict Dormitorio, Michael Clarke
- 19. 'Cry of the Cat': Initial Care and Management of the 5P-Neonate.** Randi VanOcker, Adrian A. Villarreal
- 20. Actinomyces Meyeri: From 'Lumpy Jaw' to Empyema.** Amy Attaway, Thomas Flynn
- 21. Everything's Relative: Tolerating Extreme Hyperkalemia in a Non-Compliant Dialysis Patient.** Amy Attaway, Rasha Abdulmassih, Eric Yoder, Jared Gardner, Sanjay Dalal
- 22. You Tube as a Source of Information for Atrial Fibrillation.** Rakshita Chandrashekar, Sourabh Aggarwal, Mark Loerhke
- 23. Beta Blocker Buzz: Carvedilol Causing Visual Disturbance.** Rakshita Chandrashekar, Mark Schauer
- 24. Erdheim-Chester Disease: Rare Presentation of A Rarer Disease.** Rakshita Chandrashekar, Shrey Velani, Richard Roach, Vishal Gupta
- 25. Double Trouble for the Heart: A Case of Isolated Left Ventricular Non-Compaction Cardiomyopathy Plus Ischemic Cardiomyopathy.** Kwabena O. Adu-Gyamfi, Christopher Rogers
- 26. The Impact of Antismoking Legislation on COPD Hospital Admissions in United States: Analysis of Nationwide Inpatient Sample (NIS) Data.** Ravikanth Papani, Sourabh Aggarwal, Shrey Velani, Amy Attaway, Susan Bannon, Thomas Melgar
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## AIR MEDICAL CURRICULA IN EMERGENCY MEDICINE RESIDENCIES

Paul B. Savino, Joshua D. Mastenbrook, Paul M. Mazurek, Jan L. Eichel, William F. Selde, William D. Fales, Glenn S. Ekblad

Western Michigan University School of Medicine, Emergency Medicine Department, Kalamazoo, Michigan

**INTRODUCTION:** Air medical transport is a common mode of transport of critically ill and injured patients. Many emergency medicine residency training programs include some aspect of air medical experience. However, it is unclear if there is a currently accepted standard or model curriculum that prepares emergency medicine residents to function as crew members or as future medical directors of air medical transport services.

**STUDY OBJECTIVES:** The purpose of our study was threefold. The first objective was to determine if there is a current, accepted model curriculum for air medical training of emergency medicine residents. The second objective was to determine if there is uniformity among emergency medicine residencies in air medical training. Finally, we aimed to determine what curricular elements for training exist among emergency medicine residency programs.

**MATERIAL & METHODS:** This observational study was approved by the Institutional Review Board. All of the Accreditation Council for Graduate Medical Education (ACGME) accredited emergency medicine residency programs were contacted by phone, e-mail and via the Council of Residency Directors list-serve to determine if their residents participate in air medical transport, if the program has a curriculum for this training, and if they were willing to share it for review. Curricular goals and objectives of participating residencies were compared to identify common training components. Descriptive statistics were used to analyze curricular components.

**RESULTS:** All 160 ACGME-approved emergency medicine residencies were contacted; 106 (66%) responded. Sixty-nine (65%) of these 106 participated in some aspect of air medical training. Twenty-five (37%) of the sixty-nine had explicit goals and objectives for the training and fifteen (60%) of these twenty-five provided their curricula to us. Components of these reviewed curricula included: procedure/protocols (80%), air medical systems education (67%), medical knowledge (66%), safety training (60%), administrative (60%), aircraft orientation (53%), team training (46%), medical direction (online and offline control) (27%), research (20%), financial operations (7%). Three (21%) programs explicitly stated in their goals and objectives that their training would be directed towards development of air medical directors. Three programs (21%) explicitly stated in their goals and objectives that training was directed towards becoming a crew member of an air medical transport team.

**DISCUSSION:** Our study is limited by the number and type of responses we received by residency programs. Our response rate was 65%, leaving the possibility that some programs may include curricular components in their air medical training that may prove beneficial to air medical education, but were not able to be reviewed.

**CONCLUSION:** A current, evidence based, model curriculum for the air medical training of emergency medicine residents to become either crew members or medical directors does not exist. Existing air medical curricula vary widely among emergency medicine residency programs. A model curriculum that prepares residents to function as crew members and/or medical directors of air medical transport agencies would be useful to emergency medicine residency programs.

## **AN INNOVATIVE AND INEXPENSIVE ADAPTATION OF AN AIRWAY MANAGEMENT MANIKIN TO CREATE A PULMONARY EDEMA INTUBATION SIMULATOR**

Joshua Mastenbrook, Neil Hughes, William Fales

Western Michigan University School of Medicine, Department of Emergency Medicine, Kalamazoo, MI

**INTRODUCTION:** Patients who require intubation and present with florid pulmonary edema can create a challenging airway control situation from a direct visualization standpoint, among other factors, especially in the pre-hospital setting where patient location and environmental and equipment aspects add additional layers of complexity. To our knowledge, there are no commercially available training simulators to familiarize emergency physicians with intubation of a patient in florid pulmonary edema.

**CASE REPORT:** In our program, we worked to develop a portable, realistic, and inexpensive simulator to train and familiarize our Emergency Medical Services Fellows and our senior emergency medicine residents, who staff pre-hospital response vehicles, with the challenges associated with intubating a patient with significant frothy secretions within the pharynx.

**DISCUSSION:** Utilizing an affordable, commonly available commercial airway task trainer simulator (Laerdal® Airway Management Trainer, Wappinger Falls, NY), which we already owned, and purchasing an aquarium air pump, air pump tubing, an airstone, a 3.0 endotracheal tube (ETT), and bubble solution (glycerine, dish soap, and water), we were able to build our own pulmonary edema intubation simulator. Additionally, with an easily portable manikin, we were able to simulate various pre-hospital settings, including intubating on the floor, in a tight space, on a stretcher, and in poor lighting conditions. In construction of the simulator, 30-50mL of bubble solution were placed into one of the lungs and then an airstone connected to a 3.0 ETT was placed into the solution. Air pump tubing was then connected to the opposite end of the ETT and fed proximally through the ipsilateral bronchus and out a port in the bronchus to the aquarium air pump. Turning on the pump created a simulated froth of pulmonary edema, which after several minutes, spread up into the pharynx.

**CONCLUSION:** Overall, the simulator was found to be realistic by the intubators, easily portable, inexpensive to construct and could be adapted to any standard airway training manikin.

## MAXIMUM HELICOPTER FLIGHT DISTANCE THAT ALLOWS TIMELY PERCUTANEOUS CORONARY INTERVENTION FOR ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION PATIENTS

Daniel W. Robinson, Matthew L. Heffelfinger, Glenn Ekblad

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** The 2009 American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines (ACCF/AHA) recommend a maximum 90-min door-to-balloon time for acute ST-segment elevation myocardial infarction (STEMI) management. This was changed to 120 min from first contact-to-balloon time in the 2013 Guidelines for patients presenting to non-Percutaneous Coronary Intervention (PCI) hospitals. With the 2013 guidelines the ACCF/AHA addresses transfer from non-PCI capable facilities, which is important for suburban and rural populations. Previous research has been equivocal in showing better outcomes for those transported by air for primary PCI vs ground.

**RATIONALE:** The objective of this study was to evaluate the maximum transport distance for a helicopter program to accomplish the ACCF/AHA goal of a 90 min door-to-balloon time and 120 min first contact-to-balloon time for PCI in STEMI patients.

**MATERIAL & METHODS:** Two hospital IRBs approved the protocol. This was a retrospective chart review of STEMI patients flown by a helicopter program between July 1, 2010 and August 31, 2012. Time of the first positive EKG at the sending facility was substituted for “door time”. “Balloon time” was defined as the time of initial coronary artery balloon inflation. First positive EKG-to-balloon time (FPETBT) was measured. FPETBTs were analyzed to determine the distance at which the helicopter can meet AHA goals. Flight time is distance and weather dependent and is variable. Several other variables affecting FPETBT were also identified. Inclusion criteria: 1) Acute STEMI that met AHA criteria. 2) Patients for whom helicopter transport was requested. 3) EKG independently verified by a board certified emergency physician. 4) Hospitals with an adjacent heliport. Exclusion criteria: 1) Unavailable EKG time, 2) Unavailable balloon time, 3) STEMI was not confirmed, 4) Pericarditis, 5) Cardiac arrest, 6) Patient’s condition precluded transfer within 10 minutes, 7) Patient refusal for transport, 8) Request for scene flight transport for STEMI.

**RESULTS:** 99 patients met inclusion criteria. 6 total sending non-PCI capable facilities. 2 total receiving PCI-capable receiving facilities. Average times and distances for hospitals: A: 101 +/- 19 minutes (25 flight miles), B: 109 +/- 18 (35 miles), C: 130 +/- 40 (37 miles), D: 113 +/- 23 (37 miles), E: 116 +/- 23 (38 miles), F: 135 +/- 29 (55 miles). 0/6 sending facilities achieved a mean FPETBT of 90 minutes or less. 4/6 sending facilities met the 90 min goal with 9/99 patients (9%). 2/6 sending facilities never met the 90-minute goal. 4/6 of the sending facilities (61 patients, 62%) had mean transport times less than the 120 min goal. While 2/6 of the sending facilities did have a mean time greater than 120 mins, this goal was met on a subset of their patients. Based on this data our helicopter system is able to meet the 120 min goal for hospitals within 41 miles of our home base (C.I. 70-169).

**DISCUSSION:** With the new 2013 ACCF/AHA guidelines our results show that it is indeed possible to transport STEMI patients from non-PCI facilities to PCI-capable facilities. Based on these data we can answer our objective that we can meet the 120 min goal for hospitals within 41 miles of our home base. The variability within the times by each individual facility shows that there is room for improvement in the processes of the sending facilities. Likewise, there is a large variability in the receiving facilities transfer to balloon time. Previous studies have shown that it is not possible to consistently achieve the 90 min time frame by helicopter. However, our data show that it may be possible under the right conditions and distance. Limitations: Retrospective nature of the study. Using first-EKG-to-Balloon time instead of Door-to-Balloon time (2010 guidelines) or first contact-to-Balloon time (2013 guidelines) because of the lack of consistent door-time or first-contact time reporting within our data, small number of enrolled patients, lack of patient outcome data, lack of inclusion of EMS activated STEMI transports.

**CONCLUSION:** 9/99 (9%) flights met the 90 min goal. Average flight times did not meet 90 min goal. 61/99 (62%) flights met the 120 min goal. Maximum distance that met the 120 min requirement was 41 miles.

## **PEDIATRIC PREHOSPITAL DOSING ERRORS: A QUALITATIVE STUDY**

John D. Hoyle, Jr., Rebecca Henry, Debby Sleight, Todd Chassee, Brian Mavis, Bill Fales

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Pediatric prehospital dosing errors affect approximately 56,000 US children yearly. Prior studies in Michigan have demonstrated an overall error prevalence for all drug doses of >30%, while the error prevalence for epinephrine doses was > 60%. Incorrect pediatric drug doses have been shown in the hospital setting to cause significant harm and even death.

**RATIONALE:** In order to develop interventions to decrease pediatric prehospital dosing errors, we must identify barriers and enablers to correct pediatric prehospital drug dosing, as well as possible solutions, from the EMT-P standpoint.

**MATERIAL & METHODS:** We conducted a qualitative focus group (FG) study of EMT-Ps in Michigan. FGs were held at EMS agencies and a state EMS conference. Participants were identified by random number only. No identifying information was collected in order to protect anonymity. FGs were led by a trained moderator. Questions focused on the drug dose delivery process, barriers and enablers to correct drug dosing and possible solutions to decrease errors. Responses were recorded, transcribed and coded by 2 members of the research team for themes and number of response mentions. Participants completed a pre-discussion survey on pediatric experience and agency characteristics.

**RESULTS:** FG responses reached thematic saturation after 4 groups were completed. There were a total of 35 participants. Participants' EMS agency characteristics were: 26% public, 23% private not-for-profit, 49% private for-profit, 23% fire, 77% third service. All were transporting agencies. 43% of participants had been EMT-Ps > 10 years, 11% had been EMT-Ps < 1 year. 25% reported not having administered a drug dose to a child in the last 12 months. EMT-Ps who were "very comfortable" with their ability to administer a correct drug dose to infants, toddlers, school-aged and adolescents were: 5%, 7%, 10% and 54% respectively. FGs identified themes of: difficulty in obtaining an accurate weight, infrequent pediatric encounters, infrequent pediatric training with inadequate content and practice, difficulties with drug packaging/shortages, drug bags that weren't "EMS friendly", difficulty remembering drug doses/calculations and lack of dosing aids. Few enablers to correct dosing were mentioned. Simplification of dose delivery, an improved length based tape for EMS, pediatric checklists and dose cards in ml were given as solutions.

**DISCUSSION:** Discussion: Prehospital pediatric drug dosing errors occur at a very high prevalence. It is known that these errors cause morbidity and mortality in the hospital environment and it can be reasoned that they result in similar outcomes in the prehospital environment. Prior to implementing interventions to correct these errors, we must understand, from the EMT-P viewpoint, barriers and enablers to correct prehospital drug dosing and identify issues related to work system/culture, processes and outcomes. Without this knowledge, potential interventions have the possibility of not having face validity for EMT-Ps, or not addressing the problem in an effective way for EMT-Ps. The law of unintended consequences often is the rule rather than the exception in medicine. Our study has identified barriers including difficulty in obtaining an accurate weight, difficulty in carrying out mathematical calculations and pediatric training with inadequate content and practice. Our next step will be to develop interventions to target these issues and test them in a small scale (simulation) environment followed by a large scale intervention.

**CONCLUSION:** This qualitative study identified barriers and potential solutions to reducing prehospital pediatric drug dosing errors including improved training frequency/content as well as simplification of drug calculations and the addition of pediatric checklists.

## **EFFECTIVENESS OF INITIATING TARGETED HYPOTHERMIA IN POST-CARDIAC ARREST PATIENTS BY AN AIR MEDICAL TEAM**

Joshua G. Rookus, Jonathan J Gochmour, Millind R. Chinoy, Sara K. Sturgeon, DeWayne R. Miller, Glenn S. Ekblad

Western Michigan University School of Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Therapeutic hypothermia is a standard treatment used for comatose post-cardiac arrest patients to improve neurological outcomes. This investigation evaluates the effectiveness of initiating a hypothermia protocol in post-cardiac arrest patients by an air medical team.

**RATIONALE:** The objective of this study was to determine if there is a change in temperature resulting from therapeutic hypothermia initiated during the air-medical transport of post-cardiac arrest patients.

**MATERIAL & METHODS:** Institution review board approval was obtained. Data was extracted from a retrospective chart review from December 1, 2009 to December 1, 2012 of all post-cardiac arrest patients in whom the hypothermia protocol was initiated by a single air medical service. All subjects were included regardless of presenting rhythm. Core body temperature (CBT) was measured using esophageal probes. The hypothermia protocol consisted of 30 mL/kg to a maximum of 2 L of 0.9% normal saline at 4°C administered as bolus infusions. Inclusion criteria were: GCS < 8, intubated, and maintenance of systolic blood pressure > 90 mm Hg. Exclusion criteria were: signs of neurological recovery, significant cardiac arrhythmia, known coagulopathy, do not resuscitate directive, recent major surgery, trauma, pregnancy, < 18 years old, and undocumented initial or final CBT. The following information was collected: age, sex, weight, height, body mass index (BMI), initial cardiac arrest rhythm, date of flight, cabin temperature, amount of saline infused, flight duration, initial esophageal temperature, and final esophageal temperature at time of patient care transfer.

**RESULTS:** The hypothermia protocol was initiated in 45 patients. Twenty-eight patients met criteria. Sixteen patients were excluded due to an undocumented CBT. One patient was unable to be enrolled due to hemodynamic instability. Median drop in CBT was 1°C (range -0.2 - 2.5°C). Median volume of 0.9% normal saline infused was 1050 mLs (range 300 - 2000 mLs). Median flight time was 15 minutes (range 9 - 25 minutes). Regression analysis was used to correlate relationships between BMI, flight time, saline infused, and CBT. Only the rate of saline infusion correlated with the drop in CBT ( $p=0.059$ ). There was one case where the CBT increased after saline infusion.

**DISCUSSION:** We are able to demonstrate that initiating therapeutic hypothermia by an air-medical team is feasible. We anticipate adding to the air-medical literature of successful and effective implementation of this morbidity reducing treatment.

**CONCLUSION:** This air-medical team was able to initiate a hypothermia protocol and successfully decrease CBT in post-cardiac arrest patients on average by 1°C. The rate of saline infusion appears to correspond with the drop in CBT.

## IMPLICATION OF MISSED/NEAR MISSED FOREIGN BODY INGESTIONS: CASE REPORTS AND REVIEW OF THE LITERATURE

Ranti S. Bolaji, Martin Alswang, Jessica McCoy

Western Michigan University School of Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Accidental foreign body ingestions (FBIs) are common in pediatric population and intentional ingestion is common in psychiatric population/prisoners as a means of self-injury or suicides. FBIs are seen often in the emergency departments. Types of foreign bodies ingested in pediatric population often include coins, button battery, bones, plastic toys, or magnets. In inmates and psychiatric population, intentional ingestion of sharp objects include plastic utensils, thin metal wires/rods, pins, razors, or batteries. Often times, the objects become obstructed in the esophagus or bowel and surgical/endoscopic intervention is necessary. The most harmful or life threatening cases occur when the foreign object is missed or when there is a delay in the diagnosis and identification of the object at the initial presentation to the emergency department. The objective of this case report and literature review is to describe two cases of missed/near missed ingestions with review of radiologic findings. This report will also discuss the immediate complication and long-term sequela of delayed diagnosis of foreign body ingestion.

**CASE REPORT:** CASE (1): 15 month-old girl transferred from outlying facility for cough, drooling, inability to swallow and evidence of esophageal foreign body on CXR after 2 weeks of worsening symptoms. She was seen in another ED two times but the foreign body was missed. She was about to be discharged home for the second time from the ED when she developed worsening drooling and emesis following oral challenge. CXR was finally obtained. She was transferred to our facility for surgical and ICU management. A disintegrating, corroded button battery was removed from her upper esophagus. Furthermore, a false esophageal passage was created by the battery preventing the passage of a feeding tube through the true lumen. She sustained severe burn injury with sloughing/scarring/false passage/maceration of the esophagus. She is at high risk for developing an esophageal stricture and likely to need surgical correction in the future. CASE (2): A 26 year-old male with borderline and antisocial personality disorders, currently incarcerated presented following ingestion of unknown object. Time of ingestion was unknown. No foreign object was identified on chest and abdomen x-rays. Patient was about to be discharged but insisted that he is sure he ingested something. Upon further imaging with CT chest, a 12mm wide linear-shaped metal object extending over 10 cm in length was identified within the mid and distal esophagus. The object was removed via endoscopy. In addition to the cases above, analysis of current literature including PubMed, Web of Science, Medline, and Google scholar was conducted on ingestion of foreign materials. Relevant studies were reviewed to evaluate commonly ingested foreign materials, optimal therapy, and immediate and long-term complication of delayed diagnosis.

**DISCUSSION:** Coin and button batteries ingestion are common in pediatric patients. Sharp, larger object ingestions are common in psychiatric patients/prisoners. Inability to localize objects on imaging or delay/missed diagnosis may lead to needless short-term complication and long-term morbidity.

**CONCLUSION:** Foreign body ingestion is most often seen in pediatric, psychiatric, and incarcerated patients. Ingested objects can be missed on initial presentation in the Emergency Department causing a delay in diagnosis with significant long-term complications. In cases when the ingested object is a button battery or long, sharp objects, delay in diagnosis and management can increase mortality and morbidity in patients. Potential immediate complications or long-term sequela include respiratory distress, esophageal edema or bleeding, recurrent vomiting, esophageal stricture, esophageal-aortic fistula, cervical abscess, bowel perforation, aspiration pneumonia, or mediastinitis. Failure to promptly diagnose and treat these patients often leads to further surgeries, prolonged hospitalization or death.



## COMPARISON OF STROKE TIME TARGETS FOR IN-HOSPITAL VERSUS EMERGENCY DEPARTMENT PATIENTS

Deborah Lee-Ekblad, Eugene S Kim, Nan Meyers, Kelly Becker, Milind Chinoy, Jeffrey Wilt

Western Michigan University School of Medicine, Emergency Department, Borgess, Kalamazoo, Michigan

**INTRODUCTION:** Based on the 2013 Guidelines for Early Management of Patients With Acute Ischemic Attack, hospitals and emergency departments (ED) should develop efficient processes and protocols to manage stroke patients. The guidelines have several time targets for early stroke evaluation and treatment such as door to physician, door to CT initiation, door to CT interpretation, and door to drug. The goal of these time targets is to reduce morbidity and mortality associated with stroke.

**RATIONALE:** We hypothesize that inpatient stroke evaluation and treatment is equivalent to patients presenting to the emergency department (ED) with stroke symptoms since the same stroke team responds to both inpatient stroke call downs and ED stroke call downs. This is to obtain initial data for a quality improvement project at Borgess Medical Center, Kalamazoo, MI.

**MATERIAL & METHODS:** Between September 2010 and June 2013, all in-hospital stroke call down charts were retrospectively reviewed. For each month that there was an inpatient stroke call down, ED stroke call downs were retrospectively chart reviewed as well. There were 24 inpatient stroke call downs and 93 ER stroke call downs during this time period. Each chart was reviewed for time targets: door to physician, door to CT initiation, door to CT interpretation, and door to drug.

**RESULTS:** Inpatient target times are below recommended time targets. The average time to physician for inpatient stroke patients was 5 minutes as compared to the ED was 4.2 minutes. Time to CT initiation was 31.45 minutes for hospitalized patients as compared to 25.48 minutes for ED patients. CT interpretation was 52.83 minutes for inpatient strokes as compared to 47.21 minutes for ED stroke patients. Time to tPA was 122 minutes for hospitalized patients as compared to 94 minutes for ED stroke patients.

**DISCUSSION:** The time to provider was within guidelines. Time to CT and CT read was within guidelines for ED but not IP patients. Time to drug was not within guidelines for either ED or IP patients. IP time to drug was clearly delayed compared to ED. The same stroke team evaluates both, and the delays were possibly due to transport or ED preferential prioritization for testing. The results were a small sample size, further research needs to be done for a well-powered study.

**CONCLUSION:** Hospitalized patients developing stroke symptoms have delays in care as compared to patients that present to the emergency department with stroke symptoms. This may be due to emergency department patients getting preferential treatment for tests. Identifying these delays in care is important to improve stroke treatment for hospitalized patients.

## A MYSTERIOUS CASE OF HEPATITIS: A CASE REPORT

Kimberly Gygi, Lindsey Henderson, Sneh Patel, Julius Ramirez

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Autoimmune hepatitis (AIH) is a continuous and progressive inflammatory disease of the liver. AIH is thought to be secondary to an environmental trigger in an individual with compromised immune regulation and subsequent self-reactivity. With a higher prevalence in women, AIH is a worldwide disease affecting all ages. Symptoms may be absent or generalized, including malaise, abdominal pain, fatigue and loss of appetite. However, atypical cases have been noted in which patients present with liver failure. Cases of seronegative AIH exist in which liver biopsy is necessary due to an absence of detectable autoantibodies. Seronegative AIH has similar demographics and characteristics of AIH. Timely diagnosis is important in order to initiate medical therapy, leading to improved long-term outcomes.

**CASE REPORT:** This case involves a 38-year-old African American male with no significant past medical history who presented to the emergency room with a five day history of increasing left lower quadrant abdominal pain radiating to his left flank, along with a two day history of non-radiating right upper quadrant abdominal pain. Review of systems was positive for nausea, vomiting and dark urine. Otherwise, a detailed history revealed no significant family history, surgeries, or current medications. He reported working for a firm that dealt with environmental wastes and may have had exposure to different types of dyes. He denied any IV drug abuse, transfusions or promiscuous activities. Physical examination revealed markedly icteric sclera and diffuse abdominal pain to light touch. Initial laboratory findings included significant elevated transaminases; AST and ALT were 1447 and 2218 respectively with Bilirubin of 5.4. Imaging included CT abdomen and pelvis as well as ultrasound of the RUQ, which were unremarkable. Gastroenterology consult was placed. An extensive work up including CBC, PT/INR, Urinalysis, hepatitis viral panel, Hepatitis C PCR, Hepatitis B core antibody, HIV, EBV, CMV, Acetaminophen levels, TSH, Sickle cell screen, ANA, CCP antibody, AFP tumor marker, Liver kidney microsomal antibody, AMA antibody, anti-smooth muscle antibody were all unremarkable. GGT was mildly elevated and iron studies showed iron overload, however hemochromatosis gene was undetected. Subsequently a liver biopsy was performed which showed acute hepatitis. After a few days, patient symptomatically showed improvement and was discharged. However, the patient was re-admitted two weeks later due to worsened symptoms and liver function. Laboratory findings at the time showed AST of 1196 and ALT of 1279 with elevated Bilirubin of 15.7. Additional testing such as Alpha-1 antitrypsin phenotype, 24 hour urine copper, Hepatitis B core antibody, Anti-neutrophilic cytoplasmic antibody, soluble liver antigen antibody, Hepatitis E PCR were ordered and were unremarkable. Patient's MELD score was calculated to be 21, which correlates with 24% mortality in a 90 day period. Based on worsening clinical symptoms, it was decided to empirically treat patient with a trial of methylprednisolone 20 mg every 8 hours. Within 2-3 days, the patient had significant improvement of his symptoms. Patient's liver enzymes had also decreased drastically. These findings suggest seronegative autoimmune hepatitis. Upon discharge, patient was transitioned to prednisone 40mg daily and azathioprine 50 mg daily was added. After close follow up with PCP, patient's liver enzymes revealed AST and ALT of 24 and 23 respectively with Bilirubin of 0.6 with complete resolution of symptoms. Five months later, patient continues to do well with no relapse of symptoms.

**DISCUSSION:** This case is an unusual presentation of seronegative autoimmune hepatitis due to the fact that the patient's work up thus far is not suggestive of typical SAIH. According to the Naperville Gastroenterology Autoimmune Hepatitis Calculator the patient is not likely to have a diagnosis of SAIH. However, after an exhaustive work up for other etiologies was not significant enough to make another diagnosis. Based on diagnosis of exclusion and the fact that the patient improved after prednisone and azathioprine, it is appropriate to infer this patient has SAIH.

**CONCLUSION:** In this case, hepatitis was likely due to SAIH after a thorough work up which yielded no other etiology. This diagnosis was supported by the fact that the patient improved with immunosuppressive therapy. Patient should be monitored for relapse or worsening of symptoms while still considering differential diagnosis.

## **NODULAR SCLEROSING CLASSICAL HODGKIN'S LYMPHOMA PRESENTING AS AN EDEMATOUS BREAST: A CASE REPORT**

Kimberly Gygi, Lindsey Henderson, Sneha Patel, Julius Ramirez

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Nodular Sclerosing Hodgkin's Lymphoma (NSHL) is a B-cell lymphoma that makes up 60-80% of the 9000 cases of Hodgkin's lymphoma diagnosed annually. NSHL is named for the lymphoma nodes that contain sclerotic or scar tissue. It is diagnosed microscopically with the presence of both Reed-Sternberg cells and reactive lymphocytes. The disease tends to be more prevalent in women than men, and commonly presents before age 50. With proper diagnosis and treatment, prognosis is very good.

**CASE REPORT:** We report the case of a 32 year old Caucasian female with a past medical history significant for anxiety and panic attacks that presented with dyspnea and weight loss. Patient was limiting her calorie intake with the intention of losing weight and had lost about 50 pounds six months prior to presentation. She began to have symptoms of fatigue, menstrual irregularity, dry skin, and hair loss. She also complained of right breast enlargement associated with pain for three months along with significant bilateral lower extremity swelling. She presented to the emergency department with tachypnea and hypoxia. Physical exam revealed decreased right lung breath sounds, and dullness to percussion with decreased tactile fremitus. There were no wheezes or rhonchi. The right breast was significantly inflamed and was approximately three times as large as the left breast. While the skin of the right breast had a peu de orange appearance, there was no erythema or warmth. Also of note, there was no evidence of axillary lymphadenopathy or nipple discharge. She was a non smoker and had no significant social history. Family history was pertinent for a grandmother with breast cancer and a sister with Hodgkin's lymphoma. CXR revealed complete opacification of the right hemithorax with prominent right to left midline shift. The initial work up was targeted towards the concern for a neoplastic process with suspicion for metastatic inflammatory breast cancer. Soft tissue biopsy as well as core needle biopsy of the breast yielded negative results. Patient was noted to have pleural effusions and pericardial effusions that progressed to compromise her respiratory status. She underwent a pericardial window for pericardial effusion with placement of bilateral chest tubes. Patient then developed respiratory failure secondary to right lung collapse, required intubation, and transferred to the ICU. Bronchoscopy was done which revealed two small mucous plugs. Continued work-up for malignancy was performed including lymph node biopsy, bone marrow aspiration, thoracentesis, and pericardiocentesis. Lymph node biopsy revealed Nodular Sclerosing Classical Hodgkin's Lymphoma. Oncology was consulted. She was deemed to be stage IVB and chemotherapy was initiated. Patient slowly improved to the point where her left chest tube was able to be removed. The patient had persistent asymptomatic tachycardia and was thought to be multifactorial due to NSHL, generalized anxiety, and cardiopulmonary status (chest tubes, hydrothorax, previous pericardial effusion, and anemia secondary to disease process and chemotherapy). Patient was started on IV iron sucrose for iron deficiency anemia. Patient was discharged with a right chest tube in place and was followed by a home health nurse. The patient continued to be followed by oncology for further chemotherapy. Her suggested predicted overall 5 year survival was noted to be 56%.

**DISCUSSION:** This patient's presentation was uncharacteristic for Nodular Sclerosing Hodgkin's Lymphoma. While symptoms included weight loss and fatigue, a lack of palpable lymphadenopathy and presence of significant breast edema with skin changes resembling that of peau de orange were suggestive of an inflammatory breast carcinoma. Following a benign soft tissue and needle core biopsy of the breast, further evaluation was performed. Subsequent axillary lymph node excisional biopsy revealed NSHL, overall stage IVB; thereafter, the patient was started on appropriate treatment. Due to this unusual presentation, it is important to consider Hodgkin's Lymphoma in a young patient with suspected breast cancer.

**CONCLUSION:** In this case, Nodular Sclerosing Classical Hodgkin's Lymphoma presented atypically as a suspected case of inflammatory breast carcinoma in a 32 year old female. Diagnosis and treatment of NSHL are important because early recognition and treatment improve long-term outcomes.

## **HYPOPITUITARISM SECONDARY TO IPILIMUMAB THERAPY IN A 66 YEAR OLD PATIENT WITH METASTATIC MELANOMA**

Paul J. Simpson, Kristi L. VanDerKolk

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Hypopituitarism is the deficiency of one or more pituitary gland hormones due to pituitary or hypothalamic disease and is a known complication of the chemotherapeutic medication ipilimumab. It is imperative that primary care physicians be aware of common complications of this class of chemotherapeutic medication as early intervention can help to avoid patient morbidity. This case highlights hypopituitarism as a complication of metastatic melanoma treatment with ipilimumab.

**CASE REPORT:** Our patient is a 66 year old male with a history of metastatic melanoma to his mesentery who developed progressively worsening fatigue, malaise, nausea and confusion over two weeks. He was seen in the outpatient setting and was started on levothyroxine for mild hypothyroidism. One week later he presented to the Emergency Department and was found to have significant hypotension which was resistant to fluid resuscitation. A workup revealed secondary adrenal insufficiency, low ACTH, free testosterone, IGF, and cortisol. He had been treated with four cycles of the chemotherapeutic medication ipilimumab over a four month period ending 10 weeks prior to his presentation. Ipilimumab is known to activate cytotoxic T-lymphocytes and has been implicated in several cases of autoimmune conditions including endocrinopathies and hypopituitarism. He was treated with high dose dexamethasone followed by fludrocortisone. Following initiation of this regimen, he experienced a resolution of his symptoms. He continues to follow with the West Michigan Cancer Center and his metastatic melanoma although non-operable has not been found to have progressed.

**DISCUSSION:** Ipilimumab (Yervoy) is a monoclonal antibody (MAB) that targets the T-lymphocyte antigen 4 leading to stimulation of cytotoxic T-lymphocytes that results in their proliferation and anti-tumor response. This immunostimulatory response can lead to autoimmune conditions and it has been reported that up to 17% of ipilimumab patients can experience hypophysitis and hypopituitarism. The median time from Yervoy therapy to developing relevant symptoms has been noted to be eleven weeks. Our patient presented ten weeks after his fourth treatment of Yervoy. With ipilimumab induced hypopituitarism, ACTH is commonly one of the first hormones affected, which is consistent with our patient's presentation of refractory hypotension. Even with the presence of hypophysitis and hypopituitarism, continuation of ipilimumab is often recommended. Given the ease of replacement of pituitary hormones and the fact that ipilimumab is often prescribed for life threatening cancers, continuation of the Yervoy may be in the patient's best long-term interests. A discussion of the pros and cons of treatment options including continuing with Yervoy treatment should be offered to the patient.

**CONCLUSION:** Hypopituitarism is a relatively common complication of anti-CTLA4 therapy of metastatic melanoma with the chemotherapeutic agent ipilimumab. A high index of suspicion is necessary to identify this process to ensure early identification, appropriate treatment and reduced morbidity.

## A CASE REPORT OF STURGE WEBER SYNDROME WITH COMPLICATIONS OF HYPOTHERMIA AND ALTERED MENTAL STATUS

Kimberly Gygi, Sonia Haque, Kanika Jaggi, and Shazia Malik

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Sturge-Weber Syndrome (SWS) is a rare congenital, however not hereditary, neurocutaneous syndrome affecting the cephalic microvasculature. It is characterized by a facial capillary malformation (port wine stain) and associated leptomeningeal angiomas, which mostly involves the posterior parietal and occipital lobes. Males and females are equally affected with no racial predilection. The classic neurological findings include mental retardation, seizures, intracranial calcifications, hemiparesis, and homonymous hemianopia. Recognition of SWS and adequate prevention of associated seizures are important to preserve cognition and prevent epilepsy related sequelae.

**CASE REPORT:** We report the case of a 66 years old Caucasian female with a known past medical history of Sturge-Weber syndrome with epilepsy and mental retardation, as well as a questionable history of cerebral vascular accident. The patient presented with altered mental status and hypothermia to the emergency department. Caretakers reported that the patient was not herself and had been yelling loudly. Usually she was able to converse at a simple level with complete sentences. She was not able to be aroused at her place of residence. EMS had been called and paramedics administered narcan with reported mild response. In the ED her chest x-ray showed increased density in the left lung base, suggestive of atelectasis or infiltrate. Her urinalysis showed evidence of a urinary tract infection. CT Head was negative for acute changes and consistent with Sturge Weber Syndrome with developmentally small right cerebral hemisphere. Her initial exam was limited due to her altered mental state. Initial vitals were significant for a blood pressure of 105/52, and a temperature of 96.9F. Pertinent positives on exam were port wine stain on left forehead, face and shoulder, a left eye droop with purulent discharge, dry oral mucosa, upper and lower extremity contractures. She was admitted for healthcare associated pneumonia and UTI, and started on vancomycin, cefepime and azithromycin. Once transferred to the medical floor patient developed significant hypothermia. Her lowest documented temperature was 89 degrees Fahrenheit, confirmed rectally and with urinary measurements. She was alert and responsive with a heart rate of 65. She was started on Bair Hugger therapy. Sepsis and hypothermia workups were done including: blood cultures, procalcitonin, lactic acid, CBC, TSH, prolactin, cortisol, magnesium, phosphorus, respiratory disease panel, strep pneumoniae antigen, legionella urine antigen, urine drug screen, and echocardiogram; which were normal. EEG showed encephalopathy. MRI of the brain re-demonstrated stigmata of SWS with small right hemisphere, chronic ischemic changes in the left cerebral deep white matter, and no lesion noted in the hypothalamus. Patient responded well to Bair Hugger therapy as her temperatures normalized overnight. Over the hospital course, patient developed a new onset of involuntary non-rhythmic head movement; therefore she was switched from triple antibiotic therapy to levaquin and clindamycin. Neurology was consulted and attributed the head movement to her acute infection and side effects of levaquin versus an extended postictal state. The patient was switched to oral antibiotics and discharged. Mental status improved marginally upon resolution of infection. Outpatient follow up revealed that patient was periodically becoming mildly hypothermic; this was managed efficiently by applying a heated electric blanket as need.

**DISCUSSION:** In patients with SWS, seizures typically present before the age of 2 and are well controlled in about 73% of patients. In patients that are resistant to drug control, there is a strong correlation between early onset of seizure and decline in cognition. Intellectual disability is prevalent in one half of adults with SWS. Neuroendocrine components of the syndrome include reports of central hypothyroidism. This patient did not have evidence of hypothyroidism, which is a common cause of hypothermia. As a diagnosis of exclusion, our patient's hypothermia may be secondary to protein calorie malnutrition. This is supported by a low albumin. Further follow up with nutrition counseling is necessary.

**CONCLUSION:** Our patient has manifestations of several of Sturge Weber symptoms including port wine stain, mental retardation, seizures, and encephalopathy. However, the irregular head movements and hypothermia that our patient developed are not known manifestations of SWS and are most likely secondary to an infectious process, drug therapy, and poor nutrition.

## VENOUS THROMBOEMBOLISM AS INITIAL PRESENTATION OF PHILADELPHIA CHROMOSOME POSITIVE ALL

Kunal Agarwal, Neha Gupta, Sonia Haque

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Venous thromboembolism (VTE), which includes both peripheral venous thrombosis and pulmonary embolism, is frequently associated with a diagnosis of cancer, particularly solid malignancies. Though hematologic malignancies carry an increased risk, the incidence of VTE in acute lymphoblastic leukemia (ALL) has been reported to be low. VTE may precede the diagnosis of cancer, however, the value of clinical search for potential underlying cancer has not been demonstrated. Consequently, an index of suspicion should be used during medical decision making.

**CASE REPORT:** We present the case of a 58 year old previously healthy male, who presented to the emergency room with a 3-week history of progressive weakness and swelling of the right leg. The weakness started after both legs "cramped up". Review of systems was positive for a 1-week history of decreased appetite, fatigue, and weight loss. Patient is a long time smoker, worked as a painter, with no other past medical history or medication. Family history is positive for his mother having "blood cancer" and his father having a "brain tumor". Physical examination revealed oxygen saturation of 92% on room air, and 1+ pitting edema of right lower extremity. Pertinent laboratory studies include WBC 27.8, Na 130, CXR showed a right lung opacity. CT lungs showed massive bilateral wedge shaped pulmonary embolism. HIV, TB, and hypercoagulability labs were negative. Bilateral DVTs were found on ultrasound of the lower extremities. Peripheral smear was suggestive of lymphoproliferative disorder. Flow cytometry immunophenotyping revealed increased blasts, consistent with B-lymphoblastic leukemia/lymphoma. ALL FISH and bone marrow biopsy confirmed B-lymphoblastic leukemia/lymphoma, with partial expression of the myeloid-associated antigens CD13 and CD33. Philadelphia chromosome translocation/BCR-ABL1 fusion was demonstrated. The patient was treated with lovenox for VTE, and was eventually transferred to University of Michigan for chemotherapy, where he was started on imatinib and hyperCVAD B.

**DISCUSSION:** ALL usually presents with non-specific constitutional symptoms. Other symptoms may include failure of normal hematopoiesis with consequent infections or bleeding, neurological deficits and altered mentation as manifestations of central nervous system involvement, and bone pain due to bone marrow expansion. Hepatosplenomegaly and lymphadenopathy may also occur. VTE has not been reported to be a common presentation. Some authors have found to be the incidence of VTE preceding diagnosis of ALL to be 1.9 - 4.5%. In addition, risk factors for VTE preceding diagnosis of ALL include presence of a central venous catheter, older age, and number of chronic comorbidities, all of which are absent in the case presented. Diagnosis of ALL requires a complete history and physical, and laboratory evaluation including CBC with differential, serum chemistries, peripheral smear, and coagulation studies. Lumbar puncture with cerebrospinal fluid collection is performed for potential CNS involvement. Definite diagnosis of ALL involves bone marrow biopsy in addition to cytogenetic analysis, immunophenotyping, and molecular diagnostics. Identification of the Philadelphia chromosome translocation by FISH or PCR is crucial to determine if the patient is a candidate for tyrosine kinase inhibitor therapy. HLA typing should be performed for possible transplant patients to allow for donor identification. Clinical management of Philadelphia chromosome-positive ALL is challenging due to aggressive disease process and limited effective treatment options. Management is further complicated by often concurrent thrombocytopenia which results in an increased risk of bleeding. Given the role of BCR-ABL in leukemogenesis, the tyrosine kinase inhibitor imatinib has become front-line therapy with remission rates exceeding 90%. Induction therapy with imatinib has been associated with increased risk of VTE, which increases the risk of dying by 40% within 1 year. Literature review did not reveal much data regarding the safety and efficacy of antithrombotic therapy in ALL patients with severe thrombocytopenia. Heparin can exacerbate thrombocytopenia, hence increasing risk of bleeding. Lovenox has been shown to be most effective for treatment of VTE and to prevent recurrence, though a risk of bleeding still remains.

**CONCLUSION:** Incidence of VTE in preceding diagnosis of ALL is low and the association between underlying cancer and new VTEs has not been discovered. In addition, management of VTE in ALL can prove challenging due an increased bleeding risk. Clinical index of suspicion should be used in diagnosis and treatment to decrease disease morbidity and mortality.

## A PRIMARY CARE PERSPECTIVE ON MALE BREAST CANCER: A CASE REPORT

Susan E. Jevett, Lizabeth S. Giles, Mark G. Tagett

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** In contrast to female breast cancer, male breast cancer is a rare entity in the United States, with 2,039 reported cases in 2010 according to the CDC, which represents less than 1% of the total number of female breast cancer cases reported that same year. There are well-established guidelines for breast cancer screening in females, but screening guidelines for males are much less well known. Primary care physicians play a key role in collecting a detailed family history and recommending appropriate screening tests to their patients. We report a male patient with breast cancer who had first-degree relatives with breast and ovarian cancer who was never counseled on his risk of developing breast cancer, and we present the current screening guidelines for males at an increased risk of developing breast cancer.

**CASE REPORT:** A 68-year-old male presented to the emergency department with initial complaints of low back pain, nausea, anorexia, confusion and 15lb weight loss. His medical history was significant for the following: colon cancer in 1996 for which he underwent partial colectomy, IDDM with retinopathy, HTN, history of TIA, HL, obesity, OSA, psoriasis, and PVD. He had seen his PCP one week prior to presenting to the emergency department concerned that “[his] cancer [was] back”. Family history was significant for breast cancer in his mother and ovarian cancer in his sister. Physical exam revealed an obese Caucasian male with a 3-4cm, fixed, non-tender, retroareolar palpable mass in the right breast with associated nipple retraction and dimpling of the skin, as demonstrated in the images on the right, with associated axillary lymphadenopathy. No nipple discharge was present. Pulmonary emboli were noted on CT of the abdomen and pelvis and spiral cat scan subsequently revealed a 3.1cm retroareolar breast mass with enlarged axillary lymph nodes. Core biopsy demonstrated ER positive poorly differentiated ductal carcinoma with metastatic adenocarcinoma in the axillary lymph nodes by FNA, with rib metastasis on PET scan. The patient was started on Tamoxifen. Genetic counseling and testing were recommended, however the patient died within 3 months of initial diagnosis, prior to completing genetic testing. Concern was raised about the possible risk of breast cancer in his son, daughters and granddaughters and whether they should undergo screening examination.

**DISCUSSION:** As published by the National Comprehensive Cancer Network, the current screening guidelines for breast cancer in males at “increased risk” recommend monthly self-breast exams, semi-annual clinical breast exam starting at age 35, baseline mammography at age 40 followed by annual mammography if gynecomastia and/or breast density is seen at baseline, as well as consideration of genetic testing and informing family members of their possible risk and genetic testing options. Males at “increased risk” of developing breast cancer are defined as those with strong family history of breast cancer, genetic predisposition, or a personal history of breast cancer. It is important for primary care physicians to be aware of these guidelines so that their patients can receive appropriate counseling and screening examinations.

**CONCLUSION:** This case illustrates the importance of a thorough family history and proper exposure during a physical exam. Although male breast cancer is rare, it is an important diagnosis that should not be overlooked.



## **SPONTANEOUS POST-PARTUM PNEUMOMEDIASTINUM IN A PARTURIENT: A CASE OF HAMMAN'S SYNDROME**

Kwabena O. Adu-Gyamfi, MD(Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI), Rakshita Chandrashekar, MD(Western Michigan University School of Medicine, Internal Medicine), Gregory P. Tiongson, MD(Bronson Hospital, Kalamazoo)

**INTRODUCTION:** Once in every 100,000 live births, spontaneous post-partum pneumomediastinum may suddenly afflict the young otherwise healthy woman. Hamman's syndrome is this rare complication of labor and delivery which almost certainly has a benign self-limiting course, but nevertheless a potential cause of panic for the unaccustomed clinician.

**CASE REPORT:** A 27 year old primigravida woman with a history of remote exercise-induced asthma had an uneventful pregnancy and labor at 41 weeks gestation delivering a healthy 7lb 13oz (3.55kg) baby. Immediately after delivery, she reported soft painless bilateral jaw swelling. On examination she had extensive subcutaneous emphysema from the mid-sternum to the zygomatic areas bilaterally. Chest X-rays revealed pneumomediastinum and cervicofacial subcutaneous emphysema without pneumothorax. Esophagogram showed no esophageal rupture. She was managed with rest, supplemental oxygen as needed and discharged after two days without progression of signs and symptoms. At a six week follow up, there was no clinical evidence of pneumomediastinum or subcutaneous emphysema.

**DISCUSSION:** Transient elevations in intra-thoracic pressure from valsalva maneuver during childbirth may cause marginal alveolar rupture and pneumomediastinum. Consequent subcutaneous emphysema has been reported to rarely extend into the pericardial, peritoneal and spinal epidural spaces. Case series have shown no utility in extensive workup and the need to rule out serious underlying etiology only when there are clear indications. Management remains supportive and recurrence is rare.

**CONCLUSION:** With an increasing focus on high value patient care, physician familiarity with this syndrome is needed to avoid an unnecessarily extensive workup with the attendant costs and even potential harm to the patient.



## RHABDOMYOLYSIS CAUSED BY HYPOTHYROIDISM

Neha Gupta, Sukhpreet Singh, Kristi VanDerKolk

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Rhabdomyolysis is a potentially life-threatening syndrome that can develop from a variety of causes. Classic findings include muscular aches and weakness, however, these findings are non-specific and may not always be present. Diagnosis is based on the presence of elevated plasma creatine kinase (CK) levels. Hyperkalemia, acute renal failure (ARF) and compartment syndrome are major life-threatening complications. Management includes prompt and aggressive fluid resuscitation, elimination of causative agents, and treatment and prevention of complications. Classic etiologies for rhabdomyolysis include illicit drug use, trauma and strenuous exercise. However, multiple other etiologies have been implicated.

**CASE REPORT:** We present the case of a 42 year-old African American female with poorly controlled hypothyroidism and sickle cell trait, who was admitted for chest wall pain. Patient endorsed multiple 2-3 minute long episodes of non-pleuritic, non-dermatomal pain beneath her ribs that started 2 weeks prior to admission. Pain was described as “fists underneath the ribs”. Patient denied myalgia, muscle cramping, or fatigue. Patient denied history of trauma, exercise or strenuous activity. Home medication include metoprolol, levothyroxine, ferrous sulfate, lasix and colace. Physical examination was unremarkable. Routine chemistry demonstrated a creatinine of 1.7mg/dL, a glomerular filtration rate of 33mL/min and a creatine kinase of 1375U/L. Patient as admitted for rhabdomyolysis and treated with aggressive fluid resuscitation. Further work up revealed TSH of 48.9uIU/mL, and AntiTPO antibody greater than 1300. Patient was started on thyroid replacement therapy, and CK was noted to trend downward.

**DISCUSSION:** The etiological spectrum of rhabdomyolysis is extensive. The common causes of rhabdomyolysis include illicit drugs, muscle diseases, trauma, seizures and immobility. Rhabdomyolysis can also be caused by excessive muscular activity, such as sporadic strenuous exercise, status epilepticus, severe dystonia, and military recruits in boot camp. Other risk factors include medications such as statins, metabolic deficiencies, and genetic disorders like sickle cell trait and muscular dystrophy. In many cases the etiology of rhabdomyolysis cannot be identified. The association of rhabdomyolysis resulting from strenuous exercise is well documented in those with sickle cell trait. Sustained exercise can evoke hypoxemia, acidosis, hyperthermia, and red cell dehydration, all of which can evoke sickling. Though our patient is positive for sickle cell trait, she did not relate a history of strenuous exercise. Many medications, including statins and colchicine can result in rhabdomyolysis because of their direct myotoxic effects. Studies also suggest that hypothyroidism may increase predisposition to statin induced myopathy. Upon medication review, patient was not taking any medication implicated in rhabdomyolysis. Endocrine abnormalities such as hypothyroidism or hyperthyroidism, have been reported to cause rhabdomyolysis, though mechanism remains unknown. In addition, only a few case reports of rhabdomyolysis associated with thyroid disease only, without exertion, are reported. Hence, the case reported is fairly unusual. Given that clinical presentation of rhabdomyolysis extremely variable, and can range from non-specific symptoms to muscle swelling and tenderness, a high index of suspicion is necessary in diagnosis of rhabdomyolysis. Definitive diagnosis of rhabdomyolysis is made with serum CK levels. A serum CK activity greater than five times the normal value has been accepted by many authors as a criterion for the diagnosis, though there is no cut-off value that conclusively diagnoses rhabdomyolysis. The complications of rhabdomyolysis include hypovolemia, compartment syndrome, arrhythmias, disseminated intravascular coagulation, hepatic dysfunction and acute renal failure. Acute renal failure (ARF) develops in 33% of patients and is the most serious complication in the days following the initial presentation. Management of rhabdomyolysis includes aggressive fluid resuscitation. If rhabdomyolysis is diagnosed based on an incidental finding during laboratory testing, efforts should be directed toward finding the underlying etiology, for example, hypothyroidism as described in the case presented.

**CONCLUSION:** Though cases of rhabdomyolysis resulting from exertion or statin use are reported in those with hypothyroidism, there are very few case reports of rhabdomyolysis associated with hypothyroidism alone. Patients with sickle cell disease are at increased risk, however, exertion is usually the inciting event. Given that presentation of rhabdomyolysis can be non-specific, a high index of suspicion can lead to timely diagnosis and treatment to prevent life threatening complications. Further studies are necessary to determine the pathophysiology of rhabdomyolysis in hypothyroidism.

**BREAST CANCER ASSOCIATED WITH REARRANGED DURING TRANSFECTION GENE (RET PROTO-ONCOGENE); A COINCIDENCE OR NOVEL FINDING?**

Sukhpreet Singh Family Medicine Devin Malik Internal Medicine

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Dr. Paul Broca first described hereditary cancers syndromes in the 19th century, namely breast and ovarian cancers. As breast cancer awareness spreads, so does the curiosity of patients and clinicians to look for a possible hereditary component in an attempt to reduce the risk of cancer developing in patients and relatives that may be affected by a gene mutation. Recently the University of Washington in Seattle has developed a risk panel looking for 49 gene mutations associated with various cancers, called the BROCA panel after the physician.

**CASE REPORT:** We describe a 42 years old Caucasian lady that presented to her PCP with left nipple redness. Mammography was done showing a breast mass and subsequent studies showed an estrogen receptor positive with negative progesterone receptor and HER-2/Neu negative poorly differentiated invasive ductal carcinoma with metastasis to the left axillary lymph node. Patient underwent, mastectomy, lymph node dissection, and chemotherapy and PET scan done months later showed resolution of the breast cancer. Upon further questioning, the patient had a remarkable family history of breast cancer including maternal aunt, and two maternal grand-aunts. Decision was made to test herself for possible hereditary cancer syndromes by BROCA risk panel testing. The anticipated result was breast cancer (BRCA1,2) gene mutation. Suprisingly, a mutation in the RET proto-oncogene was discovered. The RET gene is a tyrosine kinase receptor that regulates cell growth, differentiation and apoptosis. Clinically it is associated with multiple endocrine neoplasia type 2 (MEN2), an inherited syndrome manifesting as medullary thyroid cancer, pheochromocytoma and hyperparathyroidism. She was referred to an endocrinologist for management of MEN2 and ultimately referred to surgery for thyroidectomy.

**DISCUSSION:** Cancer is one of most common causes of death in the United States. While most cancers are due to lifestyle, and sporadic mutations, many have a hereditary component namely, breast, ovarian and colon. Both clinicians and patients have increasing awareness of hereditary cancer syndromes and the ability to screen for them is more readily available. Indications for testing necessitate family history and/or young onset of disease.

**CONCLUSION:** This case highlights the importance of genetic testing when family history and/or onset of cancer at young age presents. In this case, the breast cancer is likely not related to the RET gene mutation, however, its discovery prompted the appropriate clinical course of thyroidectomy to prevent medullary thyroid cancer, and follow up with an endocrinologist for hyperparathyroidism and pheochromocytoma. Further education needs to be done in order for primary care physicians to know when it is appropriate to refer to genetic testing to minimize unnecessary referrals, but also to know when genetic testing is appropriate.

## WHEN DECREASED VISCERAL FAT IS A BAD THING; A CASE SUPERIOR MESENTERIC ARTERY SYNDROME

Sukhpreet Singh Family Medicine Devin Malik Internal Medicine

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Superior Mesenteric Artery Syndrome (SMA syndrome) is an extremely rare and often fatal gastro-vascular process that is caused primarily by the absence of visceral fat between the abdominal aorta resulting in a narrow take-off angle of the SMA off the abdominal aorta. The consequence of this anatomic anomaly is the potential for the third part of duodenum to get compressed between the two large arteries causing a constellation of symptoms including early satiety, nausea, vomiting, severe post prandial abdominal pain and profound weight loss.

**CASE REPORT:** We describe a 25 year old gentleman with a 5-7 year history of intermittent stabbing abdominal pain in the epigastrium, nausea, vomiting, and significant weight loss of 60 pounds in the last few years. He describes his symptoms as coming on gradually and had been worked up in the past with 5 CT scans of the abdomen and 1 upper GI series with small bowel follow through. After malabsorptive and inflammatory intestinal etiologies were ruled out, he was diagnosed with gastroesophageal reflux and cyclical vomiting syndrome secondary to heavy marijuana use. The patient presented to the hospital with the most severe abdominal pain he has ever had after eating. His vitals revealed sinus tachycardia and labs were negative for pancreatitis with the only abnormality being hypokalemia. CT abdomen showed focal narrowing of transverse duodenum between aorta and SMA with moderate distention of stomach and proximal duodenum, concerning for SMA syndrome. Surgery was consulted and nasogastric tube was placed for decompression. Patient later underwent endoscopic gastroduodenoscopy showing partial duodenal obstruction at the level of the SMA. Ultimately a laparoscopic duodenojejunostomy for SMA syndrome was performed with resolution of his symptoms.

**DISCUSSION:** SMA syndrome is a very rare phenomenon with a high mortality rate secondary to unfamiliarity with the disease, and its intermittent symptomatology. In the majority of patients, the normal angle between the superior mesenteric artery and the aorta is between 38 and 65 degrees, due in part, to the mesenteric fat pad. Our patient had angle of only 8 degrees. The most notable risk factor for developing SMA syndrome is mainly weight loss, as loss of visceral and retroperitoneal fat allows the duodenum to be more easily compressed. This creates a vicious cycle as worsening compression leads to more weight loss from fear of eating secondary to abdominal pain and vomiting, which leads to further emaciation and further fat loss. Mortality is caused by severe catabolism, electrolyte abnormalities from vomiting, intestinal perforation from prolonged ischemia. Diagnostic modalities include upper GI series, and CT and MRI. Radiographic support of SMA syndrome includes duodenal obstruction with compression of the transverse duodenum, with an aorta-mesenteric artery angle less than or equal to degrees and high fixation of the duodenum by the ligament of Treitz, abnormally low origin of the superior mesenteric artery or anomalies of the superior mesenteric artery.

**CONCLUSION:** All clinicians should be aware of SMA syndrome when a patient presents with abdominal pain, nausea, and vomiting and weight loss. One must retain a high index of suspicion especially after malabsorptive and inflammatory conditions are excluded and to order appropriate imaging to aid in diagnosis.

**SELF-REPORTED SLEEP DYSFUNCTION AND MEDICAL ERRORS AMONG MEDICAL RESIDENTS**

Kunal Agarwal, Benedict Dormitorio, Michael Clarke

Western Michigan University School of Medicine, Family Medicine, Kalamazoo, MI

**INTRODUCTION:** Within medical residency, poor sleep has been associated with medical errors. In 2011, the Accreditation Council for Graduate Medical Education adjusted duty hours to a maximum 16 hours per shift for interns. This was an effort to improve sleep of all residents and decrease medical errors.

**HYPOTHESIS:** Medical residents at Western Michigan University School of Medicine (WMU SOM) will demonstrate poor sleep quality and daytime sleepiness as reflected by higher scores on the Epworth Sleepiness Scale (ESS) and Pittsburgh Sleep Quality Index (PSQI). Females, surgery related specialties, and senior residents will perform worse. Factors such as alcohol, caffeine, tobacco, and lack of exercise will be associated with poorer sleep. This will result in more self-reported medical errors.

**MATERIAL & METHODS:** IRB approval was obtained by WMU and Bronson Hospital. A cross sectional anonymous paper survey, with implied consent, was administered to all 201 medical residents of WMU SOM. The validated PSQI was used to determine sleep quality, with a global sum of >5 considered significant. The validated ESS was used to determine an individual's daytime sleepiness, and scores >10 were considered significant. Questions were also asked about demographics, exercise, caffeine, tobacco, alcohol, opinions on the new duty hour rule, its perceivable benefits, and if the new change impacts medical errors. ANOVA with follow up group wise comparisons and regression analysis was performed. A p value < 0.05 was considered statistically significant.

**RESULTS:** Of the 201 eligible residents, 160 (80%) participated in the study. Nineteen surveys were incomplete (N=141). The analysis sample included 83 men (58.87%) and 58 females (41.13%). The average age was 29.65. Mean PSQI global score was 6.03 and mean ESS score was 7.37. The mean total hours of sleep was 6.35 hours, mean total time in bed was 6.94 hours, and mean sleep efficiency was 93.28%. The mean PSQI score in males was 5.43 versus 6.88 in females (p = 0.0032), while the mean ESS score in males was 6.47 versus 8.66 in females (p = 0.0029). By class year, mean ESS scores were significantly different (p = 0.0124). By field of medicine, the mean PSQI global scores and mean ESS scores were significantly different (p = 0.0020 and p = 0.0077, respectively). There were particular significant positive linear relationships with caffeine intake on weekdays and ESS scores, caffeine intake on weekends and PSQI scores, and alcohol intake on weekdays and PSQI scores. No significance noted with exercise or tobacco use. Eighty percent of residents agreed with limiting duty hours to 16 hours per day. Seventy percent of residents agreed that the number of inpatient medical errors has decreased with the new duty hour restrictions. Slightly more than a majority (53.19%) of residents agreed that they themselves created more medical errors due to poor sleep, while even more (58.16%) agreed that their colleagues did. Eighty four percent of residents agreed that their attention and interaction with peers is affected by poor sleep. Opinion questions were compared to their respective PSQI and ESS scores, and not found to be significant. A significant benefit to limiting duty hours was being more alert and making fewer errors.

**DISCUSSION:** Because of a high response rate, sufficient power limits the chance of sampling error or volunteer bias. Psychiatry, orthopedics, and transitional years had normal sleep quality, while medicine- pediatrics and general surgery had increased daytime sleepiness. Literature regarding variation in sleep across specialties is lacking. Females averaged higher scores, signifying poorer overall sleep, which is consistent with prior research. Increasing alcohol and or caffeine intake affects one's sleep quality and daytime sleepiness. While the study indicates overall poorer sleep quality among residents, their opinions indicate no increase in medical errors. Underreporting out of possible fear of repercussions is possible, but all surveys were anonymous. Residents should remain educated about sleep deprivation, fatigue, and supportive services provided.

**CONCLUSION:** Medical residents at WMU SOM have poorer sleep quality than daytime sleepiness and their sleep dysfunctions significantly vary by discipline and gender. There is a positive relationship with alcohol and caffeine intake with such measures. The new duty hour restriction is favored but does not necessarily affect patient medical errors.

**‘CRY OF THE CAT’: INITIAL CARE AND MANAGEMENT OF THE 5P- NEONATE**

Randi VanOcker, Adrian A. Villarreal

Western Michigan University School of Medicine, Family Practice, Kalamazoo, MI

**INTRODUCTION:** Cri-du-chat (cat cry) is a deletion syndrome, with an incidence of approximately 1 in 45,000 liveborn infants. Approximately 85 percent of cases result from a de novo partial deletion of the short arm of chromosome 5 (the deleted chromosome is of paternal origin in 80 percent). The remaining cases derive from a parental translocation involving 5p. The critical region for the high-pitched cat-like crying is 5p15.3, while the remaining clinical features of this syndrome are mapped to a smaller region within 5p15.2. While the classical presentation and features of this condition are fairly well known, this diagnosis presents a myriad of challenges for the infant’s family as well as the primary care provider.

**CASE REPORT:** Singleton live neonate was delivered to a 28 year old G2P1 via NSVD at 40 2/7 weeks weighing 3210 grams with APGARs 4, 7, 9. The patient’s initial cries were identified as weak and high-pitched, requiring oxygen support and warming. Patient was transferred to Neonatal Special Care Nursery for difficulties with maintaining oxygenation and with feedings. Oxygenation improved with supplemental Oxygen via nasal cannula. Upon comprehensive newborn exam, patient was found to be hypotonic with micrognathia, slanted palpebral fissures, low-set ears, and an unusual cry labeled as “cat-like”. This distinctive cry, along with the atypical physical exam findings, prompted further evaluation. These included genetic karyotyping, imaging studies, and careful clinical follow up. Imaging of the brain via ultrasound and initial limited transthoracic echocardiogram were unremarkable. Karyotyping revealed monosomy for a segment in the 5p arm distal to the breakpoint for 5p13.3. Patient did pass newborn hearing and vision screens, as well. Patient’s feeding improved with lactation consultant involvement and EBM from mother and only lost 3.4% of birth weight prior to discharge from the hospital. The patient was discharged home with parents after a 6 day stay to follow up closely with Primary Care Provider (“PCP”), case management, and Genetics. During the newborn exam at the PCP’s office, unsatisfactory weight gain was noted. This was despite improved feedings prior to discharge, with patient now falling below the 5th percentile on growth curve. Subsequent well-child evaluations demonstrated continued poor weight gain and slow or missed vocalization and vision developmental milestones. Continued improvement in feeding technique and iron supplementation for infant began to show modest improvements in weight gain and growth by the 3 month well child exam. Parents and child referred to Genetic Medicine for further evaluation and follow-up. There is one older sibling without any identified genetic anomalies. Parents were directed to outside educational resources such as “Five P minus” (5p-) support groups and state-level foundations. “Early On” support began for child at three months of age for continuing evaluations of developmental potential, particularly vision, hearing, speech and language.

**DISCUSSION:** Though commonly seen on written exams, “Cri-du-chat” syndrome retains a “Rare Disease” classification according to the National Institutes of Health. Though most Cri-Du-Chat patients have a normal life span, the best potential for a full life comes only with prompt recognition and early appropriate interventions. A clear discussion on the initial management of the 5p- neonate in the Family Practice literature is itself uncommon.

**CONCLUSION:** The family practice physician must be prepared to manage not only the potentially devastating emotional toll that this diagnosis can wreak on the family but must also be vigilant in the foundations of neonatal management including the education, guidance and reassurance for the parents of these rare patients.

**ACTINOMYCES MEYERI: FROM ‘LUMPY JAW’ TO EMPYEMA**

Amy Attaway, Thomas Flynn

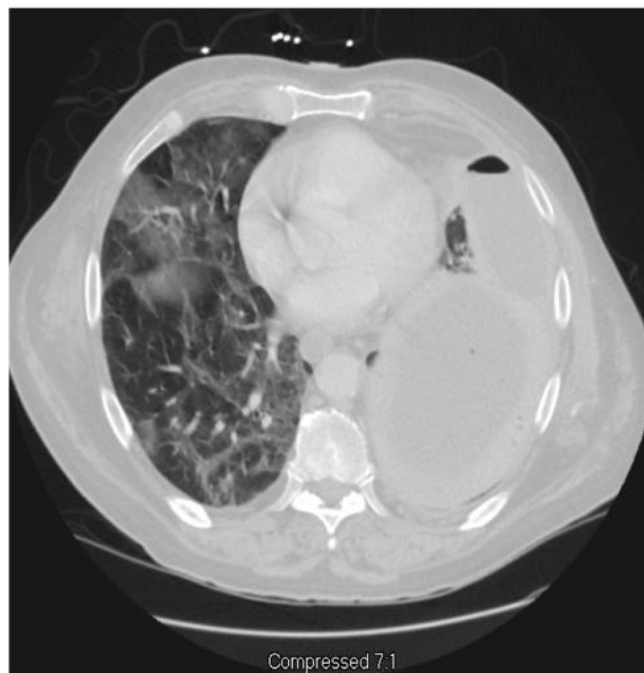
Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** *Actinomyces meyeri* (*A. meyeri*) is rarely isolated in cases of actinomycosis, and there are only 32 other cases to date in the English literature. 45% of these cases involved pulmonary disease. When actinomycosis occurs, it most often involves males who abuse alcohol and have poor dental hygiene. Prognosis is favorable with prolonged penicillin therapy as well as surgical debridement, if necessary.

**CASE REPORT:** We describe a 61-year -old Caucasian male with a relapsing-remitting mandibular sinus tract who would go on to develop weight loss, dyspnea, and a cough productive of malodorous sputum. Imaging revealed a right lower lobe pneumonia and a large left sided empyema. He underwent thoracotomy and decortication on the left side, and one liter of foul-smelling purulent fluid was drained. Culture grew *Actinomyces meyeri*. He completed an extended antibiotic course and had his teeth extracted with good clinical outcome.

**DISCUSSION:** *A. meyeri* is a rare cause of actinomycosis, with a recent review of literature reporting only 32 other cases in the English literature. The main human pathogen is *Actinomyces israelii*, and often causes “lumpy jaw syndrome” or cervicofacial disease with little regard for tissue planes. *A. meyeri* has been shown to have a predilection for pulmonary manifestations as well as hematogenous dissemination. Associated risk factors include male sex, middle age, poor dentition, and a history of alcoholism. One of the theories behind the pathogenicity of actinomycosis is that these species, which are mostly facultative anaerobes, work with other anaerobes of the oral flora called “co-pathogens” to reduce oxygen tension and thereby inhibit phagocyte-mediated host defenses.

**CONCLUSION:** While pulmonary manifestations are the third most common manifestation of actinomycosis after cervicofacial and abdomino-pelvic, it is the most frequent for *A. meyeri* infections and is found in nearly half of all cases.



## EVERYTHING'S RELATIVE: TOLERATING EXTREME HYPERKALEMIA IN A NON COMPLIANT DIALYSIS PATIENT

Amy Attaway, Rasha Abdulmassih, Eric Yoder, Jared Gardner, Sanjay Dalal

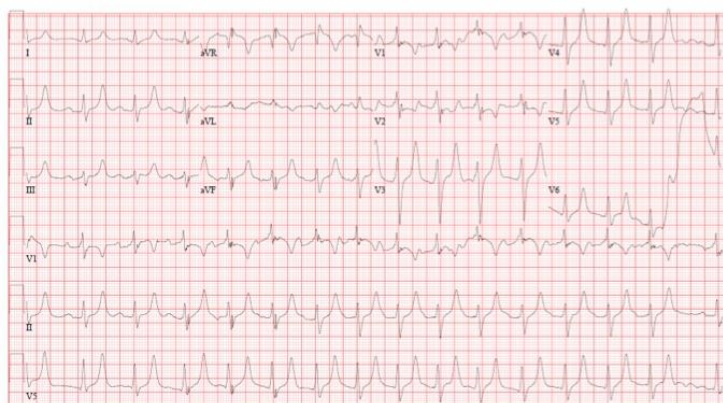
Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** End stage renal disease (ESRD) patients on dialysis are known to tolerate hyperkalemia with less EKG changes as well as less life-threatening arrhythmias leading to cardiac arrest. Despite this, most reports of extremely high potassium (>9 mmol/L) have been in the setting of cardiac arrest.

**CASE REPORT:** The patient is a 57-year-old Caucasian male with past medical history significant for end stage renal disease secondary to multiple myeloma and light chain deposition disease. He is well known to the hospital staff for noncompliance with a low potassium diet as well as frequently missed dialysis appointments and admissions for emergent dialysis. The patient himself describes that he can "feel" when his potassium is too high, especially when he has lower extremity weakness, and he presents to the hospital when these symptoms are significant. Previous to this episode he has tolerated extremely high potassiums up to 9.0 mmol/L with only mild EKG changes. He has never arrested. On non dialysis days he is supposed to take sodium polystyrene; however it is unclear if this was truly happening or not. The patient presented in the early morning with lower extremity weakness. His last dialysis was three days prior. His blood pressure on admission was 210/116, pulse 110, respirations 24. He was somewhat confused. Exam revealed 4/5 strength in upper and lower extremities. Reflexes were hypoactive. A stat potassium was 10.2 mmol/L which was non-hemolyzed and confirmed on repeat testing. Chest X-ray was clear. A stat EKG was performed which revealed peaked T waves, mildly increased PR interval (200 ms), and mild QRS widening (142 ms). There was no evidence of bradycardia or sinusoidal wave form. The patient received 10 units of insulin and 1 amp of D50 in the ER and went straight to the dialysis unit. The patient received emergent dialysis and both his mental status and EKG normalized.

**DISCUSSION:** This patient represents the second highest reported potassium level in the literature in a patient without evidence of arrest. Previous studies that have documented extreme hyperkalemia have all been reported in the setting of cardiac arrest or have not been as high as 10.2. The only other case of extreme hyperkalemia without arrest was a patient reported in Hong Kong with a potassium of 10.7. The 2007 case represented a 47 year old female who also had ESRD secondary to chronic glomerulonephritis on hemodialysis.

**CONCLUSION:** The phenomenon of chronic hyperkalemia in ESRD patients and physiologic tolerance of the cardiac myocardium has been well documented in previous studies. The ability to adapt the myocardium may be related to slow increases in potassium causing less electrophysiologic consequences. However, the exact mechanism remains unknown.



**Image 1:** Represents an EKG performed shortly after his potassium came back as 10.2 mmol/L. He had sinus tachycardia (126) with characteristic peaked T waves, flattened p waves, an increased PR interval (200 ms), and QRS widening (142). While a sine wave is not yet present, there are early changes that could represent the beginnings of this morphology.

## YOU TUBE AS A SOURCE OF INFORMATION FOR ATRIAL FIBRILLATION

Rakshita Chandrashekar, Sourabh Aggarwal, Mark Loerhke

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Internet has become an easy source for healthcare information. In recent years, websites including Google and YouTube have become increasingly popular for searching all possible queries. It is necessary to monitor the information, especially scientific facts, being disseminated from these open-access sites which will assist in keeping check on and further, in developing strategies to prevent spread of false information. This study analyzed how information related to Atrial Fibrillation was portrayed in video clips available on YouTube.

**MATERIAL & METHODS:** YouTube (www.youtube.com) was searched on December 1, 2013 using the search terms keyword "Atrial Fibrillation". First 50 videos displayed were analyzed for the purpose of this study with the theory that a layman does not usually go beyond initial videos during random search. Videos were viewed and classified as useful, misleading and news update by 2 different viewers. Data analyses were conducted for duration of videos, number of viewers and appropriateness of videos by reliability score, content score and global quality score. Statistical analysis done by SPSS.

**RESULTS:** A total of 50 videos were included in analysis. Mean duration of videos was 642 seconds (Median 254 seconds), mean viewership was 22893 views (Median 2992 views, range 12-394554 views) and mean length for video posted on YouTube was 717 days (Median 591 days, range 104 -2428 days) . Forty three videos (86%) were classified as useful, 5 as patient views (10%) and 2 as misleading (4%). Most of the videos, 26 (52%) were uploaded by university channels, followed by independent users 17(34%) and for-profit-companies 4(8%). Most of the videos 22 (44%) were focused on patient education in laymen language, followed by medical and scientific education 14 videos (28%) and personal experience 11 videos (22%). Two videos (4%) were focused on drug advertisement and 1 video (2%) discussed alternate non-approved forms of treatment. On a scale of 1-5, the mean reliability score was  $3.26 \pm 1.04$  (Median 4), mean content score was  $3.08 \pm 1.06$  (Median 3) and mean global quality score was  $3.12 \pm 1.09$  (Media 3.5)

**CONCLUSION:** The results demonstrate that there is a wide variety of information on YouTube regarding Atrial Fibrillation. Though most of the videos are useful, with appropriate content form, there are elements of misleading and inappropriate information available on free internet websites. Viewers can be misled to false information which can have grave implications. As a result, public health professionals should be more vigilant in recognizing videos containing misleading information on health related issues and physicians should counsel and educate patients against inappropriate use of online videos for medical purposes. More studies are however needed for information on YouTube for other more common diseases.



**BETA BLOCKER BUZZ: CARVEDILOL CAUSING VISUAL DISTURBANCE**

Rakshita Chandrashekar, Mark Schauer

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Carvedilol is a common medication that is used for the treatment of high blood pressure, heart failure and cardiomyopathy. Commonly reported side effects of carvedilol include breathing difficulty, congestive cardiac failure, fatigue, dizziness and weakness. Visual disturbance is rare and has been reported in 0.36% of the population on carvedilol. We present an interesting case where our patient developed these visual disturbances when started on carvedilol.

**CASE REPORT:** 35 year old obese African-American male with history of hypertension on lisinopril and hydrochlorothiazide presented to ED with acute onset of shortness of breath and retrosternal chest pain, associated with cough and frothy pink sputum. He denied other symptoms. He is a former smoker and drinks alcohol thrice a week. His blood pressure was 208/128 mm of Hg, saturating at 70% on room air. He was treated with Aspirin, Hydralazine, Lasix and Duonebs. His blood pressure dropped to less than 160/100 mm of Hg and oxygen saturation improved. Physical examination was unremarkable except for S4 on auscultation. Troponins were negative. EKG showed sinus tachycardia with left axis deviation. Chest X-ray showed minimal interstitial lung markings and marginal cardiomegaly. He was admitted to telemetry floor. ECHO showed ejection fraction of 50% with moderate concentric left ventricular hypertrophy. US renal showed no evidence of renal artery stenosis. He was started on amlodipine, lisinopril and chlorthalidone which did not control the blood pressure as expected. Carvedilol was then added. An hour after the first dose, he complained of 'visual distortions' described as alteration of images by vivid coloration. The patient further described this as similar to being 'high' on marijuana. The visual disturbances resolved completely 6 hours after his dose. Carvedilol was not restarted. His blood pressure remained 150s/100s throughout the hospitalization. He was discharged with the 3 medications mentioned previously and education on life style modifications.

**DISCUSSION:** Visual disturbance when on carvedilol most commonly occurs in the first month (66.67%, reduces to 33.33% in 6 months) of taking the drug. It seems to more commonly affect males (59.76%) than females (40.24%). Incidence of this side effect increases with age; people beyond 60 years are affected the most (78.12%). It is more commonly found in patients taking aspirin, lasix and lisinopril over prolonged periods of time. No severe or permanent eye damage has been reported with its use.

**CONCLUSION:** Further studies regarding the effect of visual disturbance on routine daily activities like driving need to be done. Physicians prescribing carvedilol may desire to educate their patients regarding this potential side effect.

**ERDHEIM-CHESTER DISEASE: RARE PRESENTATION OF A RARER DISEASE**

Rakshita Chandrashekar, Shrey Velani, Richard Roach, Vishal Gupta

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Erdheim-Chester disease (ECD) is a rare non-Langerhans histiocytic disorder most commonly characterized by multifocal osteosclerotic lesions of the long bones demonstrating sheets of foamy histiocytes on biopsy with or without histiocytic infiltration of extraskelatal tissues. ECD usually involves skeletal system in form of osteosclerosis (26% presentations). We present an interesting case of ECD who did not have any skeletal symptoms but presented with recurrent pericardial effusions and had a history of panhypopituitarism which was never linked to ECD until present admission.

**CASE REPORT:** This is a 55 year old Caucasian male with past medical history of panhypopituitarism on replacement, steroid induced diabetes and recurrent pleural effusions and pericarditis for the past few years needing frequent admissions. He underwent pericardiocentesis a year back with benign pericardial fluid analysis. Diagnosed of presumed Sjogren's syndrome as his autoimmune rheumatological workup was positive only for SSA and history of recurrent pleuro-pericardial effusions. He was treated with high dose steroids and later switched to low dose steroid with azathioprine. He presented with shortness of breath and worsening lower extremity edema. He had acute kidney injury with creatinine of 4.6(baseline-1.1) and thrombocytopenia. Physical examination was significant for decreased breath sounds and bilateral pitting edema upto the scrotum. CT abdomen and pelvis showed pleural effusion, pericardial effusion, and bilateral ureteral obstruction with hydronephrosis with soft tissue attenuation stranding in retroperitoneal space and abnormal stranding in perirenal and periaortic spaces, all of which was suggestive of retroperitoneal fibrosis. His course was complicated by shock from urosepsis which was treated in ICU requiring CRRT. He underwent bilateral ureteroscopy with bilateral JJ stent placement with drainage of purulent fluid. Retroperitoneal tissue biopsy was done to rule out myelo/lymphoproliferative malignancies. CD68 and CD163 were positive with negative KRT-AE1/AE3 supporting the histiocyte phenotype likely being ECD due to his medical history and clinical features. Kidney biopsy showed interstitial nephritis due to pyelonephritis. Repeat SSA and SSB autoantibody titres were negative. Foley catheter was removed on the day of discharge. He was discharged with ertapenem, Imuran, Lasix and prednisone.

**DISCUSSION:** As an orphan multi-systemic disease both diagnosis and treatment are challenging. Diagnosis wise, the challenge is lesser and requires a high degree of suspicion. Treatment and management of the disease are of greater complexity. Since no definite cure exists, the goals of treatment should be prolonging life and maximizing their quality. Psychological consulting is important because success of the physical treatment usually results in the maintenance of a chronic condition.

**CONCLUSION:** Our patient had involvement of pituitary gland, pleura, pericardium, retroperitoneal tissue, renal system with no skeletal system involvement though bone pain is the most common symptom(96%). Biopsies of involved tissues are characterized by tissue infiltration by sheets of foamy (xanthomatous) histiocytes with interspersed inflammatory cells and multinucleate giant cells. Treatment options include (in order of evidence of efficacy) pegylated interferon alpha, systemic chemotherapy including vinblastine, etoposide, glucocorticoids, methotrexate, cyclophosphamide or a new drug called vemurafenib which is BRAF inhibitor.

**DOUBLE TROUBLE FOR THE HEART: A CASE OF ISOLATED LEFT VENTRICULAR NON-COMPACTION CARDIOMYOPATHY PLUS ISCHEMIC CARDIOMYOPATHY.**

Kwabena O. Adu-Gyamfi, MD(Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, MI), Christopher Rogers, DO(Bronson Advanced Cardiac Healthcare, Kalamazoo, MI)

WMed Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** Left ventricular noncompaction cardiomyopathy (LVNC) is caused by arrest of fetal cardiac morphogenesis leading to persistence of a spongy inner myocardium with trabeculations and deep intertrabecular recesses. This rare condition is increasingly recognized as an important cause of morbidity and mortality.

**CASE REPORT:** A 55 year-old man with hypertension, CKD stage 3 and hyperlipidemia but no cardiac disease history presented with a 1-month history of symptoms and signs consistent with new-onset congestive heart failure. Echocardiography revealed an ejection fraction (EF) of 18% as well as a suggestion of isolated left ventricular (LV) noncompaction. Nuclear stress testing revealed extensive areas of nonviable and ischemic myocardium, followed by coronary angiography which confirmed severe multi-vessel disease with an EF of 10%. MRI done to evaluate cardiac anatomy revealed deep LV myocardial trabeculations with LV end-systolic non-compacted to compacted ratio of 2.4 consistent with LVNC.

**CASE REPORT CONTINUED:** Considered to be too high-risk for coronary bypass surgery, he later refused cardiac transplant evaluation and underwent successful high-risk percutaneous coronary intervention. On 3-month follow up he was stable with an EF of 25%, and is awaiting an implantable cardioverter defibrillator(ICD) placement.

**DISCUSSION AND CONCLUSION:** With an estimated prevalence of 0.014% by case series, LVNC may be asymptomatic or present as heart failure, ventricular arrhythmias, thromboembolic events or sudden cardiac death. When concurrent with another distinct cardiomyopathy such as ischemic cardiomyopathy, the clinical end-result may be profound cardiac dysfunction requiring either cardiac transplantation or an innovative tailored approach in this high-risk group of patients as was illustrated by our experience.

**THE IMPACT OF ANTISMOKING LEGISLATION ON COPD HOSPITAL ADMISSIONS IN UNITED STATES: ANALYSIS OF NATIONWIDE INPATIENT SAMPLE (NIS) DATA**

Ravikanth Papani, Sourabh Aggarwal, Shrey Velani, Amy Attaway, Susan Bannon, Thomas Melgar

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Smoking bans or smoke-free laws are public policies which prohibit tobacco smoking in workplaces and other public spaces. They are meant to protect people from the effects of second-hand smoke (SHS) which causes the same problems as direct smoking.

**RATIONALE:** The comprehensive effect of smoking bans on smoking related diseases like COPD has not been studied. In this research project, we intended to study the effects of the anti-smoking legislation on COPD hospital admissions and related mortality.

**MATERIAL & METHODS:** This is a retrospective analysis of data from Nationwide Inpatient Sample (NIS) online database. We identified all the states where official smoking ban has been implemented. From the online database, we gathered the total discharges and COPD related discharges and deaths. Data was gathered for two years before and after the ban, using the following International Classification of Disease-9 (ICD-9) codes- 466.0, 490, 491.0, 491.1, 491.20, 491.21, 491.8, 491.9, 492.0, 492.8, 494, 494.0, 494.1 and 496- listed as primary diagnosis. Primary outcome was the COPD hospitalization rate per 1,000 total discharges. Secondary outcomes included total length of stay and in-hospital mortality related to COPD. Chi squared test was used for analysis with  $p < 0.05$  considered statistically significant.

**RESULTS:** As of November 2013, some form of smoking ban is present in 42 states of the US. Among these, only 20 states have the required information available in the online database. In the order of two years before and after, the total number of hospital admissions in all the states combined has increased from 28,887,840 to 29,555,177. The COPD hospitalization rate decreased from 15.63 to 14.97 ( $p < 0.001$ ). COPD related in-hospital mortality also decreased from 17.97 to 8.06 ( $p < 0.001$ ).

**DISCUSSION:** There has been increasing evidence that smoking ban decreased all-cause mortality and morbidity in cardiovascular and pulmonary diseases by decreasing the exposure to Second Hand Smoking (SHS). A more comprehensive studies are required to confirm this observation. This may be important in expanding and implementing the anti-smoking legislations nationwide.

**CONCLUSION:** Anti-smoking legislation may have resulted in a drop in COPD hospital admissions and related mortality.

**30-DAY READMISSION RATE FOR PATIENTS DISCHARGED WITH DM WITH COMPLICATION:  
ANALYSIS OF 1,443,601 ADMISSIONS**

Gagan Preet, Devin Malik, Sourabh Aggarwal

Western Michigan University School of Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Diabetes mellitus (DM) with complications is a major cause of morbidity and is associated with a high 30-day re-admission rate (RR) and economic burden on health care. This study was done to determine demographic parameters associated with high 30-day RR secondary to DM with complications.

**MATERIAL & METHODS:** Nationwide Inpatient Sample data was used to extract data of patients discharged with DM with complications for years 2009-2011 using clinical classification software (CCS). NIS represents 20% of all hospital data in US. All the patients who were discharged with primary diagnosis of DM with complications and readmitted within 30 days were identified and categorized based on admitting diagnosis. Patients were classified as readmissions secondary to DM with complication as primary cause, readmissions with DM with complication as a secondary cause and non-DM associated readmissions. Statistical analysis was done using SPSS.

**RESULTS:** We identified a total of 1,443,601 admissions for DM with complications nationwide during the study period with total 30-day RR of 20.39% and RR of 8.32% secondary to DM as a primary cause (Table 1). Age group (18-44), females, patients under Medicaid, patients in low median income for zip code and in metropolitan areas had higher 30-day readmissions secondary to DM with complication as a primary cause ( $P < 0.001$ ). Elderly patients ( $>65$  years of age), females, patients covered under Medicare and living in non-Metropolitan areas had higher 30-day RR secondary to non-DM related causes.

**DISCUSSION:** Strategies to reduce 30-day readmissions secondary to DM with complications should be focused on more susceptible population including females, aged 18-44 years, under Medicaid, having low median income for zip code and staying in metropolitan areas.

**INTRACRANIAL COLLOID CYST LEADING TO SUDDEN BRAIN DEATH**

Padma V. Chandika, Kristin N. Harjer, Shrey Velani, Sourabh Aggarwal

Bronson NICU, Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Colloid cysts of the third ventricle are a rare intracranial lesion located at the anterior part of third ventricle. They comprise about 0.5% to 1 % of all intracranial tumors and are a rare cause of "thunderclap" headaches. We present a rare case of a colloid cyst leading to sudden brain death.

**CASE REPORT:** A 32 year old female, 8-weeks postpartum via cesarean section, with only known history of gestational diabetes mellitus, hypothyroidism and secondary hypertension treated with right adrenalectomy, was in usual state of health 8 hours before presentation. Patient complained of bilateral frontal headache to her husband. Headache was moderate to severe in intensity, non-radiating in nature and not accompanied by neurological deficits. The patient went to lie down. Patient was checked on four hours after onset and was only diaphoretic. An hour later, patient developed episodes of non-bloody emesis and altered mental status. On arrival to the ED, the patient had fixed and dilated pupils and minimal neurological response to physical/noxious stimuli. She was intubated for airway protection. CT head non-contrast revealed cerebral edema and massive hydrocephalus of lateral ventricles with a hyper dense lesion within the anterior third ventricular located at foramen of Monro causing obstructive hydrocephalus consistent with the diagnosis of colloid cyst. Her lines were secured and she was started on hypertonic saline and Mannitol. Neurosurgery performed an emergent bedside right frontal ventriculostomy. However, patient had no neurological recovery and was declared brain dead.

**DISCUSSION:** Colloid cysts are rare benign congenital intracranial lesions with incidence of 3.2 colloid cysts per million people in epidemiological studies. Their presentation in childhood is rare, usually presenting within the third to sixth decade. The clinical presentations are varied, from incidentalomas on CT head scans to sudden death due to non-communicating hydrocephalus. The only curative treatment is neurosurgical intervention.

**CONCLUSION:** Despite being rare, colloid cysts should be in the differential when patients present with a headache and/or altered mental status associated with nausea and vomiting. If clinicians miss this diagnosis the complications can be devastating while treatment can be life saving.

## HEPATOCELLULAR CARCINOMA CONTIGUOUS INTO THE RIGHT ATRIUM

Rakshita Chandrashekar, Karthik Kannegolla, Sreenivasa Chandana

Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Hepatocellular carcinoma (HCC) is the most common primary malignant tumor of the liver. At least 372,000 new cases of HCC occur worldwide every year, accounting for 4.6% of all new human cancers. Most cases of HCC are diagnosed at an advanced stage and the tumor spreads most frequently to the lungs, peritoneum, adrenal glands and bones. Intracavitary cardiac extension or metastasis is an unusual form of secondary cardiac malignancy. The results of autopsy studies indicate a 2.7-4.1% incidence of atrial metastases of HCC. Cardiac metastases were notably located in the right ventricle (RV), RA and left ventricle (LV) in 10 (58.8%), 5 (29.4%) and 2 (11.8%) patients, respectively. This report describes an unusual case of HCC contiguous into the right atrium.

**CASE REPORT:** A 64 year old man with a past medical history of Coronary artery bypass grafting and Aortic Valve Replacement in 2007 presented with 1 week history of worsening shortness of breath which was diagnosed as diastolic heart failure. Physical examination was positive for bilateral basilar crackles and 3+ ejection systolic murmur. Laboratory findings include elevated Brain Natriuretic Peptide of 1052, elevated liver enzymes- Aspartate Transaminase-61 IU/L (reference range: 15-41 IU/L), Alkaline Phosphatase-149 (reference range: 30-96), normal Alanine Transaminase- 34 (reference range: 5-40) and elevated alpha fetoprotein level of 179 ng/ml (reference range: 0-9 ng/ml). Hepatitis Panel was negative. Transthoracic echocardiography showed large echo density of 7x5cms in the right atrium which was confirmed by Trans esophageal Echocardiography. Computed Tomography angiography of chest was negative for pulmonary embolism but incidentally showed the presence of heterogeneous mass in the liver. Subsequent reconstructed Coronal Computed Tomography revealed 10.2x13.9x10.8cms left hepatic lobe mass with direct Inferior Vena Cava tumor invasion with continuous extension into the right atrium. Liver biopsy revealed well-differentiated Hepatocellular carcinoma. Due to the tumor inoperability, the patient was symptomatically treated for his heart failure and he was scheduled to participate in the clinical trial of Trans arterial chemoembolization with sorafenib pretreatment. Unfortunately, our patient passed away due to flash pulmonary edema secondary to existing aortic valve dysfunction within 20 days of initial presentation. Patients who develop HCC usually have no symptoms other than those related to chronic liver disease. Our patient was totally asymptomatic until he presented with congestive heart failure.

**DISCUSSION:** It is surprising how our patient who had minimal or almost no risk factors- Caucasian, very remote history of smoking, occasional alcohol use, no history of liver disease, being physically fit, could develop HCC with a contiguous extension into the right atrium and presenting so acutely.

**CONCLUSION:** Although HCC has a very aggressive metastatic profile, its tendency to spread towards the heart is unusual with an incidence of cardiac metastasis at 0.67-3%. Though aggressive surgical resection is the best therapeutic approach for HCC, it may not always be possible and in such cases combination of different therapeutic approaches such as chemotherapeutic agents, radiotherapy and chemoembolization may improve survival.



## **A COMPARISON OF SURGICAL CARE IMPROVEMENT PROJECT (SCIP) MEASURE COMPLIANCE BEFORE AND AFTER PROSPECTIVE PHARMACIST AND NURSE INTERVENTIONS**

Andrew P. Henderson, Jeanne M. Anderson, Mark P. Herriman, Kaitlyn M. Priniski

Memorial Hospital of South Bend, Department of Pharmacy, South Bend , IN

**INTRODUCTION:** The Joint Commission Surgical Care Improvement Project (SCIP) is a national quality partnership of organizations working together to improve surgical care by reducing surgical complications. There are ten core measures that when followed, can improve morbidity, mortality, cost of care, and can promote treatment consistency among patients undergoing surgical procedures.

**RATIONALE:** The purpose of the current study is to confirm that the presence of a pharmacist and nurse assessing surgeries and performing prospective medication interventions results in improved SCIP measure compliance.

**MATERIAL & METHODS:** A retrospective chart review of the electronic medical record was conducted to evaluate SCIP measure compliance before and after prospective nurse and pharmacist interventions. Patients for the control and experimental group were identified utilizing a daily surgery roster; each arm included up to 100 patients. All data was de-identified and patient health information was stored in a password protected electronic file. Control group patients were collected starting with surgeries performed in April 2013. Experimental group patients were collected starting with surgeries performed in November 2013 after implementation of nurse and pharmacist prospective SCIP interventions. The primary outcome was compliance with all SCIP measures, except for surgical hair removal (Inf-6). The secondary outcome focused on compliance with the following problematic measures for the hospital: Venous thromboembolism (VTE) prophylaxis ordered (VTE-1), VTE prophylaxis received (VTE-2), and antibiotic selection (Inf-2).

**RESULTS:** Preliminary results include thirty patients in each group. For each patient, nine SCIP measures were evaluated. In the control group, out of 270 measures, 78 were not applicable, 179 passed and there were 13 failures. In the experimental group, out of 270 measures, 92 were not applicable, 176 passed and there were two failures. Excluding those not applicable, preliminary secondary outcomes in the control group for SCIP Inf-2 show 27 passes and two failures, VTE-1 had 23 passes and one failure, and VTE-2 had 21 passes and three failures. The experimental group for SCIP Inf-2 had 26 passes and no failures, VTE-1 had 24 passes and no failures, and VTE-2 had 24 passes and no failures.

**CONCLUSION:** Compared to surgeries with no prospective pharmacist and nurse intervention, preliminary results show an improvement in SCIP measure compliance.



## LEFT MAIN CORONARY ARTERY ANEURYSM COMPLICATED WITH THROMBUS

Sourabh Aggarwal, Soundos Moualla

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Coronary artery aneurysms are defined as dilated coronary arterial segments greater than 1.5 times diameter of the normal segments. Coronary aneurysm, an uncommon disorder diagnosed by coronary angiography, is more prevalent in men and more common in right coronary artery. Left main coronary aneurysm have been very rarely described. We described a very rare case of left main coronary aneurysm with a thrombus.

**CASE REPORT:** A 43 year old male presented with acute onset of severe chest pain. It was left sided, non-radiating, 7/10 in intensity, pressure-like pain, worse with deep inspiration and not relieved by nitroglycerin. He had a 20 pack-year history of smoking. On examination, he had bradycardia, normal heart sounds and no murmurs were heard. 12-lead EKG revealed sinus bradycardia (46 beats/min), normal axis and no ST-T wave changes. Initial lab evaluation was unremarkable. Chest X-ray was unremarkable. CT angiography of chest (Pulmonary embolism protocol) revealed coronary artery calcification and possible aneurysm of coronary artery. His troponins came back elevated at 6.24. He was taken to cath lab for left heart catheterization. Angiography revealed a large left main coronary aneurysm (1.2cm\*1.6 cm) with intra-coronary thrombus (1cm\*1cm) which was occluding proximal left circumflex artery at the origin of OM1 branch. He was started on i.v. heparin and eptifibatide and transferred to a higher center where coronary CT angiography demonstrated similar finding. In the absence of guidelines for this unique pathology and after thorough discussion of risk-benefits with patient and cardio-thoracic surgeon, it was decided to treat him conservatively and he was started on aspirin, clopidogrel and warfarin. Follow up CT scan of chest done a week later showed resolution of clot. He is doing fine till date.

**DISCUSSION:** Left main coronary aneurysm with thrombus has been described very rarely in literature. An essential component in the formation of coronary aneurysms is the vessel media erosion, ulceration or hemorrhage due to underlying atherosclerotic process. Most of the coronary aneurysms remain asymptomatic and are incidentally diagnosed by angiography. Coronary angiography is the gold standard in the diagnosis, though non-invasive modalities like transesophageal echocardiography, contrast-enhanced computed tomography and magnetic resonance imaging can also point to diagnosis. Coronary artery aneurysms are more commonly found in the right coronary artery and rarely involve the left main coronary artery. Various underlying pathological process can contribute to aneurysm formation including atherosclerosis, mucocutaneous lymph node syndrome (Kawasaki's disease), trauma, angioplasty, atherectomy, laser procedures, systemic lupus erythematosus, periarteritis nodosa, dissection (spontaneous or secondary), syphilis, mycotic emboli and congenital. Thrombosis of left main coronary artery aneurysm is an extremely rare complication of aneurysmal and its treatment is equally challenging. Invasive and surgical procedures have inherent risks and can dislodge the thrombus causing emboli and infarction with potential complication of cardiac arrest. There are no current guidelines for treatment of such complication and treatment should be decided on case-to-case basis after discussion of risk and benefits with the authors.

## A CASE OF POST SURGICAL MASSIVE BILATERAL CHYLOTHORAX

Yashwant Agrawal, Sourabh Aggarwal, Gagan Preet, Mark Schauer

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Chylothorax is an uncommon medical condition characterized by accumulation of chylous fluid in the pleural space. Typically, chylothorax occurs unilaterally; we describe an interesting case of traumatic massive bilateral chylothorax.

**CASE REPORT:** A 48 year old woman was transferred from an outlying hospital with acute respiratory failure, where she had presented 14 days prior with severe pelvic pain, with CT imaging revealing a left adnexal mass. Chest X-ray was unremarkable. Total abdominal hysterectomy and left salpingo-oophorectomy was performed. The patient developed a colo-vaginal fistula, pelvic and right subphrenic abscesses. She underwent a second procedure with repair of fistula, sigmoid colectomy and Hartman's colostomy as well as drainage of the abscesses. During the post-op period she developed acute hypoxic respiratory failure requiring intubation and was transferred to our institution for further care. Her other past medical, surgical, social and family history were unremarkable. Blood pressure was 107/57mmHg, heart rate 97/min, temperature 98.8F. She was intubated, had diminished breath sounds and dullness to percussion in bilateral lower lung fields. WBC count was 29,500/mm<sup>3</sup> with neutrophilic predominance. Metabolic panel and peripheral smear was unremarkable. A central venous catheter in the left internal jugular vein was placed. Chest X-ray demonstrated and CT scan confirmed large bilateral effusions with compressive lower lobe atelectasis. Pigtail catheters were placed emergently and drained 2000 ml from the right and 1200 ml from the left side. Pleural Fluid was milky in appearance with pH 7.66, protein 0.2 g/dL, nucleated cells 367/mm<sup>3</sup> with 95% polymorphs, LDH level of 66U/L, triglyceride level of 645 mg/dL, cholesterol level of 4 mg/dL and chylomicrons consistent with diagnosis of Chylothorax. Cytology, gram stain and bacterial culture of pleural fluid were unremarkable. CT chest repeated 2 days later showed marked interval improvement with only small amount of residual pleural fluid bilaterally. The patient's respiratory status improved dramatically and she was extubated next day. Chest tubes were removed once output was below 50 ml per day. With cessation of drainage and absence of recurring symptoms, further investigations including lymphosyntigraphy were not done. Although her hospitalization was complicated by E. coli sepsis from pelvic abscess, there was no recurrence of the pleural effusions.

**DISCUSSION:** Chyle is the intestinal lymphatic fluid carried in the thoracic duct which originates in the abdomen from the cistern chili passing through the diaphragmatic opening, containing high triglyceride content in chylomicron form accounting for its white appearance. It also contains lymphocytes (mainly T-cells), proteins, immunoglobulins, fat soluble vitamins with electrolyte composition similar to that of plasma. Chylothorax is characterized by chylous effusion in the pleural fluid. Diagnosis of chylothorax is established by pleural fluid analysis, where a triglyceride concentration greater than 110 mg/dl with lipoprotein analysis demonstrating chylomicrons confirms the diagnosis of chylothorax. Surgeries and procedures involving thoracic region, neck and abdomen can cause chylothorax due to leak in the thoracic duct as there is a disruption in the flow. Non-traumatic causes including tumors especially lymphoma and CLL can cause chylothorax. Other miscellaneous causes include tuberculosis, amyloidosis and sarcoidosis. Management for the patients is primarily supportive with TPN and no fat diet. In case of severe dyspnea, placement of chest tube for drainage is helpful. Treatment of the underlying condition aids in resolution and prevents recurrence. Other treatment options include pleurodesis, thoracic duct ligation, thoracic duct embolization, pleuro-peritoneal, pleuro-venous shunts in patients when thoracentesis and dietary modification fail.

**CONCLUSION:** The etiology of our patient's bilateral chylothoraces was most likely traumatic with development of chylothorax post drainage of her subphrenic abscess with suspected injury at the level of the diaphragm. The highlight of this case being a rare reported case of a post surgical severe bilateral chylothorax with spontaneous healing of the thoracic duct and dramatic resolution of symptoms.

## **CORRELATION BETWEEN INSURANCE STATUS AND ICU OUTCOMES IN CRITICALLY ILL PATIENTS REQUIRING TRACHEOSTOMY**

Glenn G. Carlson, Paul Rigby, Ravikanth Papani, Eric C. Feucht

Bronson Methodist Hospital/Adult Critical Care  
Western Michigan University School of Medicine, Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** The effect of insurance status on medical outcomes is a subject of growing interest and it is one of the many socioeconomic variables, which play role in health care utilization and outcomes.

**RATIONALE:** In critically ill ICU patients who require tracheostomy, lack of health insurance may delay the timing of tracheostomy and transition to long term acute care facility thereby prolong the length of stay and increase the hospital costs.

**MATERIAL & METHODS:** This is a single center, retrospective cohort study in patients who underwent percutaneous tracheostomy tube placement for respiratory failure, admitted to the Adult Critical Care Service at our tertiary level community/teaching hospital, during the time period of January 1, 2007 to December 31, 2010. We divided patients into two cohorts based on their admission insurances status (Private insurance or Medicare and Medicaid or self-pay). The primary outcome was hospital mortality. Secondary outcomes were hospital length of stay and hospital costs. Student's T test was used to analyze the dichotomous data and ANOVA to describe the difference between all the cohorts. A multivariable logistic regression was studied at the end to analyze the outcomes.

**RESULTS:** A total of 410 patients were included in the study and they were grouped into two cohorts- Cohort 1 (no insurance or Medicaid) and cohort 2 (Medicare or commercial). There was no difference in in-hospital mortality between two cohorts ( $p=0.66$ ). The timing from intubation to tracheostomy was also not significantly different between cohorts ( $p = 0.85$ ). However, hospital length of stay and total hospital cost were increased in cohort 1 as compared to cohort 2 (OR 3.58; CI 2.12-6.05 and OR 1.91; CI 1.18-3.10). Significantly more patients in cohort 2 were able to be transferred to a long-term acute care facility (LTAC) ( $p= <0.001$ ).

**CONCLUSION:** Patient with Medicaid or no insurance tend to stay in the hospital longer and therefore increase cost to the hospital.

## DEMOGRAPHIC PARAMETERS IN COMPLIANCE WITH PAIN CONTRACT - A RETROSPECTIVE COHORT STUDY AT INTERNAL MEDICINE CLINIC

Sourabh Aggarwal, Ravikanth Papani, Mazen Roumia, Susan Bannon

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Chronic pain management is a challenging task. Our clinic initiated a pain policy in 2007 that required pain contracts (PC), prescription monitoring system and random UDS among other parameters. This study attempted to identify association of demographic parameters with compliance and outcome of patients started on PC.

**MATERIAL & METHODS:** Chart reviews were done to identify patients currently compliant with PC (group 1), those weaned off from narcotics (group 2) and those who violated PC (group 3). Demographic data was extracted and analysis done using SPSS.

**RESULTS:** A total of 325 patients were started on PC, with 106 patients ending in group 1, 47 patients in group 2 and 172 patients in group 3. Patients in group 3 ( $49.4 \pm 11.2$  years) were younger as compared to group 2 ( $56.8 \pm 14.7$  years) and group 1 ( $56 \pm 13.4$  years) patients ( $p < 0.001$ ). Females were more likely to be in group 2 ( $p = 0.032$ ). Patients with associated psych disorder ( $p = 0.023$ ) and current smoking ( $p < 0.001$ ) were more likely to be in group 3. Patients with back pain and arthritis were less likely to be weaned off ( $p = 0.006$ ). There was no statistically significant difference in 3 groups with respect to civil status (married or single), current employment status or ethnicity ( $p > 0.05$ )

**DISCUSSION:** Our study indicated that younger patients, with associated psych disorders and current smoking were more likely to violate PC, females were more likely to be weaned off and patients with back pain and arthritis were less likely to be weaned off. However, larger studies will be needed to supplement the results.

## **WATER IS GOOD FOR HEALTH? NOT IN ALL PATIENTS: A SINGLE CENTER QUALITY IMPROVEMENT PROSPECTIVE STUDY TO IDENTIFY IMPACT OF INTENSIVE PATIENT EDUCATION**

Sourabh Aggarwal, Jagadeesh Kalavakunta, Vishal Gupta

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** There is a lot of ambiguity on ideal daily water intake (DWI) requirements especially in patients with underlying cardiovascular symptoms. There is no literature to date that has studied impact of regulated water intake in patients with cardiac symptoms. The average DWI recommended by various societies lack any concrete scientific evidence. The present quality improvement study was designed to identify influence of intensive patient education and effective communication on DWI restriction and its impact on clinical outcomes in patients with cardiovascular symptoms and unregulated water intake.

**MATERIAL & METHODS:** This was a prospective pilot study conducted at our cardiovascular clinic. All patients who presented to our clinic with symptoms of shortness of breath (SOB), chest pain, dizziness, palpitations and peripheral edema were asked for DWI. The patients whose DWI was greater than 2L/day and were optimally medically managed were included in this study. Patients with underlying systolic heart failure, left ventricular ejection fraction  $\leq$  45% and chronic kidney disease were excluded from the study. The patients were weighed at baseline, their fluid intake recorded. Extensive water intake education was given to patients and were advised to restrict DWI. Primary outcome to be measured was symptomatic improvement in abovementioned symptoms. Patients were followed every 3-6 months in our clinic and importance of fluid restriction re-iterated with extensive patient education at follow up visits. Symptoms were noted and weight measured at each follow up visit. SPSS was used for statistical analysis,  $p < 0.05$  was considered statistically significant.

**RESULTS:** 65 patients (42 females, 23 males) were enrolled in the study with mean age of  $55.16 \pm 12.44$  years and mean follow up of  $1.92 \pm 0.56$  years (range 0.85 to 3.36 years). The average fluid intake decreased from  $2.82 \pm 1.93$  L/day to  $1.48 \pm 0.95$  L/day, with mean decrease of  $1.34 \pm 0.21$  L/day ( $p < 0.001$ ). The mean weight decreased from  $219.2 \pm 7.4$  pounds to  $203.5 \pm 6.9$  pounds with mean weight loss of  $15.8 \pm 3.2$  pounds ( $p = 0.06$ ). At end of study, 71.43% patients reported improvement in shortness of breath ( $p < 0.001$ ), 38.47% reported improvement in chest pain ( $p = 0.09$ ), 25% patients reported improvement in dizziness ( $p = 0.77$ ), 74.36% patients reported improvement in leg edema ( $p < 0.001$ ), 77.28% patients reported improvement in palpitations ( $p < 0.001$ ) and 42.86% patients reported improvement in leg pain ( $p = 0.24$ ). The improvement in symptomatology was reciprocated in both genders individually with significant decrease in shortness of breath, peripheral edema and palpitations.

**DISCUSSION:** This is first study to date which analyzed the impact of fluid restriction in symptomatic patients with unregulated water intake. This shows that non-pharmacologic intervention of fluid restriction was associated with significant improvement in SOB, palpitations and peripheral edema in patients. Also, patient education on water restriction led to significant reduction in DWI and was associated with weight loss in these patients.

## **PROGRESSIVE MULTIFOCAL LEUKOENCEPHALOPATHY FROM JC VIRUS INFECTION AS A COMPLICATION OF NATALIZUMAB!**

Shrey Velani, Sourabh Aggarwal, Arani Nanawati

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Natalizumab is a monoclonal antibody against the alpha-4 subunit of integrin molecules. These molecules are important to adhesion and migration of cells from the vasculature into inflamed tissue. Natalizumab blocks integrin association with vascular receptors, limiting adhesion and transmigration of leukocytes. Progressive multifocal leukoencephalopathy (PML) is a severe demyelinating disease of the central nervous system that is caused by reactivation of the JC virus. We here describe a patient who was started on Natalizumab for relapsing remitting multiple sclerosis (RRMS) who developed PML from reactivation of JC virus.

**CASE REPORT:** Patient is a 40 year old woman with history of multiple sclerosis (MS) diagnosed in 2000. She had been on Natalizumab (Tysabri) for approximately three and a half years. She started having left leg spasticity, gait abnormalities and ataxia of 2 days duration for which her neurologist ordered an outpatient MRI looking for new lesions consistent with MS flare. But surprisingly, MRI showed interval patchy area in occipital white matter suggestive of developing PML otherwise stable demyelinating lesions in periventricular region. Patient was admitted to neurocritical care unit for emergent plasmapheresis and lumbar puncture. Tysabri was stopped. CSF analysis showed glucose of 60, protein 33, IgG synthesis rate 2.4, oligoclonal bands were positive at 3. PCR for herpes virus, VZV, enterovirus, adenovirus and cytomegalovirus was negative. CSF gram stain and culture was negative. After 3 days PCR for JC virus was weakly positive at 500 copies/cubic ml. Patient also had seropositivity for JC virus which proves previous JC virus infection. Patient was started on mirtazapine and received 7 treatments of plasmapheresis. Patient's symptoms resolved. She was discharged in a stable condition.

**DISCUSSION:** Risk factors for natalizumab-associated PML include previous infection with JC virus as suggested by baseline seropositivity for anti-JC virus antibodies, prior immunosuppressant treatment and duration of natalizumab exposure. A 2012 review of natalizumab-associated PML in patients with MS evaluated data from three clinical trials and a registry of patients with MS. For patients treated with natalizumab for MS, the overall estimated incidence of PML was 2.1 per 1000 patients. However, among 54 patients with available serum samples who developed natalizumab-related PML, the seropositive rate for anti-JC virus antibodies prior to the diagnosis of PML was 100 percent. So it is recommended that JC virus seropositivity be assessed before starting Tysabri. Mirtazapine prevents entry of JC virus in cells. After stopping Tysabri, most patients develop immune reconstitution inflammatory syndrome (IRIS). Our case demonstrates that if PML is suspected and diagnosed early, treatment is possible. No antiviral therapy was required for our patient.

## HEMATOPOIETIC CELL TRANSPLANTATION COMPLICATED BY HUMAN HERPESVIRUS-6 REACTIVATION

Shrey Velani, Sourabh Aggarwal, Arani Nanawati

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Human herpesvirus 6 (HHV-6) reactivation occurs in 30 to 50 percent of patients undergoing allogeneic hematopoietic cell transplantation (HCT). Encephalitis occurs in only a small subset of patients. Many case reports have been published regarding the occurrence of the disease but there are still no clear-cut guidelines regarding the treatment options. We describe a case where we were able to clear the viral load from CSF. Though the patient did have significant morbidity and long ICU stay but he went to nursing home and slowly gained limited function.

**CASE REPORT:** Patient is a 45 year old male with history of large cell lymphoma having been treated with R-CHOP chemotherapy followed by HCT who presented with altered mental status. Prior to this presentation patient had initially presented with bilateral eyes with blurry vision when he was treated with high dose steroids but his vision could not be salvaged. Patient also had pancytopenia. LP was performed which showed 27 WBC of which 99% were monocytes with high protein of 120. Numerous studies including CMV, EBV, HSV 1-2, enteroviruses, influenza, JC, West-nile, HHV-7/8, measles, VDRL, mumps, LCM, E-W equine viruses, VZV, fungal and bacterial cultures were negative. But HHV-6 PCR was positive with quantitative value of 52400 copies/ml. Patient by this time had 2 seizures and got progressively altered so eventually got intubated. Patient was started on IV ganciclovir for 21 days. Patient was not following commands and showed non-purposeful movements. He was off sedation all the time. Patient was also given 2 doses of cidofovir once weekly. Patient was tolerating pressure support through tracheostomy tube. Repeat HHV-6 quantification in CSF showed no copies. MRI Brain before and after treatment showed unchanged abnormal signals involving corticospinal tracts, brainstem, basal ganglia and medial temporal lobes. Patient was finally transferred to a nursing with very slow limited neurological recovery.

**DISCUSSION:** Infection may present as delirium, bone marrow suppression or full blown encephalitis. Our patient had all features and in addition also bilateral retinopathy making it unique. A review of case reports and case series consisting of 44 patients was studied, 25% patients died due to progressive course, 43% made full recovery, 19% had prolonged course and had varying degree of neurological debility and 14% died due to complications of anti-viral therapy which include respiratory failure or kidney failure. Diagnosis is made with help of PCR from either blood but preferably from CSF. Early LP is recommended. Anti-viral therapy includes foscarnet as first line drug followed by ganciclovir and then cidofovir, CSF analysis including PCR for HHV-6 during and after therapy is recommended to see the response. In few cases there was reversal of lesions on MRI but in others they persisted as calcifications.

## PERICARDIAL EFFUSION AS A COMPLICATION OF TRANSCATHETER AORTIC VALVE REPLACEMENT

Sourabh Aggarwal, Gagan Preet, Shrey Velani, Arani Nanawati

Western Michigan University School of Medicine, Department of Internal Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Transcatheter aortic valve replacement (TAVR - also known as TAVI or transcatheter aortic valve implantation) is a new intervention for use in treating severe inoperable aortic stenosis. A bioprosthetic valve is inserted percutaneously using a catheter and implanted in the orifice of the native aortic valve. We reported an interesting case of complication following TAVR.

**CASE REPORT:** A 61 year old female presented to hospital with complains of increasing shortness of breath and generalized fatigue over preceding 7 days. She denied any chest pain, lightheadedness, fever, chills, cough, nausea, vomiting, abdominal pain, rash or sick contacts. Her past medical history was remarkable for percutaneous apical aortic valve replacement 12 days prior to presentation. Her past medical history was also significant for coronary artery disease s/p percutaneous coronary intervention, congestive heart failure, hypertension, hyperlipidemia, diabetes mellitus, chronic kidney disease and arthritis. Her family history was unremarkable. She was heavy smoker with 50 pack year history of smoking. On examination she was tachycardic, morbidly obese, with unremarkable neurological examination, irregular muffled heart sounds with 2/6 systolic murmur at right parasternal border. Chest was clear to auscultate and no pitting edema was noticed. Jugular venous distention was noticed. Initial labs were unremarkable except for baseline creatinine of 1.4. Chest Xray revealed enlarged cardiac silhouette. CT chest revealed 3cm pericardial effusion. 2D transthoracic echocardiogram showed moderate pericardial effusion without any evidence of tamponade physiology and ejection fraction of 65%. Cardiothoracic surgery was consulted and patient got her pericardial window done with removal of 600 cc pericardial fluid. The patient tolerated the procedure fairly well. She had paroxysmal atrial fibrillation postoperatively but had otherwise uncomplicated course. A repeat echo done week later showed significant improvement with trivial effusion. She was discharged a week later.

**DISCUSSION:** Pericardial effusion following TAVR has been rarely reported. TAVR can be done via femoral approach and apical approach. Our patient had trans-apical TAVR which has been associated with pericardial effusion more than trans-femoral TAVR. Conservative management is preferred traditionally however, surgical intervention is often necessary as in our patient. TAVR is also associated with other complications including paravalvular leak, aortic regurgitation, re-stenosis and valve dislocation. TAVR is a relatively new intervention and physicians/internists should be aware of complications following TAVR.



## USE OF A LOW COST SMARTPHONE/IPAD APPLICATION TO DOCUMENT EMS FELLOWSHIP EDUCATIONAL ACTIVITIES

Joshua Mastenbrook, Gerald Beltran, William Fales

Western Michigan University School of Medicine, Department of Emergency Medicine, Kalamazoo, MI

**INTRODUCTION:** Unlike most graduate medical education programs, EMS fellowship programs are primarily based in the out-of-hospital setting. These programs provide a wide range of educational activities to achieve the Core Content of Emergency Medical Services Medicine including traditional faculty-delivered presentations, administrative seminars involving EMS and other agencies, and field clinical care activities. The multiple educational modalities and venues make accurate documentation of educational activities challenging.

**APPLICATION:** We report the use of an affordable smartphone/ipad application that was customized to make documentation of fellowship educational activities easy to accomplish. The application supports iPhone and iPad mobile devices using iOS 6.1 or greater (Apple, Inc, Cupertino, CA). The application used was TimeTracker (version 4.03, Silverware Software, Inc., Sudbury, MA) purchased for \$2.99 (per user).

**DISCUSSION:** The application was customized to include lists of core content items and common educational activities. Fellows document the date/time of specific educational activities, the location of the activity, a description of the activity based on the core content, and the type of activity. Fellows may use multiple iOS-capable mobile devices to enter their activities. These are readily synchronized to one another and stored and backed up using a free cloud storage system (Dropbox, Inc., San Francisco, CA). Multiple users can load the customized input fields through synchronization with the shared cloud storage system. The application allows for reports to be easily generated from the mobile devices and emailed to selected fellowship faculty or staff. Reports can also be archived to the cloud storage system. With the addition of an inexpensive add-on report-writing component (Ultimate Custom Reports Tool, Silverware Software, Inc., Sudbury, MA) that is available for an additional \$2.99, custom reports can be generated. Reports may be exported in common formats including CSV, plain text, and PDF. The former allows for easy importation into commonly used spreadsheets and databases for even more robust analysis.

**CONCLUSION:** We believe that this affordable and easy to use application allows for the wide range of EMS fellowship educational activities to be effectively documented and will be valuable in meeting ongoing accreditation requirements and will be helpful in achieving high quality programs.

**MALIGNANT DEGENERATION OF A PULMONARY HAMARTOMA INTO A CHONDROSARCOMA**

Elbert E. Williams, Jerry W. Pratt

Michigan State University College of Human Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Pulmonary hamartomas (PH) have an incidence of 0.25% making them the most common benign tumor of the lung. Though considered largely harmless entities, we present a rare case of malignant degeneration into a chondrosarcoma. Multiple case reports present PH degenerating into malignant tumors though these have long been disputed.

**CASE REPORT:** A 74-year-old woman with known history of a left lower lobe chondroid pulmonary hamartoma presented to the cardiothoracic surgery office for surgical evaluation. The 5.3 x 4.4 cm hamartoma was initially found and diagnosed by fine needle aspiration (FNA) 16 years previously and reconfirmed by repeat FNA 8 years after initial diagnosis. She was followed with serial imaging. A chest X-ray 14-years after initial diagnosis suggested potential growth. CT scan was revealed an increase in the size of the mass showing a 6.5 x 5.5 cm, irregularly shaped, partially calcified mass in her left lower lobe without mediastinal adenopathy. She complained of infrequent cough, fatigue, and upper extremity myalgia. She denied shortness of breath, orthopnea, hemoptysis, sputum production, fever, chills, weight loss, or any other respiratory complaints. Physical examination revealed no abnormalities. Of note in the patient's history is a 50-pack/year smoking history prior to quitting 16 years before discovery of her hamartoma. Additionally, she underwent lumpectomy and radiation to her right axilla and chest for right-sided breast cancer 9-years after diagnosis of her hamartoma. Pulmonary function studies were largely unremarkable with a FVC of 2.68 (108%), FEV1 of 1.79 (96%), and a DLCO of 73%. The patient elected for left lower lobectomy with bronchoscopy given the concern for malignant degeneration. Pathology revealed a grade 2 chondrosarcoma with cellular atypia, hypercellularity, necrosis, and mitotic figures. She was discharged home on postoperative day 4 without any complications. PET scan showed no evidence of disease recurrence, metastasis, or potential bony source 6 and 12 months after resection.

**DISCUSSION:** Pulmonary hamartomas are the most common benign tumor of the lung with an incidence of 0.25% with most discovered incidentally. They occur most frequently in patients between the ages of 40 and 60 and are usually peripherally located. Typically, pulmonary hamartomas are well demarcated without invasion of the visceral pleura. Histologically, they demonstrate mature mesenchymal tissues including hyaline cartilage, smooth muscle, fibrous tissue, bone, and adipose. However, during growth of the mesenchymal components, alveolar epithelium is often trapped and undergoes cuboidal or low-columnar metaplasia. Macroscopically, pulmonary hamartomas classically average 2 cm in diameter with a range between 1-4 cm, however, larger variations have been presented. We present a case of malignant degeneration of a chondroid pulmonary hamartoma into a pulmonary chondrosarcoma. Pulmonary chondrosarcomas are a known but very rare tumor with very few cases described in the literature. These tumors are thought to arise from pulmonary mesenchymal tissue, small bronchiolar cartilaginous tissue, or the cartilaginous components of a chondromatous hamartoma. When evaluating a tumor of this nature, it is important to rule out extrapulmonary metastasis. Our patient has no history of a skeletal chondrosarcoma making metastasis unlikely especially with no sign of tumor source on post-operative PET scan. Without identifiable source, malignant degeneration is a possible explanatory mechanism. There are several reports in the literature supporting the malignant potential of hamartomas. One such manuscript presents a case of malignant degeneration in a patient who underwent resection of a longstanding clinically silent PH. Several months after surgery, the patient expired and a pleomorphic sarcoma was found on necropsy, supporting the ability of pulmonary hamartomas to undergo malignant change. In our patient, several key considerations must be made. With FNA the original diagnosis of pulmonary hamartoma can be called into question. However, given the patient's extended stable clinical course without demonstrated growth of the mass, it is less likely that the mass was initially malignant in nature. Although no alternative source is detectable currently, continued follow-up is required to rule out an extrapulmonary source of chondrosarcoma.

**CONCLUSION:** Though typically thought to be a benign entity, there is potential for malignant degeneration of pulmonary hamartomas. Special care should be taken to monitor hamartomas for growth, even after long periods of stability.

## ANTI-FUNGAL LOCK THERAPY IN CANDIDA PARAPSILOSIS CATHETER-RELATED BLOOD STREAM INFECTION

Geneva A. Sagun, Ibad U. Farooqui, Aaron L. Lane Davies

Western Michigan University School of Medicine, Department of Internal Medicine and Pediatrics.

Western Michigan University School of Medicine Department of Family Medicine.

Bronson Pediatric Hospitalist Service, Bronson Children's Hospital., Kalamazoo, MI

**INTRODUCTION:** Candida species are the third leading cause of catheter related blood stream infections (CRBSI). Some species of Candida produce intraluminal biofilms that coat indwelling catheters. These biofilms elevate MICs of conventional anti-fungal therapy leading to increased morbidity and mortality. Current standard of care for Candida line infections is line removal combined with systemic anti-fungal therapy. With bacterial CRBSIs, line salvage with antimicrobial lock therapy has proven viable. Current Infectious Disease Society of America practice guidelines use antimicrobial lock therapy for management of coagulase-negative staphylococci and other select bacteria. In vivo research using antimicrobial lock therapy in Candida CRBSIs, however, is limited to case studies. Only a few case reports discuss attempts at line salvage using anti-fungal lock therapy (AfLT) when risks associated with line removal and replacement outweigh benefits. We present a case of successful line salvage using ethanol AfLT in combination with systemic anti-fungal treatment.

**CASE REPORT:** A 16 month-old female with a tunneled central catheter, dependent on total parenteral nutrition (TPN) for short bowel syndrome, presented to the ED with fevers, irritability, decreased appetite, and diarrhea. CBC and blood culture were collected. Nasal swab testing confirmed rhinovirus/enterovirus infection. She was discharged home. The next day, preliminary blood culture grew alpha hemolytic strep and Candida. She was admitted to the hospital and started on IV Zosyn and Caspofungin. Prior to starting therapy, a second blood culture drawn on hospital day one grew only yeast. Zosyn was subsequently stopped as bacteria from the first culture was likely a contaminant. Caspofungin was continued. A third blood culture (day two) also showed yeast, after one day of IV caspofungin. All three blood cultures later identified yeast as pan-sensitive Candida parapsilosis. Surgery was consulted for possible line removal. The patient had multiple line removals and replacements within the last four months for candidemia, E.coli and Klebsiella bacteremia. There were no remaining sites for replacement of her central catheter. Line salvage was attempted using 70% ethanol lock therapy, preceded by tissue plasminogen activator (TPA), along with systemic IV caspofungin. Ethanol lock therapy (ELT) began on day three of hospitalization. Blood culture on hospital day four, after one day of ELT and two days of IV caspofungin, showed no growth. Blood culture on hospital day five was also negative. The patient remained hemodynamically stable and, when afebrile, she was discharged home. She completed a 14-day course of caspofungin and continued daily ethanol locks. Prophylactic oral Nystatin to prevent gut translocation of organisms was also started. Almost three months following discharge, she continues to have negative blood cultures.

**DISCUSSION:** Antimicrobial Lock Therapy (ALT) is a first line recommendation for certain bacterial CRBSIs to attempt line salvage. This case demonstrates that AfLT to treat Candida associated CRBSIs warrants further investigation. A literature search revealed a few important trends. In Vitro studies show that azoles have high MICs for Candida biofilms, while echinocandins and lipid preparations of Amphotericin B demonstrate lower MICs. In vitro studies also demonstrate efficacy of ethanol locks in inhibiting biofilm production, with no evidence of resistance. The combination of echinocandins as systemic anti-fungals, in conjunction with ethanol locks is theoretically promising in acute Candida CRBSIs. The outcome of our case is consistent with in vitro studies. Current literature is limited by lack of in vivo studies and randomized control trials. Our case report also has a few limitations. Firstly, our patient remained hemodynamically stable throughout her hospital course. It is currently unclear whether AfLT with the goal of line salvage is viable in a patient with overt sepsis secondary Candida line infection. Moreover, this represents one case in a pediatric patient who has a central catheter for a specific reason (TPN). Consequently, these results cannot be extrapolated to the general population and may only be applicable to a small cause of CRBSIs.

**CONCLUSION:** This report demonstrates that the current recommendation of immediately removing a CVC infected with Candida species requires re-evaluation. In carefully selected patients, an attempt at line salvage with ELT and systemic anti-fungals is warranted. A randomized controlled trial, however, is needed before this can be established as a standard of care.

## A CASE OF LINEAR IGA BULLOUS DERMATOSIS IN A TODDLER

Geneva A. Sagun, Racquel A. Sanchez, Aaron L. Lane-Davies

Western Michigan University School of Medicine, Department of Internal Medicine and Pediatrics.

Western Michigan University School of Medicine, Department of Pediatrics.

Bronson Pediatric Hospitalist Service, Bronson Children's Hospital., Kalamazoo, MI

**INTRODUCTION:** Linear IgA bullous dermatosis (LABD) is a rare autoimmune bullous disorder, characterized by the presence of linear IgA deposits in the basement membrane zone, occurring in children and adults. Incidence rates reported have ranged from 0.5 to 2.3 cases per million persons per year. Though rare, it is the most common autoimmune bullous dermatosis in children, usually beginning after six months of age, with a peak incidence at 4-5 years of age. In children, it is also known as Chronic Bullous Disease of Childhood. Though it can occur idiopathically or induced by drug exposure, drug-induced LABD is rarely described in children. As LABD can appear clinically similar to other blistering diseases, it is important to recognize this disorder, as a delay in diagnosis can lead to increased morbidity with secondary infections, ocular scars and pharyngolaryngeal stenosis.

**CASE REPORT:** Our patient was a 30-month-old male, with a past medical history significant for club feet, admitted to our hospital for worsening rash despite outpatient treatment. Rash first appeared 1.5 months prior following a reported mosquito bite. At that time, he was treated by his pediatrician with a 5-day course of azithromycin, Prelone and topical Bacitracin. On therapy, he had improvement of rash; however, after completion, his rash worsened and he was referred to a dermatologist. The dermatologist diagnosed him with impetigo and he was treated with Augmentin and topical Bactroban. Though he had mild improvement on the antibiotics, following completion of therapy, his rash again worsened. He was seen, again, by the dermatologist and was prescribed a 10-day course of Bactrim with improvement of the rash while on the antibiotic. However, after cessation of the antibiotic, his rash worsened. Dermatologist then prescribed a 30-day course of Bactrim. His rash continued to worsen despite outpatient therapy, he presented to the ED and was subsequently admitted. On admission, he was noted to have multiple confluent vesicles and bullae involving the trunk, face, scalp, extremities, scrotum but spared the oral mucosa. Bullae were tense, non-tender, and were filled with a clear fluid. Nikolsky sign was negative. He was started on Benadryl for pruritus and IV Clindamycin for suspected impetigo. Given the extent of involvement, dermatology was consulted. On examination, LABD was suspected as lesions resembled a string of pearls which is a characteristic of LABD. CBC, CMP and culture of lesion were unremarkable. Perilesional biopsy on H&E showed subepidermal blister with eosinophils. Biopsy under direct immunofluorescence (DIF) showed weak linear IgA and C3 deposits along basement membrane suspicious for LABD. Glucose-6-phosphate dehydrogenase (G6PD) test was normal so he was treated with dapsone and oral steroid therapy with resolution of his rash.

**DISCUSSION:** Drug induced LABD is not as well documented in childhood as it is for adults though case studies have suspected NSAIDs and antibiotics as triggers. In suspected drug-induced LABD, withdrawal of inciting medication usually leads to resolution of rash. However, in our case, family reported his rash to improve while on antibiotics and worsen few days following treatment with antibiotics. The limitation to our case, however, is that a repeat exposure to the antibiotics he had been previously treated with was not done. Doing so would have allowed us to pinpoint a specific antibiotic as likely cause. Given the emerging issue of antibiotic resistance, it was interesting to note the number of antibiotics prescribed, without a skin biopsy or culture, despite worsening of the rash. Our patient did suffer the side effect of diarrhea from antibiotic therapy and was treated with probiotics while in hospital with resolution of symptoms. Despite his antibiotic exposure, however, it is also plausible that this may have been idiopathic.

**CONCLUSION:** LABD, though rare, is an important dermatological disorder in childhood. Knowledge about this disorder, early recognition and diagnosis are key to prevent further morbidity from the disorder itself or from inappropriate treatment of an incorrect diagnosis.

**EFFECTS OF ANTI-SMOKING LEGISLATION ON HOSPITAL ADMISSIONS FOR COMMON LOWER RESPIRATORY ILLNESSES IN THE PEDIATRIC POPULATION**

Megan Sikkema, Geneva Sagun, Alison Agnetta, Tom Melgar, Colleen Dodich

Western Michigan University School of Medicine, Kalamazoo, MI

**INTRODUCTION:** Asthma and bronchiolitis represent a significant cause of hospitalizations and morbidity in the pediatric population. Exposure to second hand smoke is a recognized trigger of asthma exacerbations and contributes to worsened disease course and severity in asthmatics and patients with acute bronchiolitis/bronchitis. Public policies enforcing statewide anti-smoking legislation have become widespread, but the clinical impact on morbidity and hospitalizations for pediatric asthma and bronchiolitis has not been studied.

**RATIONALE:** To determine if anti-smoking legislation has an impact on severity of asthma and bronchiolitis as determined by hospital discharges for children ages 0-17 years. This is important to demonstrate in order to have further evidence to support advances in anti-smoking law. We hypothesize that there will be an observed decrease in hospital admissions of children with lower respiratory illnesses in the years following the passage of anti-smoking laws.

**MATERIAL & METHODS:** Data was queried from the Healthcare Cost and Utilization Project's Nationwide Inpatient Sample (NIS) which represents 20% of all US hospital data. As smoking bans varied in timing of implementation, only states with data two years prior and two years following the smoking ban were included (20 states). Queries were placed for asthma (ICD9 codes 493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.20, 493.21, 493.81, 493.82, 493.90, 493.91, 493.92), bronchitis (ICD9 code 466.00) and bronchiolitis (ICD9 codes 466.11, 466.19). Bronchitis and bronchiolitis discharges were combined. Only patients aged 0-17 years old were included. Data from before and after the smoking ban were compared.

**RESULTS:** Following enactment of anti-smoking legislation, there was a statistically significant decrease in hospital asthma admissions from 23.24 per 1000 to 22.15 per 1000,  $p < 0.0001$  (100,975 to 97,075). There was also significance in the decrease in combined bronchiolitis and bronchitis admissions from 20.23 to 19.62 per 1000,  $p < 0.0001$  (87,878 to 85,997). This amounted to a combined decrease in hospital admissions for lower respiratory illnesses from 43.47 per 1000 to 41.77 per 1000,  $p < 0.0001$  (188,853 to 183,072).

**CONCLUSION:** To our knowledge, this is the first reported study evaluating the impact of anti-smoking legislation on lower respiratory illnesses in children. Following implementation of statewide public indoor smoking bans, there was a significant decrease in hospital admissions for asthma and bronchiolitis or bronchitis within the pediatric population. This highlights an acute clinical benefit in response to legislated health-improvement policies. Further studies will be needed to evaluate the economic impact resulting from changes in length-of-stay and total hospital admissions.

## **PARENTAL PERSPECTIVES ON VACCINES IN SOUTHWEST MICHIGAN: DELAY, REFUSAL AND SOURCES OF INFORMATION**

Megan C. Brown, Colleen Dodich

MSU CHM, Western Michigan University School of Medicine, Pediatric and Adolescent Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Childhood vaccinations have proven to be one of the most effective public health strategies in the world. From 1912 to 1998, vaccines effectively eliminated poliomyelitis and decreased the cases of diphtheria, measles, mumps and rubella by over 99%. Kalamazoo County vaccination records for children 19-35 months of age showed complete vaccination in 72-81% of children over the past six years, and have remained above statewide averages throughout the time frame. Despite remaining above both the statewide and national average, there is still room for improvement, as approximately 20% of children in Kalamazoo County are undervaccinated. Studies shown that even with high overall vaccination levels, regions with clusters of unvaccinated and undervaccinated children are associated with increased outbreaks of vaccine preventable illnesses. In recent years, “shot limiting” or “alternative vaccine schedules” have become more common, and studies have shown that reasons for delay and refusal of vaccines vary significantly depending on population. With a trend towards undervaccination and resurgence of previously contained infections, it is critical for pediatricians to understand parents underlying attitudes and hesitations towards vaccines in order to provide optimal education.

**RATIONALE:** This study aims to investigate the rationale behind parents’ decision to delay or refuse vaccinations. Secondly, the study will examine where parents are obtaining their information regarding vaccines, to help to understand their reservations. By determining underlying concerns about vaccinations, the study aims to identify potential areas to improve patient education regarding vaccines.

**MATERIAL & METHODS:** An anonymous survey was developed with quality improvement aims. The survey evaluated parental perspectives on vaccines and the sources parents use for information on vaccines. After gaining IRB approval, the survey was distributed to parents at the WMed Pediatrics Clinic. The anonymous survey was given to all parents and guardians of children ages 0-18 at the clinic for acute or well child visits. The surveys were collected at check out, and the data was compiled and analyzed by the investigators with assistance from the biostatistician.

**RESULTS:** Preliminary data consisted of 58 survey respondents of parents with children ranging from infancy through adolescence. Of the 58 respondents, eight children had not received all recommended vaccinations, and two respondents were unsure. Four parents reported that they had chosen to delay vaccines and seven had refused one or more vaccines. Six parents refused the influenza vaccine, one refused HPV and two did not specify which vaccine they refused or delayed. Parents reported multiple reasons for delay and refusal; the most common responses were belief that the vaccine was unnecessary, concerns with chemicals in vaccines, general concerns of safety or previous reaction to a vaccine. Additional concerns included government conspiracy, illness, the number of vaccines at once and the concern that vaccines cause autism. Eighty two percent of survey respondents reported that their main source of information was the pediatrician with sixty-one percent received information from pediatric nursing staff. Parents also reported obtaining information from family members, friends, books, websites and television.

**DISCUSSION:** Studies have shown that an increasing number of parents are choosing to delay or refuse a number of childhood vaccines. A group at Johns Hopkins examined the association between geographic clusters of unvaccinated children in Michigan and pertussis outbreaks; the study found that the overlap of exemptions and clusters was statistically significant even after adjusting for confounding factors. While Kalamazoo county is still above the national and state average for vaccination compliance, there is still a considerable amount of parental concern regarding the safety of vaccines. Of the survey respondents, 13.7% were incompletely vaccinated due to a variety of concerns. It is important for pediatricians to be aware of the concerns of parents in their geographic area to improve the quality and efficacy of their patient education.

**CONCLUSION:** Although vaccination rates in Southwest Michigan are above average, parents report many concerns about the safety of vaccines and vaccine components. By understanding parental concerns, pediatricians can better tailor their time and energy during patient education to addressing these specific concerns, as the majority of patients report that their pediatrician is their primary source of vaccine information.

**ABDOMINAL PAIN IN A THREE YEAR OLD FEMALE: A CASE REPORT**

Nilam Patel, Jessica Segedy, Ife Eleyinafe, Dilip Patel

Western Michigan University School of Medicine, Pediatrics, Kalamazoo, Michigan

**OBJECTIVE:** To understand that abdominal pain in children can be an atypical presentation of a serious underlying illness of the chest.

**CASE PRESENTATION:** A 3 year old, otherwise healthy female presented to the outpatient clinic multiple times for abdominal pain, fatigue, low grade fever and decreased appetite. Initially she was treated as having viral syndrome, and advised close follow up if not better. Patient's symptoms did not improve, the abdominal pain was stable, but patient was very fatigued at the two subsequent visits, review of systems otherwise remained negative. Abdominal exam revealed diffuse tenderness. Given her persistent symptoms, screening labs and an abdominal x-ray were obtained. X-ray of the abdomen showed a normal bowel pattern, but on the AP view cardiomegaly was noted. Chest x-ray showed a massive cardiomegaly with a moderate pericardial effusion. A Patient was hospitalized. Upon arrival at the hospital, patient developed respiratory distress. An Echocardiogram (ECHO) showed a large pericardial effusion and a possible intracardiac mass. Pericardiocentesis and drain placement produced 400 mL of bloody, serosanguineous fluid. Repeat echocardiogram revealed a significant reduction in the size of the pericardial effusion and improved cardiac function. A computed tomography scan showed an intrapericardial mass. A tissue biopsy and elevated AFP suggested a malignant endodermal sinus or yolk sac tumor (YST).

**DISCUSSION:** Our patient's initial diagnosis of a viral abdominal illness was a likely possibility, but due to the persistent nature of the abdominal pain and increased fatigue, the threshold for further work up was very low. Our patient's initial symptoms were marked by a non-specific abdominal pain, fever, and fatigue, but other children with an intracardiac mass have been known to present with generalized swelling consistent with systemic fluid retention, shortness of breath or chest pain. Differential diagnoses included viral illness, infectious mononucleosis, acute lymphoblastic leukemia, acute myeloid leukemia and neuroblastoma. The presence of cardiomegaly and hepatomegaly on X-Ray could have occurred simply because of a viral pericarditis or myocarditis with subsequent cardiac compromise. The ECHO and CT scan both revealing an intrapericardial mass expanded our differential to include a benign teratoma, rhabdomyoma/rhabdomyosarcoma, an unspecified fibroma or sarcoma or an embryonal carcinoma. In cases of YST, AFP elevation is sensitive but not specific since similar elevation can be observed in malignant hepatomas, seminomas and other embryonal carcinomas. Rhabdomyomas and teratomas are the most common causes in the extremely rare group of primary intracardiac tumors. Even within this group, only 10% are malignant and most of these are fibrosarcomas and rhabdomyosarcomas. Rarer still is a cardiac manifestation of an extragonadal yolk sac tumors. YSTs are a histological variant of germ cell tumors and they are generally known for being the most common gonadal tumors of childhood. Treatment of YST follows the general algorithm of bulk reduction using some combination of surgery and chemotherapy. In our patient the location of the mass between the great vessels lead to the use of chemotherapy (Cisplatin, Etoposide and Bleomycin) alone. The tumor responded very well to chemotherapy.

**CONCLUSION:** The purpose of this case presentation is to alert primary care providers the importance of close clinical follow up, and initiation of further work up if the symptoms are not improving. Also, to keep in mind that non-specific complaints of pain can very well be referred pain, especially in children.

## SLE: A MIMICKER FOR TOXIC SHOCK SYNDROME

Neelakanta Kanike, Aditya Dewoolkar, Mary Moore

Western Michigan University School of Medicine, Pediatrics, Kalamazoo, Michigan

**INTRODUCTION:** The presentation of systemic lupus erythematosus (SLE) is diverse and can present insidiously over years with nonspecific complaints or acutely with life threatening symptoms. We report a case of a 15-year old female who was admitted to our hospital with signs and symptoms of toxic shock syndrome with multi-system organ failure. Further work-up of this patient lead to a new diagnosis of SLE. This case highlights the potential degree of immune dysfunction in patients with SLE by opportunistic and common pathogens. A high index of suspicion for SLE in childhood is important as delays in diagnosis can lead to life-threatening complications and long-term morbidity.

**CASE REPORT:** The patient is a 15 year old African American female who presented to our ER with 2 day history of nausea, vomiting, anorexia, fever, weakness and headache. Physical exam was positive for pharyngeal erythema, anterior cervical lymphadenopathy, tachypnea, flushed appearance, facial edema, macular rash on superior chest, sandpaper like rash on back, eczematous lesions on inner thighs and upper arms, left forearm with scars from previous self-inflicted lacerations. She had been at Girls Residential program for last 4 months for her mental health issues (Mood disorder, PTSD, ADHD and self destructive behavior). She was on Cymbalta, Topamax and Lamictal. Initial labs showed lymphopenia, thrombocytopenia and elevated procalcitonin, creatinine, CPK, Liver enzymes and ferritin. DIC panel was abnormal with positive Coombs DAT. Chest Xray showed low lung volumes and bilateral pulmonary infiltrates. Extensive studies for infectious diseases were negative except for a positive rapid strep throat screen. She was admitted to floor and treated with Vancomycin, Clindamycin and Rocephin for presumed Group A strep with a toxic shock like picture. Patient continued to be febrile, hypoxic, hypotensive and confused despite the treatment. Her creatinine and liver enzymes continued to rise, indicating multi organ failure requiring transfer to Pediatric ICU. Echocardiogram showed small pericardial effusion and mild to moderate LVH. CSF showed 19 cells, mainly lymphocytes, culture and Enterovirus PCR were negative. MRI showed meningeal enhancement. EEG showed features of Encephalopathy. Her Rheumatologic workup was positive for ANA 1:2560, speckled; SSA>240; SSB: 74; negative for Smith, anti-DNA, cardiolipin antibodies, RNP, SCL-70, centromere, Jo-1 and ANCA; normal complement levels. CT scan of neck showed retropharyngeal edema and prominent cervical lymph nodes. She showed tremendous improvement in platelet and WBC count after receiving IVIg and decadron and was sent home after 2 weeks, on her home meds and Norvasc as she had developed HTN during the stay. During follow up with her Rheumatologist the next week, she had developed typical malar rash across both cheeks. She was then diagnosed with SLE in view of multisystem presentation, abnormal serologies and clinical course. She was started on Hydroxychloroquine and was referred to Nephrology for the treatment of persistent Hypertension.

**DISCUSSION:** Approximately 20% of all patients who have SLE are mostly diagnosed in adolescence. SLE is predominant in females, with female-to-male ratio of 9:1. SLE is characterized by autoantibodies directed at self-antigens, resulting in inflammatory damage to various organs throughout the body. As a result, the presenting features of SLE are diverse, from nonspecific symptoms such as fever, malaise and multisystem dysfunction over several months, to acute life-threatening symptoms. Lupus patients are particularly susceptible to infections, and this can often be a presenting symptom. The immunosusceptibility of lupus patients is characterized by immunoglobulin deficiency, chronic hypocomplementemia, functional asplenia and impaired cellular immune responses.

**CONCLUSION:** SLE is a great imitator of other diseases because of wide range of symptoms and varied presentation. It should therefore be considered in the differential diagnosis of many conditions including fever of unknown origin, arthralgia, anemia, nephritis, multi-organ symptom involvement and overwhelming sepsis. Some patients may not fulfill diagnostic criteria initially. These children should be monitored closely for the development of the other manifestations of SLE, with an elevated ANA titer being an early indicator. Therefore, a high index of suspicion for SLE in childhood is important in diagnosing SLE, as delay in diagnosis can lead to increased mortality and morbidity.



## **RARE RED RASHES: A CASE REPORT OF LEVETIRACETAM INDUCED CUTANEOUS REACTION AND REVIEW OF THE LITERATURE**

Ryan T. Jones, William Evans, Tracey L. Mersfelder, Kevin Kavanaugh

Michigan State University College of Osteopathic Medicine, Ferris State University College of Pharmacy, and Western Michigan University School of Medicine Department of Internal Medicine, Kalamazoo, MI

**INTRODUCTION:** Cutaneous reactions secondary to medications are rare but can be serious events resulting in morbidity and mortality and can be caused by anticonvulsant medications. Levetiracetam has been considered relatively safe compared to other antiepileptics with regard to skin eruptions. We report a case of a cutaneous reaction secondary to levetiracetam.

**CASE REPORT:** A 64 year-old male presented to the hospital with an altered mental status and aphasia. Upon evaluation in the emergency department, imaging revealed a left basal ganglia mass. Admission vital signs and pertinent laboratory data included blood pressure: 132/82 mmHg, heart rate: 76/min, respiratory rate: 16/min, white count:  $5 \times 10^9/L$ , procalcitonin:  $< 0.05 \text{ pg/mL}$ , aspartate aminotransferase (AST): 21 U/L, alanine aminotransferase (ALT): 17 U/L, and alkaline phosphatase: 46 U/L. The patient was admitted to the hospital with a neurosurgery consult. A biopsy of the lesion was obtained, and levetiracetam was started at 500 mg intravenously twice a day for seizure prophylaxis. The biopsy revealed diffuse large B-cell lymphoma and positive Epstein-Barr virus (EBV). The patient was sero-positive for cytomegalovirus (CMV) and was diagnosed with new-onset HIV-1 with a CD4 count of 64. After 13 doses of levetiracetam, the patient had a diffuse, erythematous, warm, blanching, morbilliform rash. The vital signs, upon the discovery of the rash showed a temperature:  $38.7^\circ\text{C}$  and a normal blood pressure and heart rate. Laboratory data showed a white count:  $8.4 \times 10^9/L$ , ALT increase to 64 U/L, and peripheral eosinophils had a minor increase to  $3 \times 10^9/L$ . Other current medications the patient was receiving at the time were dexamethasone, docusate/senna, and pantoprazole. All other values remained within normal limits. Apart from the rash described, the physical examination was negative for corneal ulcerations, oral cavity ulcerations or lesions, and there was no angioedema. Levetiracetam was discontinued, and methylprednisolone 125 mg intravenously every eight hours was started. After four days the rash dissipated and methylprednisolone was changed to oral dexamethasone as part of his chemotherapy regimen.

**DISCUSSION:** Levetiracetam is an antiepileptic medication that has an unknown mechanism of action. To date, there are only four cases reported involving skin reactions from levetiracetam. Two of the cases were classified as Stevens-Johnson Syndrome, one as toxic epidermal necrolysis, and one as erythema multiforme. Our case was classified as a morbilliform rash. The Naranjo score in our patient was calculated to be seven suggesting a probable cause for a levetiracetam induced skin reaction.

**CONCLUSION:** Antiepileptic medications are utilized in certain cases to prevent seizures in patients with CNS tumors. Although levetiracetam appears to have fewer side effects than the traditional antiepileptic medications, it is important for the healthcare provider to continuously evaluate the need for all medications and discontinue unneeded ones to help avoid potential medication adverse effects.

## EVALUATION OF RIVAROXABAN, ENOXAPARIN, AND WARFARIN ON HOSPITAL READMISSION RATES AFTER TOTAL KNEE ARTHROPLASTY

Janelle E. Kummick, Jeanne M. Anderson, Mark P. Herriman, Kaitlyn M. Priniski

Mamorial Hospital of South Bend , South Bend , IN

**INTRODUCTION:** Venous thromboembolism is a major and potentially fatal complication that can occur after orthopedic surgery including total knee arthroplasty (TKA). For many years, orthopedic surgeons used anticoagulants such as warfarin and enoxaparin as the mainstays of treatment for thromboprophylaxis after a TKA. Rivaroxaban, a direct factor Xa inhibitor, gained FDA approval in July 2011 for this indication. In addition, rivaroxaban has proven superiority to enoxaparin in The Regulation of Coagulation in Orthopedic Surgery to Prevent Deep Venous Thrombosis and Pulmonary Embolism (RECORD3) clinical trial.

**RATIONALE:** To compare prescribing patterns for rivaroxaban, enoxaparin, and warfarin and determine hospital readmission rates for venous thromboembolism (VTE) or adverse treatment effects.

**MATERIAL & METHODS:** This study protocol was submitted and approved with exemption by the Institutional Review Board. Electronic medical records were examined to complete a retrospective review of hospitalized patients that received either rivaroxaban, enoxaparin, or warfarin after a TKA. All data was de-identified and all patient health information was stored in a password protected electronic file. Data was analyzed in reverse chronological order for a one year timeframe and included a maximum of 100 cases for each anticoagulant evaluated. The primary endpoint of this study is 30 day hospital readmission rate. Secondary endpoints include 60 and 90 day hospital readmission rates, cause of readmission, bleeding rates, and initial anticoagulant dose.

**RESULTS:** One hundred and eighty four patients met inclusion criteria. The patient population included 100 warfarin patients, 52 rivaroxaban patients, and 32 enoxaparin patients. The median age was 65 years of age (range 44 - 88). Seventy nine percent of patients that received rivaroxaban also received one dose of warfarin the morning rivaroxaban was initiated. Seventy two percent of patients received enoxaparin as bridge therapy with warfarin. Ten patients were readmitted within 30 days. Reasons for readmission include suspected and diagnosed deep vein thrombosis, suspected and diagnosed pulmonary embolism, hematoma, and suspected wound infection.

**CONCLUSION:** Anticoagulant use for VTE prevention following TKA at Memorial Hospital of South Bend is not consistent with current evidence based recommendations. Conflicting treatment guidelines exist which may create confusion among healthcare providers and could negatively impact patient outcomes. The results suggest a need for education among healthcare providers and the adoption of a hospital protocol or treatment algorithm to ensure safe and consistent practice.

## UNTREATED MANIA COMPLICATED BY ANTIDEPRESSANTS

Priya Mahajan, Mark Kanzawa, Michael R. Liepman

Western Michigan University School of Medicine, Psychiatry, Kalamazoo, MI

**INTRODUCTION:** A missed opportunity in diagnosing bipolar disorder early in its presentation can delay appropriate treatment with a mood stabilizer. Furthermore, a misdiagnosis as unipolar depression may lead to antidepressant therapy exposing the patient to risk of failed medication trials, drug-induced mania and further mood destabilization. An accurate diagnosis will further increase the chances of mood stability.

**CASE REPORT:** A 47-year-old transgender Caucasian male->female with a long history of untreated bipolar disorder was hospitalized for a florid episode of mania with psychosis that developed while taking sertraline, bupropion, alprazolam, several opioids, herbal medications and cannabis. The patient was raking leaves, singing songs at 3am and working on 200 plus inventions. He wanted to open the gas line to heat up his marijuana plants, believed that several men were speaking through him in Chinese, and believed his grandson was Jesus reincarnated. He drew a picture of his grandson crucified on a cross and being pulled into a meat grinder and kept a jug that he labeled "death". He was taking handfuls of Black Cohosh to keep him calm. He had a remote history of spending sprees, impulsivity, and irritability. We describe successful treatment using a mood stabilizer.

**DISCUSSION:** We report a case of a 47 year old white male who had a long course of untreated mood disorder that evolved into mania with psychosis while taking antidepressants. He experienced remission of psychosis and improvement in symptoms of florid mania after a course of full therapeutic dose of mood stabilizer. Individuals with symptoms of depression and mania continue to go unrecognized many times due to the patient failing to divulge an accurate personal history; therefore, obtaining collateral information is important before making a diagnosis and starting treatment. We had the opportunity to witness the patient's florid mania with psychosis and obtain collateral information from the family. Bipolar disorder symptoms often are predominantly depressive and can be chronic, as 45% of individuals with bipolar disorder never seek treatment. The natural course of untreated mania lasts for four months and bipolar depression lasts for eight months. Most patients are initially treated with antidepressants without a mood stabilizer. Half or more of bipolar patients are not taking a mood stabilizer. The literature shows currently how antidepressants may increase the recurrence rate of bipolar disorder in those with rapid cycling and they do not improve the overall course of bipolar depression.

**CONCLUSION:** Accurate diagnosis and adequate dosing of the correct mood stabilizer may decrease the need for additional medications.

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**CONCLUSION:** Accurate diagnosis and adequate dosing of the correct mood stabilizer may decrease the need for additional medications.

**TOXOPLASMOSIS INFECTION PRESENTING AS SEVERE BEHAVIOR DISTURBANCES IN A PRE-PUBESCENT CHILD**

John D. Lindo, Ruqiya S. Tareen

Western Michigan University School of Medicine, Psychiatry, Kalamazoo, Michigan

**INTRODUCTION:** Severe behavior disturbances in pre-pubescent children are common reasons for psychiatric consultation. Explanations for these behaviors vary widely. Some infectious diseases are known to present in children with disruptive behavior, but there are no studies reporting such behavior in association with Toxoplasmosis infection.

**CASE REPORT:** A 7 year-old immunocompetent female with no prior psychiatric condition presented to our consultation liaison service with a six-month history of progressive, unexplained behavior disturbances with headaches, speech regression, left facial droop, staring spells, vomiting, and enuresis. Preliminary diagnoses included ADHD and Disruptive Behavior Disorder, NOS. Two hospital admissions and a variety of medical tests revealed no medical pathology. Nevertheless, psychiatric evaluation resulted in a recommendation of further medical workup. Eventually, this patient was found to have Toxoplasmosis encephalitis. She improved with Pyrimethamine and returned to her baseline behavior.

**DISCUSSION:** Toxoplasmosis encephalitis most commonly presents in immunocompromised children and is characterized by sub-acute onset of focal neurologic abnormalities including hemiparesis, personality changes, and aphasia. *T. gondii* is thought to affect signal transduction and dopamine synthesis pathways; cytokine reactions may mediate the observed psychiatric symptoms.

**CONCLUSION:** This case illustrates an immunocompetent child with Toxoplasmosis infection and severe behavior disturbance. There are numerous factors, including medical causes, that can explain severe behavior disturbances in pre-pubescent children. Therefore, it is important that the evaluation of these cases must be encompassing and thorough.

## CARDIAC CLEARANCE OF COLLEGIATE ATHLETE FOLLOWING SURGICAL CARDIAC CORRECTION

Jeffrey P. Levenda, Robert J. Baker

Western Michigan University School of Medicine, Sports Medicine, Kalamazoo, Michigan

**INTRODUCTION:** Team physicians are increasingly faced with appropriate return-to-play recommendations following cardiac surgery for cardiac anomalies. As the ability to identify and treat these conditions improves, new return-to-play protocols will be required.

**CASE REPORT:** Eighteen-year-old African-American collegiate football player presented for pre-participation physical three years following correction for anomalous coronary artery. Five years prior the athlete underwent surgical correction of a left anterior descending artery off the pulmonic artery. This was well tolerated and he had returned to his usual sporting activities. At the time of presentation he had no acute distress, was alert and oriented x 3, well appearing, and had a good affect. He was 178.5 cm tall, weighed 71.9 kg, with a heart rate of 66 beats per minute, a respiratory rate of 16 breaths per minute, and a blood pressure of 127/71 mmHg. His neck exam lacked any carotid bruits and veins were non-distended. On cardiac exam he had a regular rate and rhythm, a +S1/S2 (physiologically split), and no murmurs, gallops, or rubs. His lungs were clear to auscultation without wheezes, crackles, or rhonchi in all fields. Abdomen was flat without any bruits. Extremities lacked cyanosis, clubbing or edema. Peripheral pulses were equal. The athlete was monitored with periodic nuclear stress studies, which were within normal range. A recent stress nuclear study demonstrated possible perfusion defect of the intra-ventricular septum to the base of the heart. A PET stress test was performed which showed normal myocardial perfusion, normal left ventricular global function, a left ventricular ejection fraction of 62%, and no regional perfusion defects upon stress images. Final working diagnosis is status post surgical re-implantation of anomalous left anterior descending artery from the pulmonary artery.

**DISCUSSION:** Bethesda guidelines of 2005 state that an athlete that has a cardiac anomalies where the coronary artery passes between great arteries should be excluded from sporting activities. Although, those that have surgical correction of their anomaly may return to play after three months if they do not show any signs of ischemia, ventricular or tachyarrhythmia, or issues during maximal exercise. The Bethesda guidelines do not recommend any specific follow-up, however, this athlete was allowed to continue with periodic follow-up stress tests or perfusion scanning. Risks were discussed with the athlete and his family; these include a one in three chance of developing ectasia, intramyocardial coursing, coronary compression during systole, or collateral development at some point. The athlete was warned to monitor for any signs or symptoms including chest pain, dizziness, or palpitations that may lead us to believe a problem is arising.

**CONCLUSION:** This case demonstrates an approach for return-to-play for a collegiate athlete with anomalous coronary artery repair.

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Joanne Baker, DO  
Director, Osteopathic Medical Education

Robert Baker, MD  
Faculty, Department of Family and Community  
Medicine

Susan Bannon, MD  
Medical Director, Department of Medicine

Craig Beam, PhD  
Division Director, Epidemiology and  
Biostatistics  
Department of Biomedical Sciences

Joseph Calles, MD  
Faculty, Department of Psychiatry

Colleen Dodich, MD  
Faculty, Department of Pediatric and Adolescent  
Medicine

Martin Draznin, MD  
Faculty, Department of Pediatric and Adolescent  
Medicine

Donald Greydanus, MD  
Chair and Program Director, Department of  
Pediatric and Adolescent Medicine

Mark Loehrke, MD  
Chair and Program Director, Department of  
Medicine

Larry Lutwick, MD  
Faculty, Infectious Diseases Clinic

David Overton, MD  
Associate Dean for Educational Affairs  
Chair and Program Director, Department of  
Emergency Medicine

Philip Pazderka, MD  
Associate Program Director, Department of  
Emergency Medicine

Vinay Reddy, MD  
Faculty, Department of Pediatric and Adolescent  
Medicine

Richard Roach, MD  
Faculty, Department of Medicine

Dale Rowe, MD  
Chair and Program Director, Department of  
Orthopaedic Surgery

Mark Schauer, MD  
Medical Director, Department of Medicine

Saad Shebrain, MD  
Faculty, Department of Surgery

Ruqiya Tareen, MD  
Faculty, Department of Psychiatry

Perry Westerman, MD  
Faculty, Department of Psychiatry

Alan Wilke, MD  
Chair and Program Director, Department of  
Family and Community Medicine

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