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### Scientific Day, 2010

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# Scientific Day

May 4, 2010 • 10 a.m. to 4:45 p.m. • Aurora Conference Center

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Aurora Health Care®



# Scientific Day

**Tuesday, May 4, 2010**

**10 to 4:45 p.m.**

## **Welcome and Opening Remarks**

*10 to 10:10 a.m.*

*Sycamore*

## **Oral Presentation Session I**

*10:10 to 10:55 a.m.*

*Sycamore*

## **Rieselbach Distinguished Papers Session**

*10:55 to 11:45 a.m.*

*Sycamore*

## **Lunch Break**

*11:45 a.m. to 12:15 p.m.*

*Sycamore*

## **Poster Viewing and Judging**

*12:15 to 1:45 p.m.*

*Work in Progress (Buckeye I)*

*General Posters (Buckeye I)*

*Judged Posters (Ash)*

## **Oral Presentation Session II**

*1:45 to 2:45 p.m.*

*Sycamore*

## **Break**

*2:45 to 3 p.m.*

## **Oral Presentation Session III**

*3 to 4:15 p.m.*

*Sycamore*

**(Awards immediately following)**

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*Aurora Scientific Day is open to all resident/fellow physicians, students, teaching faculty and allied health professionals at Aurora Health Care.*



# Oral Presentation Session I

## *Diverticulitis: Morbidity, Mortality and Association with Colonic Malignancy*

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El Ramah M, MD, Department Internal Medicine, Aurora Sinai Medical Center,  
will be presenting the following TWO abstracts:

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El Ramah M, MD, Department Internal Medicine, Aurora Sinai Medical Center

Vakil N, MD, Department of Gastroenterology, Aurora Sinai Medical Center

Affi A, MD, Department of Gastroenterology, Aurora Sinai Medical Center

Horwitz J, DO, Department of Gastroenterology, Aurora Sinai Medical Center

Einstein M, DO, Departments of Gastroenterology, Aurora Sinai Medical Center

### **Background/ significance:**

Despite a lack of evidence-based guidelines, the current standard of care recommends colonoscopy 4 to 6 weeks after acute diverticulitis due to the risk of an underlying malignancy.

### **Purpose:**

To determine whether diverticulitis is associated with colonic malignancy or advanced adenoma at a rate greater than the general population.

### **Methods:**

All Patients diagnosed with diverticulitis at 3 community hospitals over a 9-year period were included. Using ICD9 coding for diverticulitis, 188 patients were identified. Of these, 58 did not meet inclusion criteria (CT evidence of diverticulitis and a follow-up colonoscopy within 6 months of the acute attack). The remaining 130 patients were included for evaluation. Patients were divided into 4 groups based on CT scan findings: diverticulitis alone, diverticulitis with mass-like lesion, diverticulitis with abscess, and diverticulitis with perforation.

### **Results:**

The average age of our cohort was 63.7 years, 79% were Caucasian, 62% were female. One hundred and fifteen patients (88%) were noted to have diverticulitis alone on CT scan. Of those, 105 patients were managed medically. One cancer was identified in this group; however it did not correlate with the radiographic location of diverticulitis. The remaining 10 patients required surgery and none had malignancy. Of the 7 patients whose CT scan demonstrated a mass-like lesion, 6 were managed medically. At follow-up colonoscopy, 2 patients (28.5 %,  $p = 0.03$ ) were found to have colon cancer (Stage IIA cecal adenocarcinoma and Stage IV sigmoid adenocarcinoma) that corresponded in location to the CT scan findings. The remaining patient was diagnosed with Stage IV sigmoid adenocarcinoma at surgery rather than by follow-up colonoscopy. Three patients had diverticulitis with abscess, all required surgery and no malignancy was identified. Five patients had diverticulitis with perforation, all required surgery and no cancer was found. Of note, of the 130 patients who received a follow-up colonoscopy, 2 patients had a single tubular adenoma, neither of which was greater than 1 cm.

### **Conclusion:**

Colon cancer corresponding to the location of diverticulitis was found in 2.3% of patients with acute diverticulitis, which is substantially higher than in the general population. Patients with a mass effect on computed tomography are at greatest risk for an underlying neoplasm and need careful follow-up. Although prospective studies are needed, our data supports current guidelines for colonoscopy after acute diverticulitis.



El Ramah M, MD, *Department of Internal Medicine, Aurora Sinai Medical Center*  
Horwitz J, DO, *Department of Gastroenterology, Aurora Sinai Medical Center*  
Omballi M, MD, *Department of Internal Medicine, Aurora Sinai Medical Center*  
Leo J, DO, *Department of Internal Medicine, Aurora Sinai Medical Center*  
Affi A, MD, *Department of Gastroenterology, Aurora Sinai Medical Center*

**Background/  
significance:**

The indications for surgical management in the treatment of acute diverticulitis are still under debate. Review of surgical and medical literature revealed scarce and conflicting evidence about morbidity, mortality and association between this disorder and colonic malignancy in surgically managed patients.

**Purpose:**

To study the characteristics of surgically managed patients; identify morbidity, mortality and association between this condition and colon cancer.

**Methods:**

ICD-9 codes were used to identify patients with diverticulitis who had surgery over a 9-year period. Patients included had clinical symptoms, CT evidence of diverticulitis and /or pathology revealing diverticulitis. 608 patients were identified, 523 included. Patients were divided into 3 groups: those who had emergency surgery, those who had elective surgery and those who failed medical treatment.

**Results:**

The average age was 61.3 years. 42% of the cohort had recurrent diverticulitis. 69 patients had emergency surgery (average age 61.8), 155 patients had elective surgery (average age 58.5) and 299 patients failed medical treatment and had surgery (average age of 62.5). 66 patients had laparoscopic surgery and 467 had open surgery. The average length of stay was approximately 12 days for those who had emergency surgery and those who failed medical treatment compared to 7.6 days in those who had elective surgery. 15 patients (average age 73.4) in the total cohort died (2.86%). No mortality was seen in the elective surgery group compared with 2.8 % in the emergency surgery group and 3.6% in those who failed medical therapy ( $p = .09$  and  $.0058$  respectively). The difference in mortality between emergency surgery and failure of medical treatment was not significant ( $p = .74$ ). 3 patients in the total cohort were found to have adenocarcinoma of the colon (0.57%), 2 of which had a mass lesion on CT scan that correlated with the site of diverticulitis and one had normal CT scan. 19 patients had a colonic mass on CT scan, 2 had malignancy (10.5%,  $p = 0.0048$ )

**Conclusion:**

The mortality in our cohort was significantly higher than that previously reported. This may be related to the advanced age and comorbidities in those deaths seen in the group who failed medical treatment. Surgery after failed medical treatment carries a higher risk of mortality. Malignancy associated with diverticulitis in our cohort was similar to the general population, although patients with a mass on CT scan have a higher incidence of malignancy and need careful follow-up.



# ***Implantable Cardioverter Defibrillator After Percutaneous Revascularization in Patients with Cardiomyopathy***

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**Mortada ME, MD,** *Department of Cardiology, Aurora St. Luke's Medical Center*

**Bangash A, MD,** *Department of Cardiology, Aurora Sinai Medical Center*

**Mori N, PhD,** *Center for Urban Population Health, Aurora Sinai Medical Center*

**Rahman M, MD,** *Department of Cardiology, Aurora Sinai Medical Center*

**Keating V, MD,** *Department of Cardiology, Aurora Sinai Medical Center*

## **Background/ significance:**

CABG-Patch trial showed no benefit from epicardial implantable cardioverter defibrillator (ICD) in patients with cardiomyopathy undergoing complete revascularization by coronary artery bypass grafting (CABG). Therefore, guidelines recommend waiting 3 months post complete revascularization before inserting an ICD.

## **Purpose:**

To evaluate data on outcome of intravascular ICD implantation post revascularization via percutaneous coronary intervention (PCI).

## **Methods:**

We reviewed 516 consecutive patients ( $69.8 \pm 10.8$  years old, 81.4% males) who received an ICD after PCI at our institution, then compared outcomes between Group A (37 patients) who received an ICD within 3 months after PCI, and Group B (479 patients) who received an ICD 3 or more months post PCI. Endpoints measured were adverse reactions and mortality both in-hospital and after discharge. Median follow-up was the same in both groups (461 days in Group A vs. 467 in Group B,  $p = 0.495$ ).

## **Results:**

Demographics of the two groups were similar ( $67.5 \pm 11.2$  vs.  $67 \pm 10.8$  years old, 81.1% vs. 81.4% males, 75.7% vs. 83.3% Caucasian in A and B, respectively). In addition, all comorbidities (CAD, history of CABG surgery >3 months prior to implantation, average EF, congestive heart failure, hypertension, diabetes, COPD, cerebrovascular accident, dialysis, and length of hospital stay after implantation) were the same. Interestingly, all endpoints were also similar: in-hospital adverse reaction (0% vs. 1.5%,  $p = 1$ ), after-discharge adverse reaction (8.1% vs. 7.5%,  $p = 0.75$ ), readmission (43.2% vs. 38.6%,  $p = 0.7$ ), myocardial infarction after ICD implant (2.7% vs. 3.4%,  $p = 1$ ), arrhythmias after ICD implant (10.8% vs. 7.5%,  $p = 0.52$ ), and mortality (13.5% vs. 13.2%,  $p = 0.95$ ) Groups A and B, respectively. Results were the same even after excluding patients with ventricular arrhythmia or positive complex EP study.

## **Conclusion:**

Outcomes in cardiomyopathy patients are the same for patients receiving ICD implants within 3 months following PCI or more than 3 months post PCI. Prospective randomized trials are needed to verify this finding.



# ***Comparison of Peer, Self and Faculty Ratings of a Medical Student Community Project***

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**Brill J, MD, Aurora UW Medical Group Department of Family Medicine, Aurora St. Luke's Medical Center**

## **Background/ significance:**

Medical student assessment has historically been the exclusive realm of faculty. With a growing focus on lifelong learning, interest in self and peer assessment has expanded in higher education. In the fall of 2009, the University of Wisconsin School of Medicine and Public Health's Primary Care Clerkship added an obligatory Community Project. This project, reflecting the school's developing commitment to care beyond an individual level, offered students several options, including writing a newspaper health column, creating patient education materials and describing a community resource. Each student presented his/her project at the end of the rotation to a faculty member and a group of 5–7 peers. Faculty, peer and self-assessment were completed using identical but color-coded evaluation forms. A 1–10 Likert scale was used with descriptive anchors at the ends of the scales and comments required for the two highest or lowest ratings. These ratings were then converted to a 1–5 scale to fit with other clerkship evaluation components.

## **Purpose:**

Rationale for inclusion of self-evaluation were: independent nature of the assignment; desire to nurture life-long learning as part of clerkship goals; and desire to build "ownership" of the project. Peer assessment was suggested to ensure rigor in project completion and presentation and to ensure active listening to other students' presentations. The purpose of this study is to compare these peer, self and faculty evaluations to ensure that peer and self evaluations are valid in this setting.

## **Methods:**

We compared evaluation data for the 77 students who completed the first three rotations of the academic year. Data were de-identified for analysis. UW IRB approved the protocol. Mini-Tab was used for analysis.

## **Results:**

Mean ( $\pm$  std dev) ratings for each of the groups were: preceptors = 4.38 (0.49); self = 4.57 (0.40); peers = 4.65 (0.25). Spearman rank correlation coefficients showed significant correlations among all groups: peer-self evaluation: 0.264 ( $p = .021$ ); peer-faculty evaluation: 0.587 ( $p = .002$ ); self-faculty evaluation: 0.238 ( $p = .005$ ).

## **Conclusion:**

Mean peer and self-ratings were 7% and 4% higher than faculty ratings, respectively. There were significant correlations among peer-self, peer-faculty and self-faculty evaluations of student community projects, with peer-faculty scores correlating most closely. For this project, peer and self assessment were a valid complement to traditional faculty-only evaluation.

# *Rieselbach Distinguished Paper*



***Richard E. Rieselbach, MD***  
*Associate Dean and Chairman*  
*Department of Medicine*  
*University of Wisconsin Medical School*  
*Milwaukee Clinical Campus*  
*1974-1991*

Born in Milwaukee, educated at the University of Wisconsin–Madison and Harvard Medical School, trained in Internal Medicine at the University of Illinois and nephrology at Washington University in St. Louis, Dr. Rieselbach has been a faculty member of the University of Wisconsin Medical School since 1965.

Dr. Rieselbach provided the inspiration and administrative leadership which created the Milwaukee Clinical Campus at Mount Sinai Hospital in 1974. He shepherded its growth from the initial 46 faculty (full-time and clinical) and 18 residents/fellows, to 90 full-time faculty, 158 clinical faculty, and 108 residents/fellows in six departments by 1991.

His high standards for clinical and academic excellence fostered the recruitment of leaders and the development of innovative programs in primary care, geriatrics, interventional cardiology and electro-physiology, and high risk obstetrics which came to characterize the campus. He maintained a strong commitment to care of the medically indigent, fostering an expectation of community service in faculty and students. He projected a national vision in progressive reform of medical education and health care delivery.



# Rieselbach Distinguished Papers Session

## *Age-Stratified D-Dimer Thresholds Maintain High Negative Predictive Values for Excluding Pulmonary Embolism in Emergency Department Patients While Significantly Decreasing Imaging*

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**Bloomgarden D, MD**, Department of Radiology, Aurora St. Luke's Medical Center

**Rader K, MD**, Department of Emergency Medicine, Aurora St. Luke's Medical Center

**Anderson J, MSE**, Department of Epidemiology, Aurora St. Luke's Medical Center

**Yanny L, RN**, Department of Radiology, Aurora St. Luke's Medical Center

**Sup S, MD**, Department of Pathology, Aurora St. Luke's Medical Center

### **Background/ significance:**

Patients commonly present to the Emergency Department (ED) with nonspecific signs and symptoms of PE. Clinical strategies (Wells score) and D-dimer have high negative predictive values but low specificity resulting in many patients being imaged with subsequent high costs and radiation exposure.

### **Purpose:**

To assess whether more stringent criteria can safely be applied to young ED patients suspected for pulmonary embolism (PE) to limit need for diagnostic imaging.

### **Methods:**

We prospectively studied 1375 ED patients suspected for PE at Aurora St. Luke's Medical Center. ED physicians assessed clinical pretest probability for PE using Modified Wells model. Patients at low likelihood for PE had D-Dimer blood test. Patients with positive D-Dimer test (value  $\geq 1.2\mu\text{g/mL}$ ), meeting Kline Criteria, or at high likelihood for PE, received imaging (CT pulmonary angiography or nuclear medicine ventilation/perfusion Scan). Board certified radiologists, who were blinded to clinical score and D-Dimer test results, interpreted all imaging studies. Patients were diagnosed with PE if they had a positive CT pulmonary angiogram, or an intermediate or high probability V/Q scan. Follow up phone calls were made to patients with negative imaging results or normal D-dimer test results, in 60–90 days to exclude false negative clinically significant venous thrombo-embolism (VTE).

Sensitivity, specificity, positive and negative predictive values (NPV) were calculated at different D-dimer thresholds by Modified Wells categories and age ranges using the SAS System.

### **Results:**

Seventy eight patients were diagnosed with PE, 37 in the low likelihood clinical category, Wells  $<4.5$ . There were 8 PE in 656 patients under age 50 (1.2%) and 29 PE's in 508 patients age 50 and over (5.7%). When using the standard manufacturer recommended (and FDA approved) D-dimer threshold of 1.2 for excluding PE, 69.3% of the patients were imaged. If a higher threshold of  $2.0\mu\text{g/mL}$  was used, only 38.9 of patients would have been imaged. Using the 2.0 cutoff for patients under age 50 still maintains a 99.8% NPV (CI 99.8, 100) value while increasing the specificity to 68.6% from 27.8% for the 1.2 threshold which has a NPV of 100%.

### **Conclusion:**

A higher threshold d-dimer level in conjunction with the modified Wells score can safely exclude PE in patients under 50 years old, resulting in 56% less imaging studies, and significantly reducing hospital costs and patient radiation exposure.

# Cardiac Imaging for Arrhythmia Ablations: Anatomy, Registration and Error Correction

*Hare J, BS, Department of Cardiology, Aurora Sinai Medical Center and Krum D, MS, Department of Cardiology, Aurora Sinai Medical Center will be presenting the following THREE abstracts:*

**Hare J, BS**, Department of Cardiology, Aurora Sinai Medical Center

**Krum D, MS**, Department of Cardiology, Aurora Sinai Medical Center

**Mori N, PhD**, Center for Urban Population Health, Aurora Sinai Medical Center

**Sra J, MD**, Department of Cardiology, Aurora Sinai Medical Center

## Background/ significance:

The left atrium (LA) and its pulmonary veins (PV) are critical target areas for ablation of atrial fibrillation and atrial flutter. Electrical isolation of these sites is essential to eradicate these arrhythmias.

## Purpose:

Since ablation of these areas is primarily anatomically based, a successful outcome is dependent on a knowledge of the LA and PV anatomy for catheter selection and navigation.

## Methods:

CT scans from 450 patients were analyzed. The anatomical variations in regards to the number of PVs were identified. PV size and shape were calculated from 2 oblique views. Size was calculated by measuring the long and short axis of the ostium. By calculating the difference between axes, the shape of the PV ostia could be compared. LA volume was calculated after removal of the PVs. Demographic differences: height, weight, gender and age relating to the above measurements were analyzed.

## Results:

**PV Anatomy:** We identified 10 variations of LA PV anatomy. The three most common, 2 Left x 2 Right, 2 Left x 3 Right and 1 Left x 2 Right, make up 94% of the anatomies. The 2 Left x 2 Right anatomy is by far the most common as seen in 60% of females and 67% of males.

Other variations identified include (Left x Right): 1 x 1, 1 x 3, 1 x 4, 2 x 1, 2 x 4, 3 x 2 and 3 x 3.

**PV Size:** In the 2 x 2 anatomy, the Right Superior PV is the largest vein followed by the Left Superior PV, Right Inferior PV and the Left Inferior PV.

**PV Shape:** Male LSPV's and RSPV's are significantly more oval shaped (flatter) than female LSPV's and RSPV's. Left PV's are significantly more oval shaped (flatter) than right PV's in both male and female.

**LA Volume:** LA volume is significantly different between male and females. However, no difference is noted between anatomical variations. LA volume increases significantly with every 20 kg of weight gain in both males and females. Height and age have only a minimal effect on LA volume.

## Conclusion:

The 2 x 2 PV anatomy is the most common. Male PV's are more oval shaped (flatter) when compared to females. The SPV's are larger than the IPV's. Anatomical variations have no effect on LA volume. Weight is more of a factor in LA volume than height, age or PV anatomy. Because of the number of LA/PV anatomical possibilities, knowledge of the individual patient's anatomy is critical to an accurate and complete ablation procedure. This may also aid in pre-procedural planning to determine the proper selection of catheters in regards to size and type used during the procedure.

Sra J, MD, Department of Cardiology, Aurora Sinai Medical Center  
Krum D, MS, Department of Cardiology, Aurora Sinai Medical Center  
Hare J, BS, Department of Cardiology, Aurora Sinai Medical  
Choudhuri I, MD, Department of Cardiology, Aurora Sinai Medical Center  
Djelmami-Hani M, MD, Department of Cardiology, Aurora Sinai Medical Center

**Background/  
significance:**

Image registration is helpful in treating certain types of cardiac arrhythmias. However, rotation resulting from varying patient positions between modalities and misalignment from motion of the heart due to cardiac and respiratory cycles can cause errors during this process.

**Purpose:**

This study used phantom, animal and patient models to assess and correct errors in registration of cardiac CT images with fluoroscopy.

**Methods:**

The effect of in-plane rotation (rotation in a horizontal plane about the vertical axis) and out-of-plane rotation (rotation about a horizontal axis) was evaluated by registering a phantom with deliberately applied inter-modality rotation and then measuring its effects at a distance of 20 and 30 mm from the axis of rotation. Correction of cardiac cycle motion with ECG gating, using a predictive (A Priori) method was compared to gating with a retrospective (A posteriori) method performed to align fluoroscopic images with similarly gated CT images. The effectiveness of a tracking algorithm that adjusted the position of the CT model with respect to incoming fluoroscopic images for respiratory motion compensation was also evaluated in respiration sequences from 17 patients.

**Results:**

With 8 degrees of in-plane rotation applied to the phantom, and at a distance of 20 mm and 30 mm from the center of rotation, the measured error was 2.94 mm at 20 mm and 5.60 mm at 30 mm. Subsequent rotation of the CT model with respect to the fluoroscopic images by 8.5 degrees in the registration software eliminated this error. Out-of-plane registration errors using a 5-degree rotation at 20 mm and 30 mm were 1.1 mm and 0.9 mm, respectively. Cardiac cycle motion compensation using the A Priori method accurately predicted ECG location in only 38% ( $p = 0.0003$ ) of 313 R-R intervals from 9 patients in atrial fibrillation (AF). The A Posteriori method accurately gated the ECG during AF and sinus rhythm in 97% and 98% of 375 beats evaluated, respectively ( $p = \text{NS}$ ). The respiration motion tracking algorithm using 4 independent observers for 25 sequences from 17 patients was good or fair 96% of the time, with essentially no difference between observers and an automated method ( $p = \text{NS}$ ). Target registration error following correction of all of these types of errors in phantom and animal models was  $1.75 \pm 1.03$  mm and 0 to 0.5 mm, respectively.

**Conclusion:**

Common errors during cardiac image registration can be identified and corrected. This process can help improve accuracy in delivering therapy using image guidance.



Krum D, MS, *Department of Cardiology, Aurora Sinai Medical Center*  
Hare J, BS, *Department of Cardiology, Aurora Sinai Medical Center*  
Choudhuri I, MD, *Department of Cardiology, Aurora Sinai Medical Center*  
Djelmami-Hani M, MD, *Department of Cardiology, Aurora Sinai Medical Center*  
Sra J, MD, *Department of Cardiology, Aurora Sinai Medical Center*

**Background/  
significance:**

Catheter ablation procedures for atrial fibrillation target anatomic structures in the left atrium (LA). Fluoroscopy (fluoro) shows these catheters well in real-time, but depict the cardiac anatomy only poorly. Computed tomography (CT) images show the anatomy well, but not the catheters. Fusion, or registration, of both modalities may improve left atrial ablations by accurately depicting both anatomy and real time catheter position together.

**Purpose:**

We have previously demonstrated the utility of single plane CT-Fluoro integration in LA procedures. However, ambiguity of catheter location within the depth of the fluoro field is a limitation of this technique. We hypothesized that integration of biplane fluoro images with CT is feasible and may help facilitate left atrial ablation procedures.

**Methods:**

CT-Fluoro integration was performed on a workstation with custom software that displayed segmented LA images from CT with incoming X-ray images from a fluoroscopy system. The software allowed alignment of images from the two modalities by superimposing features from the images from CT with corresponding features from fluoro simultaneously with both C-arms of the biplane system. The resultant images were then compare with a standard 3D cardiac mapping system (Carto, Biosense Webster).

**Results:**

Images from biplane fluoroscopy were successfully registered with a left atrial CT model. The second fluoroscopic view made it possible to determine catheter position along the anterior-posterior axis. The catheter position marked on the surface of the registered 3D image correlated well with catheter location as seen on the 3D mapping system.

**Conclusion:**

Integration of CT images with biplane fluoroscopy is feasible. This process has potential for improving left atrial ablation procedures.

# Poster Viewing – Work In Progress

## *Specialized Outpatient Pharmacy Services for Patients with Multiple Sclerosis*

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Fang B, PharmD, Department of Pharmacy, Aurora St. Luke's Medical Center

Wojtal P, Department of Pharmacy, Aurora St. Luke's Medical Center

### **Background/ significance:**

Disease-modifying medications, such as interferon beta and glatiramer acetate, are the only treatments currently available to likely slow down the progression of multiple sclerosis (MS). These agents have adverse effects that may be poorly tolerated and lead to noncompliance of therapy.

### **Purpose:**

The objectives of the specialized services are to increase distribution of medications for MS through Aurora Pharmacy – St. Luke's Medical Center (AP-SLMC) and to increase patient compliance with disease-modifying medications.

### **Methods:**

When a prescription for a disease-modifying medication is received from the Regional MS Center, pharmacists from AP-SLMC will determine insurance coverage for the medication. If AP-SLMC is able to dispense the medication, a pharmacist will have a private consultation with the patient and/or their caregiver to provide injection training along with compliance tools, such as customized calendars. A delivery or mail service will be offered. Follow-up phone calls will be conducted at week two, week four, and monthly thereafter for three months following the initiation of therapy. During the calls, the pharmacist will discuss various education topics related to MS, including side effect management and lifestyle modifications. All staff involved in care of the patient, including prescribers, pharmacists, nurses, and coordinators, will be educated on the new service to facilitate implementation into existing workflows. A retrospective prescription volume evaluation will be conducted to compare the number of patients receiving disease-modifying medications for MS from the AP-SLMC at baseline to post-implementation of program. Changes in compliance rates will also be evaluated by assessing refill consistency at baseline compared to at post-implementation of the service.

### **Results:**

At baseline from January to September of 2009, six patients received disease-modifying medications from AP-SLMC. Refill consistency of those six patients was 100%. There is opportunity for improvement in prescription volume and compliance with the implementation of the outpatient service.

### **Conclusion:**

Data collection is still in progress.

# ***Assessment of the Accuracy of Medication Histories Taken Upon Patient Admission to Selected Hospitals Within a Health Care System***

---

Weitendorf AM, PharmD, *Department of Pharmacy, Aurora St. Luke's Medical Center*

Iglar A, R.Ph., MS, *Department of Pharmacy, Aurora St. Luke's Medical Center*

Volquardsen A, PharmD, BCPS, CACP, *Department of Pharmacy, Aurora St. Luke's Medical Center*

## **Background/ significance:**

National patient safety goals focus on accurate medication histories upon admission to hospitals by health care providers. Home medications are identified during an inpatient stay via a medication history and the medication reconciliation process. As health care systems transition to electronic home medication lists, it is imperative to have an accurate reflection of a patient's medications upon admission to avoid errors, identify drug interactions, and reasons for admission.

## **Purpose:**

The objective of this project is to assess the accuracy of medication histories taken upon patient admission to hospitals within a health care system and to determine the best practice for performing medication histories.

## **Methods:**

After submission to IRB, the project was considered exempt from oversight since it does not focus on human research. Four of the thirteen hospitals in the health care system, each with a different process, were selected to assess the accuracy of medication histories upon admission. Each hospital process for collecting medication histories was flowcharted to assess for variation. After the initial medication history had been performed, the investigator obtained a second medication history by re-interviewing the patient and follow-up discussions with retail pharmacies, as well as other sources when information was incomplete. The accuracy of each medication history obtained by the original caregiver compared to the investigator was assessed for correct drug, dose, route and directions for use. Accuracy was reviewed for each medication line item and total overall accuracy of the medication history. After review of accuracy, a best practice for performing medication histories will be determined.

## **Results:**

Will be presented at Aurora Scientific Day.

## **Conclusion:**

Will be presented at Aurora Scientific Day.



# ***Assessing The Percentage of Time Spent on Pharmacist Functions Across the Aurora Health Care System***

---

**Servais RM, PharmD, Department of Pharmacy, Aurora St. Luke's Medical Center**

**Iglar AM, MS RPh, Department of Pharmacy, Aurora St. Luke's Medical Center**

**Loeb AJ, MS RPh, Department of Pharmacy, Aurora St. Luke's Medical Center**

## **Background/ significance:**

The pharmacy department at Aurora Health Care is in the process of transitioning from a collection of distinct regional entities to a single integrated, all-inclusive system department. At the same time, Aurora is implementing computerized physician order entry (CPOE) site by site to enhance patient safety and increase quality of care. CPOE is currently utilized in two hospitals, and plans exist for system-wide implementation within the coming years.

## **Purpose:**

Completion of a work sampling study to assess how pharmacists currently use their time will allow for strategic planning for the future of the department and standardization of services throughout the system. In addition, data collected will quantify the differences between CPOE and non-CPOE sites, helping to determine the efficiency and impact of CPOE in this early phase of implementation.

## **Methods:**

All inpatient staff pharmacists throughout the Aurora Health Care system were asked to wear pagers that signaled randomly at a rate of 6.4 times per hour to gain an understanding of current use of pharmacist time. The study was completed during all shifts at the electronic intensive care unit (eICU) as well as each of the thirteen inpatient facilities over the course of one week. Pharmacists were prompted to record their current work activity on a data collection form each time the pager signaled. Upon study completion, observations were recorded and analyzed. Emphasis was placed on quantifying differences in the percentage of time spent on work activities between CPOE and non-CPOE sites. Data were also used to plan for system-wide CPOE implementation as well as identify opportunities to improve use of pharmacist time by increasing cognitive functions.

## **Results:**

Data collection has been completed at thirteen inpatient hospital pharmacies and the eICU. Tabulation and analysis are in progress; results will be presented at Aurora Scientific Day.

## **Conclusion:**

Conclusions will be presented at Aurora Scientific Day.

# ***Barriers to Initiating Early and Continuous Prenatal Care: African American Women's Perceptions of Racism***

---

**Salm Ward TC, MSW**, *Center for Urban Population Health, Aurora Sinai Medical Center*

**Mazul M, Student/CNM**, *UW-Milwaukee/Wheaton Franciscan*

**Perry S**, *Center for Urban Population Health, Aurora Sinai Medical Center*

**Bridgewater F**, *Center for Urban Population Health, Aurora Sinai Medical Center*

**Harley A**, *Center for Urban Population Health, Aurora Sinai Medical Center*

## **Background/ significance:**

In Milwaukee, African American infants are at 2–3 times greater risk of adverse birth outcomes such as low birth weight, preterm birth, and mortality than White infants (WDHS, 2010). African American women with lower socioeconomic status are at greater risk of adverse birth outcomes (Sims, et al., 2007). Self-reported experiences of racism have been linked to adverse birth outcomes (Nuru-Jeter, et al., 2009). The Institute of Medicine (2002) released a report identifying disparities in the quality of care received by African Americans, charging that both covert and overt racism play a large role in these disparities. Limited research has been conducted on African American women's experiences of racism during prenatal or obstetric care (De Marco, et al., 2008).

## **Purpose:**

To examine the presence and nature of racial discrimination during prenatal care from the perspective of African American women in Milwaukee.

## **Methods:**

Using a community-based approach, researchers collaborated with leaders at the YWCA of Greater Milwaukee to design a descriptive study. Utilizing focus groups, we are gathering information from 40 African American women with infants who are consumers of YWCA services.

## **Results:**

So far, we have interviewed 8 African American women, all over 18 years of age with at least one child in the past year, most with an education of 12th grade/GED or less, most were unemployed and/or earning under \$10,000 per year, and most had early, adequate prenatal care. Seven visited the ER during their pregnancy, with 3 visiting 3 or more times and 2 visiting 7 or more times. We have identified some very preliminary themes, including: use of emergency room services during pregnancy (7 of 8 women visited the ER, with 2 visiting 7 or more times), concerns regarding perceptions of poor care, having experienced instances of racism, long waits in the office for visits, examples of good prenatal care, expectations of racism, and responses to poor care. On the other hand, some women expected to encounter some type of racism and were surprised that they were not discriminated against.

## **Conclusion:**

Based on these preliminary findings, we believe that African American women in the City of Milwaukee do perceive racism and that it could impact their use of prenatal care services. These findings may also support development of a more culturally sensitive approach to providing care to pregnant African American women.

## ***Statin Compliance at a Family Medicine Center***

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### **Background/ significance:**

The benefits of statin medications and lowering of LDL have been well established. Achieving optimum control, that being 130mg/dL or less in patients with no risk factors, diabetics below 100mg/dL, and those with CAD below 70mg/dL have shown benefit. Previous studies have documented greater than 80% of patients in one community were on statins but only 60% were at their goal LDL.

### **Purpose:**

The goal of our project is to document the percentage of patients on a statin and at their target goal at our Family Medicine Residency Clinic.

### **Methods:**

Chart review, examining current compliance of approximately 200 clinic charts with the diagnosis code: hyperlipidemia or hypercholesterolemia. Men and non-childbearing women 18 and older will be included. Excluded will be those with less than one office visit per year or documented rhabdomyolysis or intolerance secondary to statin. LDL control will be defined as patients with no risk factors, who are below LDL of 130, diabetic patients with LDL less than 100, and those with documented atherosclerosis with LDL less than 70. Individuals with no risk factors and LDL between 130 and 160 will be given six months for lifestyle modification prior to being considered qualifying for statin therapy. Comparisons by age category and gender will be made. Chi-square tests will be used for categorical data and binary logistic regression for multivariate analysis, as appropriate.

### **Results:**

To be presented.

### **Conclusion:**

We hypothesize that our clinic will be below 60% for goal achievement. We hope to define the problem and improve patient outcomes by making goal LDL achievement a higher priority and informing targeted quality improvement.



# Poster Viewing – General Posters

## *Hypocalcemic Cardiomyopathy Mimicking Acute Coronary Syndrome*

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### **Background/ significance:**

Hypocalcemic cardiomyopathy is a rare disease with few reported cases in literature.

### **Purpose:**

To illustrate this rare disorder and make clinicians aware of its presentation and management.

### **Methods:**

A 49-year old female with a history of billroth II procedure performed 5 years ago, which was followed by chronic nutritional deficiencies, presented to the ER with muscles spasms, shortness of breath and diffuse chest pain for 2 days. No history of CAD or cardiomyopathy. Vital signs showed blood pressure 100/70, heart rate 110, temperature 107° F, respiratory rate 25, and pulse ox 94%. Physical exam revealed normal heart sounds with no murmurs, clear lungs, no JVD and 2 plus pitting edema in the lower extremities. Shortly after presentation, she developed severe respiratory distress and was intubated. She became hypotensive and was started on norepinphrine. Chemistry panel showed calcium of 4.8 mg/dl, ionized calcium .68 mmol/l, potassium 2.5 mg/dl, albumin 1.7 gm/dl, creatinine 1.6 mg/dl, lactate 2.5 mmol/l, WBC count 13.7, Hb 10.5 g/dl and platelet count 320. ECG showed prolonged QTc 736 ms, and no ischemic changes. Cardiac enzymes showed CPK 5926, CK-MB 186.4, Myoglobin 16194 and Ultrasensitive Troponin I 55. Chest X-ray was normal. Patient was started on broad-spectrum antibiotics and her electrolyte imbalance was treated aggressively. A 2-D echocardiogram showed LVEF of 25% with severe global hypokinesis. Hyperthermia resolved over the next day. She was extubated 3 days later and weaned off pressers. Work-up revealed no sepsis and her antibiotics were discontinued. Electrolyte imbalances were corrected. Vitamin D level was Undetectable and PTH was 927. Repeat echocardiogram 6 days later, showed LVEF of 55%. Patient had cardiac catheterization which revealed normal coronaries.

### **Results:**

Hypocalcemic cardiomyopathy.

### **Conclusion:**

Hypocalcemic cardiomyopathy is a rare but well described disorder. Pathogenesis is based on the physiologic role of calcium in myocardial excitation contraction coupling. Diagnosis of this disorder rely on the absence of other causes of cardiomyopathy and dramatic improvement after correction of hypocalcaemia which is well described in our patient's clinical course. This patient has unique presentation with significantly high ultrasensitive Troponin I elevation and severe hyperthermia which has not been reported in literature. The cause of acute exacerbation of chronic hypocalcaemia was not clear in this case. This condition should be suspected and treated accordingly.

# ***Metabolic Alkalosis and Rhabdomyolysis with Profound Electrolyte Abnormalities Resulting from Baking Powder Pica***

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## **Background/ significance:**

We report a case of a 42 year old female who presented with severe pain involving all extremities. She denied any recent history of trauma, surgery, excessive exercise, medications or any febrile illness. Initial lab values revealed alkalemia and bicarbonaturia, which may have explained the hypokalemia, but the cause of her metabolic alkalosis was unclear. The patient denied taking any laxatives or diuretics, nor reported any vomiting. Primary hyperaldosteronism was considered, but the aldosterone: renin ratio was not elevated. Upon further questioning, the patient admitted to ingesting 3-4 10 oz canisters of baking powder monthly for the last year. An explanation for her pica may relate to her iron deficiency. Additionally, she also admitted to using cocaine, which she cuts with additional baking powder.

## **Purpose:**

Except for cases of co-existing renal failure, excess bicarbonate usually does not lead to metabolic alkalosis, as it should normally be excreted by the kidneys. However, in some reported cases of chronic and excessive intentional ingestion of sodium bicarbonate, sustained metabolic alkalosis have been shown to ensue, even in the setting of normal renal function. Hypokalemia, hypovolemia, and chloride depletion generally impair renal handling of H<sup>+</sup> ions and bicarbonate, and would further exacerbate the existing metabolic alkalosis if also present in the setting of such abuse. Bicarbonate makes up approximately 30% of baking powder, which in the case of our patient's abuse, may have led to her alkalemia.

## **Methods:**

Our patient was admitted and started her on aggressive crystalloid supplementation and potassium replacement. After three days, her electrolyte disturbances and rhabdomyolysis resolved. This patient was counseled against further use of baking powder, and to abstain from further use of cocaine.

## **Results:**

On admission, her labs were as follows: CPK; 58,313 units/L. Electrolytes; sodium 140 mmol/L, potassium 2.2 mmol/L, chloride 92mmol/L, bicarbonate 36 mmol/L, creatinine 0.5 mg/dL and BUN of 4mg/dL. ABG; pH 7.50, pO<sub>2</sub> 85 mmHg, pCO<sub>2</sub> mmHg, HCO<sub>3</sub> 33 mmol/L. CBC: WBC 8.4 K/uL, Hgb 10.5 gm/dL, Hct 34.2%; Iron: transferrin saturation of 4; urine pH 8.

## **Conclusion:**

We conclude that our patient's underlying electrolyte derangement could be a cause of her rhabdomyolysis. Hypokalemia is a known side affect of bicarbonate abuse, and despite having normal renal function, her electrolyte disturbance, coupled with her baking powder pica, would therefore explain her sustained metabolic alkalosis.

## ***Project Boost: Identifying Barriers to Improving the Patient Discharge Process***

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### **Background/ significance:**

Transition from hospital to home is a vulnerable time for the frail elderly. A suboptimal discharge process may lead to dissatisfaction, early readmission and poor outcomes. Project BOOST (better outcomes for older adults through safe transitions) is a mentored project with Society of Hospital Medicine with the goal to improve the discharge process, reduce readmission and improve patient satisfaction.

### **Purpose:**

Identify barriers of the discharge process in the hospital.

### **Methods:**

This project was piloted on the Acute Care for Elders (ACE) Unit at Aurora Sinai Medical Center in Milwaukee, WI. A multidisciplinary team composed of representatives from hospital administration, nurses, pharmacy, doctors, social services and quality department was formed as the initial step. Following the recommendation, the team used the “7Ps” guidelines from Project Boost to perform a chart review to identify measurable outcomes. The team also developed a flow chart documenting current activities and the ideal state.

### **Results:**

Chart reviews demonstrated that mean age of the subjects were 80 years old, and mean number of scheduled discharge medications were 9.7. Majority (95%) had a dictated discharge summary prior to discharge and mean time to transcription was 2.3 days. Only 10% had follow-up appointment noted on the discharge summary. When Primary Care Physician was noted on the discharge summary (55%), 73% of them received the discharge summary and 73% of their patients were seen at the follow up in the clinic. There was a slight delay in follow-up phone calls in 72 hours. In addition, the current state flow chart was developed and led to identify a number of issues, including constraints of time and funding faced by key personnel, the challenge of communication across and within the organizations, the accessibility of electronic medical record and the duplication of efforts occur at multiple levels.

### **Conclusion:**

Transitions in care are complex and it is best to optimize the efforts of the multidisciplinary team. Electronic medical record can be leveraged to identify vulnerable elderly, provide appropriate interventions and feedback at the team level.



# ***Abdominal Hysterectomy for Benign Indications: Evidence Based Guidance for Surgical Decisions***

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## **Background/ significance:**

Hysterectomy, or removal of the uterus, is the most common major gynecologic procedure in the United States. Approximately, 600,000 hysterectomies were performed in the United States in the early 2000s and 20 million U.S. women have had their uterus removed. From 1994–1999, the overall hysterectomy rate for U.S. female was 5.5 per 1,000 women who are at least 15 years old. Though the uterus can be removed vaginally, or with laparoscopy, the most common route is with open abdominal hysterectomy (AH). In 2003, there were 538,722 hysterectomies for benign disease and about two-thirds (66%) of them were performed by abdominal laparotomy.

While the mortality with AH for benign indications is 0.25 per 1000 procedures, morbidity occurs in 3–5%. The potential complications include infection, blood transfusion, ureteral, bladder or intestinal injury, deep venous thrombosis and pulmonary embolism. One possible way to decrease the surgical complication rate is to ascertain what aspects of the surgery are evidence based and have been linked with lower morbidity. Additionally, a review of the literature would identify the surgical decisions that are not based on randomized clinical trials (RCT) and potentially encourage properly designed trials.

## **Purpose:**

The purpose of this review is to provide evidence-based guidance for surgical decisions during abdominal hysterectomy performed for benign indications

## **Methods:**

Using combinations of terms “abdominal,” “hysterectomy,” and “randomized clinical trials (RCT),” we performed Ovid, PubMed, and COCHRANE searches for publications between 1988 and 2008.

## **Results:**

After reviewing over 3,000 abstracts, 19 RCT were identified. There are no grade A recommendations. The only grade B suggestion is use of a bipolar vessel sealing device (LigaSure) for vascular pedicles rather than sutures. Routine closure of peritoneum should be avoided. Evidence behind 71% (15/21) of surgical steps is insufficient (grade I).

## **Conclusion:**

Despite its common performance, there are no grade A recommendations that can be made for the technical aspects of abdominal hysterectomy. Since almost 70% of the surgical steps during abdominal hysterectomy lack randomized clinical trials, adequately designed studies are needed to decrease perioperative morbidity.

# ***A Novel Approach for Treating Hypermobile Females Who Present to Physical Therapy with Sacro-Iliac Joint Dysfunctions***

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## **Background/ significance:**

Women have a higher incidence of sacro-iliac joint (SIJ) pain and dysfunction, and a higher incidence of hypermobility than men. Existing textbooks explain the use of muscle-energy techniques (MET) to effectively treat SIJ dysfunction, however none address modifications specific to hypermobile individuals.

## **Purpose:**

The purpose of this investigation was to examine a novel approach using MET principles to treat SIJ pain related to Backward Sacral Torsion (BST) dysfunction in women with clinical hypermobility.

## **Methods:**

A retrospective case series (n = 5) was performed on consecutive clients who fit the following inclusion criteria: clinical hypermobility as determined by the presence of 5 or more signs on a detailed Beighton Scale screening, and BST dysfunction determined by the physical therapist-gathered history and manual evaluation. The novel treatment technique incorporated common components found in traditional MET: spinal extension, counter-rotation of the trunk/pelvis and reciprocal inhibition, but was completed in standing vs. the traditional side-lying position. Outcome measures included pain scores, ROM, repeated palpation measures and quality of life questions.

## **Results:**

All clients achieved a near pain-free state, improved motion and reported higher quality of life, specifically related to sleep quality and fitness activities. Compliance with self-corrections was enhanced after the novel technique was introduced. There were no adverse effects reported using this modified technique.

## **Conclusion:**

This approach achieved positive results in this patient sample. Future investigations should focus on (1) use in a larger population sample (2) validation of this approach as an alternative MET and (3) comparative studies with traditional forms of MET used by physical therapists.

# **Total Laproscopic Hysterectomy: Evidence-Based Guidance for Surgical Decisions**

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## **Background/ significance:**

Hysterectomy is one of the most common surgical procedure. There are different methods to perform hysterectomy.

## **Purpose:**

Berghella et al, (AJOG 2005) reviewed the literature and using the methodology outlined by US Preventive Services Task Force (USPSTF), provided graded recommendations for surgical technique involved with cesarean delivery. We similarly sought to review the literature to ascertain the evidence for surgical decisions during total laproscopic hysterectomy (TLH).

## **Methods:**

From TeLinde's Operative Gynecology, (Tenth edition, 2008), we identified 16 surgical steps for TLH and sought evidence for each of them. Using combinations of terms "laparoscopy," "hysterectomy," "randomized clinical trials (RCT)," we performed Ovid, COCHRANE searches for articles published between 1970 and 2010. Articles were excluded if they were in foreign language, focused on antibiotics, pain management, cancer, cost-or decision-analysis, abdominal, vaginal hysterectomy, or did not discuss technical aspect of TLH.

## **Results:**

Our search yielded 107 abstracts of which all were excluded because they focused on antibiotics (n = 2), cancer (12), cost (10), decision (1) analysis, abdominal (0), pain management (10), non-technical aspect (64), or vaginal hysterectomy (8).

There were no RCT for the steps involved with TLH (Position the patient's arms at her side, abdomen, perineum, and vagina preparation, Foley catheter, intrauterine manipulating, the round ligament transaction, broad ligament dissection, the bladder dissection, the infundibulopelvic ligament transaction, the ovarian artery and vein transaction, the uterine vessels transaction, anterior and posterior colpotomies, vaginal apex closure, Trocar site closure).

Then we started search on individual TLH steps technique; one article was found for peritoneal entry that has included 17 randomized controlled trials concerning 3,040 individuals undergoing laparoscopy (7 and 10). However on the basis of evidence investigated in this review, there appears to be no evidence of benefit in terms of safety of one technique over another. However, the included studies are small and cannot be used to confirm safety of any particular technique.

## **Conclusion:**

Our overview allows clinicians to see that none of the surgical steps during laproscopic hysterectomy are evidence based and investigated, and that could be related to high complication rate during the surgery and further randomized trial are need to improve the technique of TLH.

# ***Implementation of a Medication Reconciliation Process in an Ambulatory Geriatric Clinic/Medication Discrepancies in an Outpatient EMR***

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## **Background/ significance:**

Medication safety is a major concern to both patients and providers as the rate of drug use continues to grow among Americans. Over 60% of U.S. adults aged 65 or older in the ambulatory setting take at least 5 different medications per week, with 15% taking at least 10.

Medication-related problems occur with alarming frequency and account for significant morbidity and mortality. Individuals 65 years and older were 2.4 times more likely to sustain an adverse drug event and 7 times more likely to be hospitalized than younger patients. One important factor that increases the opportunity for medication related problems is the presence of discrepancies in the medication record. Accurate medication records are necessary to avoid drug interactions, monitor compliance and therapeutic responses, diagnose adverse effects, and respond to refill request.

## **Purpose:**

The aim of this study was to measure the accuracy of medications stored in electronic medical records (EMR) and evaluate inaccuracies of medication data.

## **Methods:**

This project reviewed 167 records from patients that were randomly identified in an outpatient geriatrics clinic. Patients were asked to bring their medication bottles/list to appointments, where providers recorded discrepancies in names, doses, and frequencies between EMR and medications the patient took at home. Only scheduled medications were reviewed.

## **Results:**

Patients were prescribed an average of 8 medications and 44.3% of the lists were accurate. However, 18.1% of patients were taking the incorrect dose, 7.1% the incorrect frequency, 35.3% were not taking one or more scheduled medications, and 22.2% were taking medications that were not on the medication list. 18.6% of patients had more than one problem in the medication list. The most common class of medications that were taken incorrectly was vitamins/supplements, which resulted in 36 errors. Cardiovascular medications had the next highest number of errors reported at 33 and gastrointestinal medications followed with 24 errors reported. Failing to take prescribed medication accounted for 48% of medication errors reported.

## **Conclusion:**

The results of this study demonstrate the lack of medication compliance exhibited by patients and the need to improve the resources available to these patients when receiving and maintaining their medication regimen. We hope to conduct a follow up to this project to help determine if a medication list will reduce discrepancies between the patients' EMR and their reported medication compliance.



# Judged Posters

## ***Comparison of Amplatzer® PFO Versus Cardioseal/Starflex® Versus Gore Helex Devices in Closure of Patent Foramen Ovale: A Single-Center Experience***

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### **Background/ significance:**

Only a few studies have compared these devices for safety, complications, mortality and recurrence of stroke, transient ischemic attack (TIA) and arrhythmia.

### **Purpose:**

We compared current devices for patent foramen ovale (PFO) closure with respect to procedural complications, residual shunt and clinical outcome.

### **Methods:**

We studied 114 consecutive patients who had PFO closure for various reasons (85% cryptogenic stroke). Amplatzer® PFO device (AGA Medical Corp., Plymouth, MN) versus CardioSEAL/STARflex® device (NMT Medical Inc., Boston, MA) versus Gore Helex device (W.L. Gore & Associates Inc., Flagstaff, AZ) were compared.

### **Results:**

Closure was equally successful for all devices. Clinical follow-up was completed in 95% of patients. There was no significant difference in rate of periprocedural complications, recurrence of TIA/stroke, or arrhythmia. One death related to closure occurred in each Amplatzer PFO (Hemothorax) and STARflex (retrocardiac hematoma) group. Immediate periprocedural shunts (mostly small) were more common in the Amplatzer PFO and Gore Helex devices.

### **Conclusion:**

Most closure devices in the market have comparable safety and efficacy rates. Immediate post procedural residual small shunts were more commonly observed in Amplatzer PFO and Gore Helex devices. Results showed a higher out-of-hospital mortality rate associated with Amplatzer PFO device.

# Renal Dialysis Effect on Implantable Cardioverter Defibrillator's Outcome

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## Background/ significance:

Dialysis for end-stage renal disease carries a high risk for dysarrhythmia and sudden cardiac arrest. Furthermore, dialysis may increase risk of complications (e.g., infection) from implantable cardioverter defibrillator (ICD).

## Purpose:

We evaluated outcomes of an ICD implant in this population.

## Methods:

We reviewed 1,555 consecutive patients who received an ICD at our institution between January 2007 and June 2009. Two groups were derived from this pool of patients. Group I (46 patients, mean age  $64.6 \pm 10.6$  years, 65.2% male) included all patients who had end-stage renal disease and were on dialysis; Group II (46 patients, mean age  $68.9 \pm 10.6$  years, 63% male) was a matched group for age, gender, race, coronary artery disease and hypertension, with no dialysis. The groups were compared for adverse reaction (including infection), readmission, acute myocardial infarction, arrhythmia, ICD shocks and mortality. Median follow-up was 439 days.

## Results:

Baseline characteristics (demographics, comorbidities and medications) were similar, as expected in matched groups. Both groups had similar rates of acute myocardial infarction (2.2% vs. 4.4%,  $p = 1.0$ ). Group I had a trend for more adverse reactions (13% vs. 4.4%,  $p = 0.27$ ), readmission (47.8% vs. 41.3%,  $p = 0.67$ ), ICD shocks (8.7% vs. 2.2%,  $p = 0.357$ ), and mortality (28.3% vs. 15.2%,  $p = 0.2$ ). The difference did not reach statistical significance due to the small number of patients in each group.

## Conclusion:

Dialysis for end-stage renal disease trends toward worse outcomes in patients following ICD implantation. However, more study is needed to confirm this finding.

## ***Earlier Intervention with Implantable Cardioverter Defibrillator Might be More Beneficial in Non-Ischemic Cardiomyopathy Patients***

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### **Background/ significance:**

Current guidelines recommend implantable cardioverter defibrillator (ICD) in patients with non-ischemic cardiomyopathy (NICMP) after 3 months of optimal medical therapy. However, it is unclear if ICD therapy instituted earlier than 3 months would benefit patients with NICMP. We compared baseline characteristics and procedural and clinical outcomes between patients with recent NICMP (duration <3 months) who received ICD and patients with established NICMP (duration 3–9 months and >9 months).

### **Purpose:**

We compared baseline characteristics and procedural and clinical outcomes between patients with recent NICMP (duration <3 months) who received ICD and patients with established NICMP (duration 3–9 months and >9 months).

### **Methods:**

Data was collected prospectively for the ICD registry at our institution on 1,555 consecutive patients who underwent ICD for appropriate indications from January 2007 through June 2009. Mortality data was acquired by Social Security Death Master File query. Additional data on arrhythmia, ICD shock, and in-hospital and long-term mortality were obtained by manual review of patient charts. Primary end point was post-ICD mortality. Secondary end points were in-hospital mortality, cardiac readmission, arrhythmia and MI post ICD placement.

### **Results:**

Of the 1,555 patients analyzed, 556 (36%) had NICMP. Patients were  $60.9 \pm 14.4$  years of age, 60% male, 69% Caucasian and had a mean EF of 28.5%. Duration of NICMP until implant was <3 mo in 45 patients (8%), 3–9 mo in 83 (15%) and >9 mo in 428 (77%). Mean follow-up was 473 days. No significant differences in baseline characteristics or procedural success and in-hospital morbidity or mortality were noted between the three groups. Mortality rates for patients with NICMP were: duration <3 mo = 0%; 3–9 mo = 2.4%; >9 mo = 3.0% ( $p = 0.008$ ). Readmission rates for cardiac causes in patients with NICMP were: <3 mo = 20%; 3–9 mo = 28.9%; and >9 mo = 37.6% ( $p = 0.03$ ).

### **Conclusion:**

Patients with recent-onset NICMP (<3 months) and implanted ICD had lower mortality and cardiac readmission rates. Further study from registry and clinical trial data may be warranted.

## ***Low Vision Education for the Hospital Work Force: A Strategy to Create a Vision-Friendly Hospital***

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### **Background/ significance:**

As the baby boomers age, utilization of health care services continue to increase in the U.S. This presents a unique set of challenges for health care workers. Vision loss is common in the elderly and can co-exist with other geriatric syndromes. Low vision may be a barrier to adequate communication and result in lower patient satisfaction. Because vision loss may contribute to increased mortality and morbidity, it is important to prepare the hospital workforce to develop skills to appropriately take care of the aging population. Thus, targeted interventions may improve the quality of the hospital experience.

### **Purpose:**

This is an educational program targeting health care workers to improve knowledge and awareness of low vision in the hospital setting.

### **Methods:**

A low vision knowledge questionnaire was used to test the participants from the hospital work force. A pre-test/post-test design was used to test the effectiveness of the intervention. After completing the pre-test, an interactive education program was given to the participants. A post-test was conducted after the participants completed the education program. Chi-square test was performed to examine the difference of the test results. All statistical analyses were performed using SAS 9.2.

### **Results:**

There were 386 participants who completed the training. Of them, 19.5% were nurses, 32.2% ancillary services, 3.1% physicians, 13.3% environmental services, 4.7% maintenance, 7.5% dietary and 2.3% transportation department. The majority of the participants were 46–60 years (42%) and female (80%). Within the 8 low-vision questions, we found statistically significant improvement in 7 questions. One question demonstrated a positive trend but was not statistically significant.

### **Conclusion:**

An interactive educational model on vision loss can improve knowledge of the health care team. This may lead to improvement of patients' satisfaction, quality of care and create a vision friendly hospital.



# ***Health-Related Quality of Life Among Adults with Chronic Conditions in the U.S.: Implications for Interventions***

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## **Background/ significance:**

As prevention and disease management improve, and the aging population increases, the prevalence of chronic conditions accelerates among the U.S. population. The growing number of Americans living with chronic illness has shifted the focus solely on treatment and quantity of life to improvement of the quality of life. However, little is known about the relationship of health-related quality of life (HRQoL) across people with chronic conditions.

## **Purpose:**

This study examines the relative risk of self-perceived HRQoL and the association between the level of burden and the HRQoL outcomes among U.S. adults with chronic conditions.

## **Methods:**

Data from Behavioral Risk Factor Surveillance System (BRFSS) in 2007 (N = 430,912) were used to compare four HRQoL measures across nine chronic conditions. Weighted prevalence was calculated, and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were estimated using survey-logistic regression analyses.

## **Results:**

People with multiple ( $\geq 3$ ) chronic conditions had highest risk of reporting worse HRQoL (Fair/Poor Health: OR = 8.4, 95% CI = 7.8–9.0). People with cardiovascular conditions or diabetes had higher risk of reporting lower general health. (Fair/Poor Health, MI: OR = 8.3; CHD: 9.2; Stroke: 6.9; Diabetes: 7.6). In most chronic conditions, the percentages of self-reported frequent physical distress were higher than those of frequent mental distress and frequent activity limitations. The relative risk of self-reported frequent physical distress (OR range: 2.3–5.4) were consistently higher than frequent mental distress (OR range: 1.8–2.8) and frequent activity limitations (OR range: 2.1–4.2) across conditions.

## **Conclusion:**

Improving physical health might have a critical impact on HRQoL among adults with chronic conditions. Our findings may help to better plan and allocate resources for interventions.

## ***Understand That Multivessel Intervention in Acute STEMI in the Setting of Multivessel Disease is as Safe and Effective as Single-Vessel PCI During STEMI***

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### **Background/ significance:**

ACC/AHA guidelines discourage simultaneous percutaneous coronary intervention (PCI) of nonculprit lesions in hemodynamically stable patients with ST-segment elevation myocardial infarction (STEMI). In STEMI patients with severe multivessel disease and cardiogenic shock, simultaneous PCI of both culprit and nonculprit lesions may reduce ischemic burden.

### **Purpose:**

To analyze the differences in mortality and complications following multivessel vs. single vessel (infarct-related artery) PCI in patients with ST elevation MI.

### **Methods:**

We evaluated 2077 consecutive STEMI patients who underwent PCI at our hospital from 2005 to 2008. Data was obtained from local ACC-NCDR CathPCI registry and Social Security Death Master File.

### **Results:**

Culprit-vessel PCI was done in 1449 patients, while 578 patients had both culprit- and nonculprit-vessel PCI. Age, gender, comorbidities, ejection fraction and periprocedural medications were similar between the groups. Patients with multivessel PCI had higher incidence of right coronary artery (77% vs. 71%), proximal (53% vs. 46%) and mid-distal left anterior descending artery lesions (55% vs. 45%;  $p = 0.005$  for all), and there were more grade C lesions (58% vs. 52%). In-hospital and 1-year mortality (cardiac and overall) as well as vascular and bleeding complication rates were similar. Renal failure was higher in the multivessel group (odds ratio 1.44, 95% confidence interval 0.71–2.91;  $p = 0.31$ ). Survival analysis revealed no significant differences.

### **Conclusion:**

Mortality rates and cardiac, vascular, and bleeding complications for multivessel PCI are no worse than for single-vessel PCI in patients with STEMI.

# ***Health-Related Quality of Life Among Children with Special Health Care Needs in the United States***

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## **Background/ significance:**

In the past two decades, health-related quality of life (HRQoL) has been widely used in the adult population to provide a broader view of health, including aspects of perceived health, health behavior, and well-being. In pediatrics, however, few studies have provided nationally representative estimates of children's HRQoL in the United States. Particularly, little is known about the HRQoL among children with special health care needs (CSHCN).

## **Purpose:**

By using nationally representative data, we aim to (1) examine the health-related quality of life among children with special health care needs, and (2) identify the risk factors and their associations with the health-related quality of life.

## **Methods:**

Data from 2003 National Survey of Children's Health were used (N = 102,353). A multidimensional index (Simon et. al, 2008), consisting of 12 HRQoL subdomain questions, was applied to calculate HRQoL subdomain and summary scores. Children who were younger than 6 years were excluded because parents of these children were not asked questions in all of the 12 domains. Multivariate linear regression analyses were conducted to examine the associations between independent variables and the HRQoL summary scores. Survey functions and weights were used for all analyses to provide population estimates and account for the complex survey design. All analyses were conducted using SAS 9.2.

## **Results:**

There were 66,416 children aged 6 years and above identified as the study subjects (weighted n = 46,758,930). The national HRQoL summary mean scores was 65.7 (95% CI = 65.3–66.2) among CSHCN, lower than those among non-CSHCN (74.1; 95% CI = 73.9–74.3),  $p < .0001$ . Children with five qualifying screener questions had the lowest summary mean scores (46.5, 95% CI = 44.1–48.9). Among the 50 states and Washington DC, Vermont had the best HRQoL summary mean scores of CSHCN (70.2; CI = 68.2–72.1), while Mississippi had the lowest summary mean scores of 58.8 (CI = 56.5–61.1). From the multivariate analyses, unmet needed medical care had the strongest negative effect (Coefficient = -6.8,  $P < .0001$ ) on HRQoL among CSHCN.

## **Conclusion:**

In the United States, children's health-related quality of life is lower among CSHCN than non-CSHCN. Children with multiple special health care needs have poorer health-related quality of life. Age, socioeconomic disparities, health care access barriers, and maternal health are factors associated with lower health-related quality of life.

## ***Triumph: Training in Urban Medicine and Public Health***

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### **Background/ significance:**

Wisconsin's public medical school students have historically lacked experiences in working with urban underserved and diverse populations. Milwaukee suffers from some of the country's largest disparities in employment, income, education, STDs, infant mortality, and outcomes of chronic medical conditions, as well as a shortage of physicians in the central city. Over the last 10–15 years, we have developed three M3 clerkships, several M4 elective experiences, and an opportunity for students to base their M4 year here, but did not have a unifying clinical and community program.

### **Purpose:**

To address health disparities and the urban physician shortage in the state, TRIUMPH was developed. It is a 15-month, longitudinal experience that begins in January of the M3 year for students with a strong interest in urban medicine. The purpose is to connect and enhance the current offerings, integrate service learning opportunities, establish partnerships with Community Health Centers and other community organizations and nurture urban medicine career goals.

### **Methods:**

In 2009, we initiated the M3 component of the curriculum with a cadre of 6 student volunteers. They completed each of the 3 current urban clerkships sequentially (OBG, Primary Care and Internal Medicine), as well as a 2-week Community And Public Health ENrichment Experience (CAPHENE). Each student completed a community health improvement project and participated in weekly core curricular activities.

Students completed written evaluation of each individual aspect of the CAPHENE course, evaluation of their service learning project and community partnership, and evaluation of the overall M3 TRIUMPH experience. A focus group was held with the student group at the completion of the experience.

### **Results:**

Evaluations demonstrated excellent student ratings of CAPHENE elements, with a mean rating of 13 components = 4.5 (Range 3.17–5.00 on scale of 1–5). The overall TRIUMPH experience was qualitatively reviewed very highly. A representative comment: "I've learned so much on the important of connections and collaborations. I've learned how important it is to know a community in order to help them. I've learned how to problem solve hurdles in beginning my project – how to think creatively. I've learned the meaning of cultural barriers and ways to overcome."

### **Conclusion:**

We conclude that an urban-underserved track of a non-urban medical school can be a valuable addition to training opportunities. Dedicated faculty and community mentoring are essential.



## **Wide QRS as an Independent Predictor for Worse Implantable Cardioverter Defibrillator Outcome**

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### **Background/significance:**

Large implantable cardioverter defibrillator (ICD) implantation trials (SCD-HeFT and MADIT II) have shown a trend toward increased benefit in patients with QRS duration greater than 120 ms without reaching statistical significance.

### **Purpose:**

Do these patients with wide QRS (>120ms) continue to have higher risk of complications and mortality after ICD implantation than patients with narrow QRS?

### **Methods:**

We reviewed 1,555 consecutive patients (mean age  $66.8 \pm 13.38$  years, 72.3% male, mean EF of  $29.2 \pm 11.91\%$ ) who received an ICD implant from Jan. 2007 and June 2009, and divided them into two groups. Group A (879 patients) had a wide QRS duration on their ECG ( $\geq 120$  ms), and group B (676 patients) had a narrow QRS (<120 ms). The two groups were compared for occurrence of in-hospital and after-discharge adverse reactions, in-hospital and after-discharge cardiac events (acute MI, arrhythmia), hospital readmission and mortality (cardiac and all-cause). Median follow-up was 503 days.

### **Results:**

Group A had older patients ( $70.6 \pm 11.17$ ,  $p < 0.001$ ), more males (76% vs. 68.5%,  $p = 0.001$ ), and more Caucasians (86.1% vs. 73.7%,  $p < 0.001$ ). As expected, patients with wider QRS (Group A) had higher incidences of: coronary artery disease (69.5% vs. 61%,  $p < 0.001$ ), coronary artery bypass graft surgery (41% vs. 29.6%,  $p < 0.001$ ), heart failure (94.2% vs. 78.1%,  $p < 0.001$ ), and arrhythmias (51% vs. 30.3%,  $p < 0.001$ ). Both groups had the same in-hospital mortality (0.3–1%), post-implant myocardial infarction (1.5%), and post-implant arrhythmia (7.7%). However, Group A had worse in-hospital complications (2.1% vs. 0.6%,  $p = 0.017$ ) and more after-hospital discharge mortality (15.6% vs. 8.3%,  $p < 0.001$ ) for cardiac and non-cardiac causes.

### **Conclusion:**

Wide QRS ( $\geq 120$  ms) is an independent predictor for worse outcome in patients following ICD implant, especially for long-term mortality.

# ***Implantable Cardioverter Defibrillator Inserted Within 40 Days Post Acute Myocardial Infarction***

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## **Background/ significance:**

Guidelines caution against implantable cardioverter defibrillator (ICD) insertion within 40 days of medically treated acute myocardial infarction (AMI). However, some patients are at high risk for sudden cardiac arrest and may benefit from ICD.

## **Purpose:**

To illustrate that it makes no difference when an ICD is implanted following acute myocardial infarction.

## **Methods:**

We reviewed ICD registry data at our two centers on 937 consecutive patients who received an ICD after medically treated AMI between Jan. 2007 and June 2009. Patients were divided into two groups based on timing of ICD implant. Group A (60 patients) received an ICD within 40 days post AMI, and Group B (877 patients) received an ICD more than 40 days post AMI. We compared baseline characteristics, adverse reactions, readmissions, cardiac events and mortality. Subgroup analysis was also performed in Group A to compare patients with (7) and without (41) sudden cardiac arrest, sustained ventricular tachycardia, or positive complex EP study.

## **Results:**

Diabetes mellitus, CVA, COPD of the two groups were similar, except Group B had more patients with congestive heart failure (63.3% vs. 91.5%,  $p < 0.001$ ) and history of CABG more than 3 months prior to implant (33.3% vs. 57%,  $p < 0.001$ ). Group A had longer hospital stay ( $2.9 \pm 4.5$  days vs.  $1.7 \pm 3.4$  days,  $p < 0.001$ ). All medications were equal, except aspirin or clopidogrel, which was used more in Group A (93.3% vs. 80.5%,  $p = 0.014$ ). Median follow-up was the same in both groups (452 vs. 526 days). All end points (in-hospital and out-of-hospital adverse reactions, cardiac and all-cause mortality, arrhythmias, and readmissions) were the same, except more patients experienced an AMI in Group A, both within 30 days of implant (3.3% vs. 0.3%,  $p = 0.036$ ) and after 30 days of implant (8.3% vs. 1.8%,  $p = 0.008$ ). There was no difference in end points between high-risk vs. low-risk patients for sudden cardiac arrest who received an ICD within 40 days of AMI.

## **Conclusion:**

There is no difference in major patient outcome between ICDs implanted within 40 days of medically treated AMI or more than 40 days post AMI.

## ***Impact of Different Demographics on Implantable Cardioverter Defibrillator***

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### **Background/ significance:**

Implantable cardioverter defibrillators (ICDs) are used for sudden cardiac death prevention. There is data on the impact of age and more recently gender on outcome in patients with ICDs. The impact of race on ICDs has not been studied.

### **Purpose:**

We aim to investigate the overall impact of all these mentioned demographics on ICDs outcome.

### **Methods:**

1,555 consecutive patients received ICD implant at our institution between January 2007 and June 2009. 964 (62%) of these patients were elderly (65 years or older) and 591(38%) were younger (less than 65 years old). 1,131 (73%) of these patients were male and 424 (27%) were female. 1,255 patients (80.7%) were white, 226 (14.5%) were African American, 52 (3.3%) were Hispanics and 22 (1.4%) were categorized as others. Our endpoints were in-hospital and after discharge adverse reactions and mortality, re-admission rates and rates of myocardial infarction and arrhythmia within 30 days or more. Univariate analysis was used to account for the differences in medical history and medications between the groups. Multivariate analysis was used to identify demographics that have an impact on the endpoints with a p value of 0.05 considered statistically significant.

### **Results:**

Elderly patients had higher rates of overall mortality (OR (95% CI) of 2.49 (1.60 - 3.85),  $p < 0.001$ ) and lower rates of re-admission (0.68 (0.53 - 0.88),  $p = 0.003$ ). There was a trend toward higher rate of in-hospital adverse reactions in the elderly group but it was not statistically significant ( $p = 0.062$ ). Whites had lower rates of one-year mortality (OR (95% CI) of 0.70 (0.60 - 0.82),  $p < 0.01$ ) and re-admission (0.69 (0.55 - 0.92),  $p = 0.010$ ).

### **Conclusion:**

Elderly patients and non-Whites had higher rates of mortality after ICD implantation in our study; Whites and elderly patients had lower rates of re-admission. More studies are needed in the future to confirm and explain our findings.

# Accuracy of Calcium Scoring Pre- and Post-Atrial Fibrillation Ablation

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## Background/ significance:

The presence of calcium deposits in coronaries is a surrogate marker for coronary atherosclerosis. Patients with atrial fibrillation may have grossly irregular and/or short RR intervals which may confound standard gating of coronary CT scans and therefore spuriously alter both the absolute coronary artery calcium (CAC) scoring and the reproducibility of the score.

## Purpose:

The aim of this study is to determine if a difference in CAC exists between the CAC score in AF pre ablation to the CAC in the same patients post AF ablation in normal sinus rhythm.

## Methods:

Twenty patients in AF underwent a clinically necessary pre-ablation CT angiogram for evaluation of left atrial anatomy. A calcium score was also obtained. All patients then underwent elective ablation of atrial fibrillation. Eight (6 men, 2 women) of these successfully ablated patients had a repeat calcium score in sinus rhythm.

Standard calcium scoring was performed with commercially available software (Smartscore) on a GE 64 slice scanner using 2.5 mm slice thickness and diastolic gating. The median calcium scores were then compared using Spearman's rank correlation coefficient and Wilcoxon signed rank test. Scores of <100 were considered low, 100–399 Intermediate and 400 or more, high.

## Results:

Table

Patient No.	Months b/w study	Pre CAC	Post CAC
1	8	41	48
2	5	265	241
3	11	779	1124
4	13	67	124
5	17	54	86
6	19	28	2
7	20	333	387
8	0	104	117
Median (IQR)	12 (6.5–18)	85.5 (47.5–299)	120.5 (67–314)
Spearman's rank correlation coefficient: $rs = 0.976$ ( $p < 0.001$ )			
Wilcoxon signed rank test: $p = 0.674$			

## Conclusion:

There is no significant difference in the coronary artery calcium score amongst those patients in AF who underwent successful ablation into sinus rhythm. Only one patient changed score categories (low to intermediate). A strong correlation exists between the CAC scores of these two groups. Therefore, in patients with AF and varying degrees of coronary artery disease, both the absolute score and the clinical risk classification may still be valid. A larger group is needed for confirmation.



# ***A Prospective Analysis of the Incidence of Atrial Tachyarrhythmias in Patients with Percutaneous Device Closure of Patent Foramen Ovale or Atrial Septal Defect***

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## **Background/ significance:**

Atrial septal defects (ASD) and patent foramen ovale (PFO) are present in approximately 25% of adult patients at autopsy and 45% of patients with cryptogenic stroke. Atrial electrical remodeling can occur in patients with atrial shunts, resulting in a substrate for atrial tachyarrhythmias (AT). Late development of AT post surgical ASD closure is well known. However, the incidence of AT post percutaneous closure of ASD and PFO remains to be determined.

## **Purpose:**

To determine the incidence of AT post percutaneous closure of ASD and PFO remains to be determined.

## **Methods:**

We are prospectively analyzing patients who underwent percutaneous device closure (AMPLATZER, CARDIOSEAL, STARFLEX, GOREHELIX device) of ASD or PFO for various indications from Oct. 2005 to Oct. 2010. Each patient was given a MicroER cardiac event recorder for a period of two weeks. Baseline EKGs were compared. Patients were given a questionnaire at the time of their enrollment to record symptoms and past medical history, including arrhythmias.

## **Results:**

We followed 29 consecutive patients (55% females, mean age  $58 \pm 15.21$ ) with percutaneous PFO and ASD closure (31% ASD, 69% PFO) for an average period of 27.5 months. The arrhythmia burden was assessed with the use of loop recorder, using twice-a-day recording of EKG rhythm strips continuously for two weeks. A total of three patients (10.3%) were found to have atrial fibrillation, one of whom carried a previous diagnosis of paroxysmal atrial fibrillation. Two of these (6.9%) were new-onset atrial fibrillation (one in ASD and one in PFO group). Another patient (3.5%) with ASD closure, who had AV nodal reentry tachycardia previously, continued to have episodes of supraventricular tachycardia in the follow-up period. The incidence of new arrhythmias was independent of size or type of device.

## **Conclusion:**

Overall incidence of new-onset atrial tachyarrhythmias post percutaneous closure of ASD and PFO is low (~7%) in the intermediate period post procedure and is independent of the size of PFO or ASD.

# ***Coronary In-Stent Restenosis in Patients on Triple Antiplatelet Medications of Aspirin and Clopidogrel and Cilostazol: Single Center Experience***

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## **Background/ significance:**

Rate of coronary in-stent restenosis ranges from 5–35% on a dual anti-platelet regimen of Aspirin and Clopidogrel. We propose that addition of a third anti-platelet agent such as Cilostazol will decrease the rate of in-stent restenosis.

## **Purpose:**

To determine the incidence of in-stent restenosis in patients on triple anti-platelet agents.

## **Methods:**

We retrospectively identified 386 patients at our institution that had been on Cilostazol and Clopidogrel for various reasons between 2007 and 2008. Out of these patients, 47/386 patients (12%) were on triple antiplatelet treatment with Aspirin, Cilostazol and Clopidogrel after percutaneous intervention to prevent in-stent restenosis. Presence of in-stent re-stenosis in this group was determined by angiography, stress test and clinical follow-up.

## **Results:**

A total of 47 patients receiving triple antiplatelet therapy were identified. Average age of patients was 70 (50–90). The average ( $\pm$  Standard Deviation) duration of stent patency based on repeat cardiac catheterization was 18.9 months  $\pm$  17.1. Out of these, 3/47 (6.4%) had angiographically determined in-stent restenosis. Average duration of chest pain free interval on clinical follow up was 24.1  $\pm$  23 months.

## **Conclusion:**

This retrospective study is our center's experience of patients with coronary stents patency on triple antiplatelet regimen. In this study the in-stent restenosis rate was 6.3% in patients on triple anti-platelet therapy. This is lower than our institutional average in-stent restenosis of 30 percent on standard dual antiplatelet regimen. Large randomized trials are needed to determine the effectiveness of triple anti-platelet therapy.

## ***Preterm Birth at 24–34 Weeks and Ultrasonographic Findings***

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### **Background/ significance:**

Preterm delivery (PTD) is defined as birth prior to 37 weeks and occurs in 12% of obstetrical patients. It is the leading cause of perinatal morbidity and mortality. The management of preterm labor involves ultrasound to ensure normal fetal growth and adequate amniotic fluid. ACOG recommends that women with preterm labor (PTL) should have transvaginal cervical (TV Cx) length and fetal fibronectin (fFN) to differentiate between false vs. true PTL.

### **Purpose:**

To evaluate the frequency with which ultrasounds and fFN are obtained among parturients who deliver between 24–34 week. To record the likelihood of abnormal findings noted on ultrasounds in women who deliver prematurely.

### **Methods:**

This retrospective study included non-anomalous, singletons who had preterm birth between 24 and 34 weeks. From the maternal charts we pulled the following: age, parity, previous preterm birth, drug use, complications, Celestone administration, fFN, ultrasound, gestational age at delivery, birth weight, Apgar < 3 at 5 minutes, and NICU admission. Perinatal mortality (1/1000 births) was calculated.

### **Results:**

In the study period, 157 patients delivered before 37 weeks and 117 (74%) met the inclusion criteria. The mean (+ standard deviation) maternal age was 25.3 + 6.3 years and 17% (20) were nulliparous. Among parous women, 54% (53/97) had a previous preterm birth. Urine drug screen was positive in 7% of the patients. Only 40% of patients received Celestone prior to preterm birth. fFN was obtained in 3% and 38% (44) had an ultrasound before birth. Of the 44 patients that had an ultrasound performed, an abnormality was noted in 40%. Oligohydramnios was noted in 20%, hydramnios 9%, IUGR 9%, and LGA 2%. Only 30 (26%) patients had a cervical length and it was abnormal (<2.5 cm) in 14% (4/30). fFN was obtained in 3 patients (2.5%) and all were normal. The mean gestational age at delivery was 31.2 + 2.8 weeks, with birth weight of 1715 + 587 gm. Apgar score was < 3 in 2.5% of patients (3/117) and 79% (92) were admitted to NICU. The corrected perinatal mortality births was 117 / 1000 births.

### **Conclusion:**

Our retrospective study indicates that Celestone was not administered in the majority of case and in most cases clinicians did not obtain ultrasound or fFN prior to preterm birth. Considering that 40% of patients with preterm birth have abnormal fetal growth or amniotic fluid and majority of the TV Cx length are normal, we suggest that all patients with PTL should have ultrasound, TV Cx length and fFN.

# ***Metabolic Syndrome is an Independent Predictor for Worse Implantable Cardioverter Defibrillator Outcome***

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## **Background/ significance:**

To diagnose metabolic syndrome, three or more of the following should be present: central obesity, triglycerides  $\geq 150$  mg/dl, HDL  $< 40$  mg/dl for males and  $< 50$  mg/dl for females, blood pressure  $\geq 130/85$  mmHg, and fasting plasma glucose  $\geq 110$  mg/dl. Metabolic syndrome is a cluster of risk factors in an individual that predicts more cardiovascular events.

## **Purpose:**

The effect of metabolic syndrome on the outcome of ICD recipients is not established.

## **Methods:**

We reviewed 1,554 consecutive patients ( $66.8 \pm 13.4$  years, 72.7% male) who received ICD implant between January 2007 and June 2009 and divided them into two groups. Group A, those with metabolic syndrome (888 patients), and Group B, those without metabolic syndrome (666 patients), were compared for occurrence of adverse reactions, cardiac events (acute MI, arrhythmia), hospital readmission, and mortality. They were followed for a median of 503 days.

## **Results:**

Demographics were similar in both groups. As was expected, Group A had more CAD (71% vs. 59%,  $p < 0.001$ ), heart failure (90.2% vs. 83.3%,  $p < 0.001$ ), hypertension (82.3% vs. 61.1%,  $p < 0.001$ ), diabetes mellitus (50% vs. 15.3%,  $p < 0.001$ ), and renal failure on dialysis (3.9% vs. 1.7%,  $p = 0.008$ ). Longer hospital stays after implantation were seen in Group A ( $1.9 \pm 3.6$  vs.  $1.4 \pm 2.24$  days,  $p < 0.001$ ). In-hospital adverse reaction and all-cause mortality were the same in both groups. However, Group A had higher risk of post-discharge adverse reaction (7.5% vs. 4.2%,  $p = 0.009$ ), readmission (40.7% vs. 27.3%,  $p < 0.001$ ),  $> 30$  days post implantation acute MI (2.9% vs. 0.8%,  $p = 0.004$ ),  $> 30$  days post implantation arrhythmia (10.6% vs. 4.1%,  $p < 0.001$ ), and post-discharge cardiac mortality (3.3% vs. 1.2%,  $p = 0.008$ ).

## **Conclusion:**

Metabolic syndrome should be considered an independent predictor of worse outcome in patients post ICD implantation, primarily after hospital discharge.

# ***Mechanical Compression Devices are Better than Manual Compression Following Percutaneous Coronary Intervention***

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**Background/ significance:** Mechanical compression devices may shorten time to ambulation and decrease vascular complications.

**Purpose:** To assess differences in risk of vascular complications, all-cause mortality and length of hospital stay between manual compression and mechanical compression devices (Fem-Stop; C-clamp) following PCI.

**Methods:** We retrospectively assessed length of hospital stay, all-cause mortality, and local vascular complications in 12,276 consecutive patients who underwent percutaneous coronary intervention (PCI) using femoral approach from March 2005 to June 2009.

**Results:** More patients had mechanical compression devices (10,030, 82%) than manual compression (2,246, 18%). Rate of any vascular complication was lower with mechanical compression devices (1.6% vs. 3.1%,  $p < 0.001$ ). Length of hospital stay was shorter with mechanical compression devices (2.1 days vs. 3.1 days,  $p < 0.001$ ). Adjusted odds ratios showed lower rates of vascular complications and 1-year all-cause mortality with mechanical compression devices.

**Conclusion:** In patients undergoing PCI, mechanical compression devices may reduce length of hospital stay and lower the risk of local vascular complications and 1-year all-cause mortality when compared to manual compression.



# ***Safety and Efficacy of Angio-Seal™ Vascular Closure Device Following Percutaneous Coronary Intervention***

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## **Background/ significance:**

Although Angio-Seal™ (St. Jude Medical, St. Paul, MN) vascular closure device (VCD) is effective in reducing time to hemostasis following diagnostic coronary angiograms, its efficacy and safety in patients undergoing percutaneous coronary intervention (PCI) is uncertain.

## **Purpose:**

To assess safety and efficacy of Angio-Seal VCD in a large cohort of patients undergoing PCI.

## **Methods:**

From March 2005 to June 2009, 13,379 consecutive patients underwent PCI using femoral artery approach. We retrospectively evaluated length of hospital stay, rate of local vascular complications, in-hospital mortality, and all-cause 1-year mortality in 2 groups: Angio-Seal VCD (1,103 patients, 8%) and manual compression or mechanical compression (12,276 patients, 92%).

## **Results:**

Length of hospital stay was shorter with Angio-Seal VCD (1.8 days vs. 2.3 days,  $p < 0.001$ ). Incidence of any vascular complication was similar (1.1% vs. 1.9%,  $p = 0.053$ ), and there was no difference seen in in-hospital mortality (0.5% vs. 0.9%  $p = 0.107$ ). Adjusted odds ratios showed no difference in rate of vascular complications or 1-year all-cause mortality between the 2 groups.

## **Conclusion:**

Following PCI, Angio-Seal vascular closure is safe and effective. It shortened length of hospital stay, but did not increase vascular complications, in-hospital mortality, or all-cause 1-year mortality when compared to manual compression/mechanical compression.

# ***Clinical Outcomes of Unprotected Left Main Coronary Artery Stenting in Non-Surgical Patients: A Single-Center Experience***

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## **Background/ significance:**

Coronary artery bypass graft (CABG) is the standard treatment for unprotected left main disease, however, some patients are poor surgical candidates due to comorbidities.

## **Purpose:**

To assess the safety and clinical outcome of elective, unprotected left main coronary artery (LMCA) stenting in non-surgical patients.

## **Methods:**

Between October 2004 and June 2006, 50 consecutive patients underwent elective, unprotected LMCA stenting at our institution. Patients were followed for a median of 16 months and clinical outcomes were monitored.

## **Results:**

The median logistic EuroScore was 28.6 (14.6–43.4). Median baseline left ventricular ejection fraction (LVEF) was 50%. Procedural success rate was 100%. The rates of cerebrovascular accident, myocardial infarction, target vessel revascularization, and cardiovascular death were 2%, 4%, 4%, and 2%, respectively, at 30 days, and 2%, 6%, 6%, and 2% at 16 months. Major adverse cardiac and cerebrovascular event (MACCE) rate was 12% at 30 days and 16% at 16 months. Median LVEF at 16 months was 55%. LVEF was significantly improved ( $p < 0.001$ ).

## **Conclusion:**

In non-surgical patients with left main disease, stenting of unprotected left main coronary artery is safe, with acceptable rates of MACCE up to 16 months post stenting.

# Inhaled Epoprostenol as Solo or Adjunctive Therapy for Pulmonary Artery Hypertension

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## Background/ significance:

Pulmonary Arterial Hypertension (PAH) is a common finding in patients with valvular heart disease. The postoperative mortality rate of patients with pulmonary hypertension undergoing cardio-thoracic surgery as well as general surgery is high. Currently, the most commonly used drug for postoperative pulmonary hypertension is inhaled nitric oxide. The two major drawbacks of inhaled nitric oxide include its acquisition cost (\$3,120 initial cost, \$312/hr with maximum cost/patient of \$12,000 every 30 days) and non-reimbursement from Medicare. Hospital acquisition costs for inhaled nitric oxide exceeded 3 million dollars per year during the last 3 years.

## Purpose:

In our study we show the efficacy of inhaled EPO in patients with severe pulmonary hypertension, primary target being cohort of patients who underwent valvular surgery.

## Methods:

The selected study population was patients undergoing cardiothoracic surgery at Aurora St. Luke's Medical Center, in Milwaukee, Wisconsin, between July 2008 and April 2009. Anesthesiologists prospectively initiated inhaled EPO therapy, using the AeroNeb nebulizer, on the vasodilated and fully anesthetized patients, with a measured PA systolic pressure greater than 60mmHg by Swan-Ganz catheter. We collected data by chart review of the identified study population. Pulmonary artery pressure and cardiac index were compared using two sample paired t-test, respectively (two-tailed).

## Results:

Of all patients, seventy-two (82.8%) underwent valve surgeries, seven (8.1%) had LVAD's, and two (2.3%) had heart transplants. Inhaled EPO was used as adjuvant therapy in 6 (6.7%) medical patients. No adverse effects from this therapy was observed.

Cardiac Index Pre (n = 52)	2.12 ± 0.5
Cardiac Index Post Flolan	2.92 ± 0.7 (p < 0.001)
Mean Pulmonary Artery Pressure Pre Op	39 ± 0.52
Mean Pulmonary Artery Pressure Post Flolan	25.1 ± 0.5 (p < 0.001)
Average Cost Inhaled Flolan	\$19/hour
Average Cost of Inhaled Nitric Oxide	\$132/hour

## Conclusion:

Inhaled Epoprostenol demonstrated excellent clinical and hemodynamic results and was well tolerated in this critically ill subgroup of patients. It was a cost effective alternative to inhaled nitric oxide with a net savings more than \$875,000.

# Effect of Age and Chronic Kidney Disease on Outcomes of Endovascular Repair of Abdominal Aortic Aneurysm

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## Background/significance:

The effect of age and preexisting chronic kidney disease (CKD) on outcomes of endovascular repair (EVR) of abdominal aortic aneurysm (AAA) has not been well established.

## Purpose:

To describe clinical characteristics and outcomes of endovascular AAA repair in older vs. younger patients and those with and without CKD.

## Methods:

Between February 2003 and February 2009, 227 consecutive patients underwent EVR of AAA at our institution. We retrospectively compared clinical outcomes in two age groups: <70 years (61 patients, 27%) and ≥70 years (166 patients, 73%). We also compared outcomes on patients without CKD (191 patients, 84.1%) versus those with CKD (36 patients, 15.9%).

## Results:

Median follow-up was 15 months. Patients under 70 had more history of smoking and more peripheral artery disease. There was no difference in all-cause mortality in those <70 (3.3%) vs. those 70 and older (2.4%,  $p = 0.661$ ) or in reintervention (1.6% vs. 3.0%, respectively,  $p = 1.000$ ). Incidence of procedure related complications was similar in both age groups. Length of hospital stay (2 days vs. 2 days,  $p = 0.732$ ), and rate of discharge directly home (91.8% vs. 94.0%,  $p = 0.559$ ) were similar in both age groups. Patients with CKD had more diabetes mellitus. There was no difference in all-cause mortality in those without CKD (3.7%) vs. those with CKD (0.0%,  $p = 0.593$ ) or in reintervention (2.1% vs. 5.6%, respectively,  $p = 0.243$ ). Rate of any complication was higher in patients with CKD (4.2% vs. 19.4%,  $p = 0.001$ ). Spinal cord complications were more common in patients with CKD (0.0% vs. 8.3%,  $p = 0.004$ ). There was no difference in length of hospital stay (2 days vs. 2 days,  $p = 0.770$ ) or rate of discharge directly home (94.2% vs. 88.9%,  $p = 0.267$ ). None of the study patients had aneurysm-related death, cardiac death, or aneurysm rupture.

## Conclusion:

Age does not affect outcome of endovascular repair of abdominal aortic aneurysm. Preexisting chronic kidney disease does not affect mortality or reintervention rate after endovascular repair of abdominal aortic aneurysm, although it may increase periprocedural complications.

# ***Outcomes of Primary Percutaneous Coronary Intervention for Acute ST-Segment Elevation Myocardial Infarction in Octogenarians***

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## **Background/ significance:**

Primary percutaneous coronary intervention (PPCI) with goal door-to-balloon time <90 minutes is the choice reperfusion strategy in ST-segment elevation myocardial infarction (STEMI). However, there is little data on outcome for octogenarians undergoing PPCI for acute STEMI.

## **Purpose:**

The aim of this study was to describe clinical characteristics and outcome in patients 80 years of age or older who were treated with PPCI.

## **Methods:**

We identified a cohort of 790 consecutive STEMI patients (69% male, n = 547; median age 61 years, range 23–96) who presented within 12 hours of symptom onset between January 1, 2002 and June 30, 2008. Using a precise cardiac catheterization protocol, PPCI was the choice reperfusion strategy for all patients. In this cohort, we evaluated outcomes of all patients ≥80 years of age for in-hospital survival, major adverse cardiovascular events (MACE) and 1-year mortality.

## **Results:**

Over a period of 6 years, we identified 91 octogenarians (62% women, median age 83 years). Median duration of hospitalization was four days. Technical success rate was 100%. Overall, the frequency of in-hospital death, cardiovascular death, and MACE (composite of recurrent myocardial infarction, post-PPCI cardiogenic shock, heart failure and stroke) were 5.5%, 4.4% and 20.9%, respectively, compared with 5%, 4% and 12.6% in patients <80 years. One-year mortality was particularly high in the octogenarians (24.2%) compared with those <80 years (8%; p < 0.001).

## **Conclusion:**

Our study demonstrates that, although PPCI in contemporary practice may be performed with high technical success in octogenarians, MACE remain higher in this population group. Advanced age and higher burden of pre-existing cardiovascular disease alone may not contribute to this outcome, but may be due in part to physician inertia, as evidenced by a higher door-to-balloon time.



## ***Affect of Monthly Refresher Classes on Resident Code 4 Skills***

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### **Background/ significance:**

It has been stated in literature that the skills necessary to perform during a code event includes not only a firm knowledge of ACLS guidelines, but also effective communication skills, leadership, and the ability to collaborate within a team approach. These skills are shown to be transient and decline rapidly without regular use. Our residency programs at Aurora Health Care follow recommendations from the American Heart Association, providing ACLS renewal every two years. However, no further courses are available to the residents formally in the interim.

### **Purpose:**

The purpose of this study is to evaluate the impact that monthly ACLS refresher classes have on the residents' self evaluation of their performance during in-house cardiac arrest events (code 4).

### **Methods:**

Residents rotating through the Aurora St. Luke's Medical Center adult medicine teaching service were instructed to complete a self-assessment survey immediately post-code 4 for a period of eight months. Survey questions assessed ACLS knowledge, leadership skills, communication skills, collaboration, and were scored from 1 (poor) to 5 (excellent). Monthly refresher classes were instituted at the fourth month and were conducted by the cardiac intensive care unit's clinical nurse specialist and the chief internal medicine resident. This ACLS refresher class included mock codes where a simulation mannequin was utilized to allow residents to re-familiarized themselves with code cart equipment and practice effective communication strategies.

### **Results:**

Compared to pre-course, percentage of post-course self assessment score of 5 increased for ACLS knowledge (% responses of 1–3, 4, 5 pre vs. post; 8, 76, 16 vs. 14.3, 28.6, 57.1, respectively;  $p < 0.02$ ), leadership (58.3, 37.5, 4.2 vs. 28.6, 14.3, 57.1;  $p < 0.02$ ), communication (20.8, 50, 29.2 vs. 14.3, 21.4, 64.3;  $p < 0.10$ ), and collaboration (12, 60, 28 vs. 14.3, 21.4, 64.3;  $p < 0.08$ ).

### **Conclusion:**

Compared to residents on ward months who did not receive a refresher class, those who participated in the class demonstrated significant improvement in the evaluation of their knowledge and leadership. Although no statistical significance was achieved based on the available data, residents who participated in the classes self-reported an overall improvement in their communication and collaboration with auxiliary staff. From our study, introduction of monthly refresher classes at our institution demonstrated an overall improvement in the residents' perception of their ACLS skills.

# Oral Presentation Session II

## *Maximum Lifetime Blood Lead Levels and Attention Deficit/Hyperactivity Disorder Diagnosis in Children*

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**Havlena JA, MS**, *Wisconsin Lead Poisoning Prevention*

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### **Background/ significance:**

Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent, highly familial neurodevelopmental disorder of childhood. Certain environmental factors, including lead, may have important interactions with genotype in the manifestation of this disease. Recent studies have focused on low-level lead exposure.

### **Purpose:**

To investigate the association of lifetime maximum lead level and ADHD diagnosis in an Eastern WI integrated medical system.

### **Methods:**

Maximum lifetime lead levels from a State database were linked to 3,899 matched subjects in a larger dataset of 50,463 primary care clinic children age 5–17 with and without ADHD diagnosis. Street addresses and individual demographic data were geocoded and block group level U.S. Census 2000 data including population density; and household size, ownership and income were linked to subjects. Univariate analysis was performed by chi-square test or Mann-Whitney U test, and multivariate analysis by logistic regression.

### **Results:**

The rate of ADHD diagnosis was 16.6%, compared to 13.5% in the whole dataset, and the percentages of males, and white and black children were similar, however Hispanic children were overrepresented (6.0% vs. 2.3%;  $p = 0.03$ ). All 21 counties with 0.1% or more of the entire study population were represented in this subset; Milwaukee County children represented 30.0%, compared to 23.0% of the whole. The mean and median blood lead levels, respectively, did not differ between children with diagnosis of ADHD and controls (5.37/4.00 vs. 5.17/4.00 micrograms/dL;  $p = 0.3$ ). Among the children with ADHD diagnosis, however, those with a maximum blood lead level of 10 micrograms/dL or more (64/646, 9.9% [23% in Milwaukee County]) differed significantly from controls (230/3,253, 7.1%;  $p = 0.016$ ). Lead levels of 10 micrograms/dL or more remained a significant predictor of ADHD diagnosis ( $p = 0.003$ ) when entered into a binary logistic regression model with other previous predictors: age, gender, race category, median household income and population density.

### **Conclusion:**

Significantly elevated lifetime maximum lead levels were associated with ADHD diagnosis in a subset of Southeastern Wisconsin children, consistent with older literature.

# ***Utility of Colonoscopy in Patients Undergoing Evaluation for Solid Organ Transplantation***

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**Leo J, MD**, *Department of Internal Medicine, Aurora Sinai Medical Center*

**Prasad R, MD**, *Aurora Sinai Medical Center*

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**Guda N, MD**, *Department of Gastroenterology, Aurora St. Luke's Medical Center*

## **Background/ significance:**

There is no consensus on screening colonoscopy recommendations before organ transplant.

## **Purpose:**

To establish the incidence of, and identify risk factors associated with, high-risk adenomas in a population undergoing solid organ transplantation evaluation.

## **Methods:**

This is a retrospective analysis of all patients undergoing evaluation for solid organ transplantation (kidney, liver, heart, lung, pancreas) who underwent colonoscopy prior to being presented at organ selection committee from 2006–2008. Data collected were age, sex, type of organ evaluated for transplant, age at colonoscopy, indication for colonoscopy and result of colonoscopy, including endoscopic and pathologic findings. Patients were grouped by the presence or absence of advanced adenoma. Advanced adenomas were defined as villous histology of any size, one tubular adenoma >1 cm, or multiple tubular adenomas of any size. The association with advanced adenomas was evaluated by chi-square for categorical variables and the Student's t test or Mann-Whitney rank sum test for continuous variables.

## **Results:**

350 patients who were evaluated with colonoscopy prior to being presented to the organ selection committee were eligible for this study. The mean age of the cohort was 56 years; 36% were female. 129 patients were evaluated for kidney transplant, 58 for liver, 111 for heart, 23 for lung, and 30 for multiple organs. No cancers were discovered by colonoscopy. There were 53 patients with advanced adenomas (AA), (15%). Those with advanced lesions were more likely to be older (60 versus 55,  $p = 0.007$ ). There was no difference in AA observed by type of organ being evaluated for transplant ( $p = 0.87$ ), sex ( $p = 0.66$ ), indication for colonoscopy as screening ( $p = 1.0$ ), family or personal history of colorectal cancer or polyps ( $p = 0.29$ ), or anemia ( $p = 0.94$ ). AA were less likely to be present when "change in bowel habits" was the indication for colonoscopy ( $p = 0.028$ ). Of those with AA, 55% were found in the proximal colon.

## **Conclusion:**

In a cohort of 350 patients being evaluated for transplant, the incidence of AA on colonoscopy was 15%, however, none had colon cancer. These data support the value of colonoscopy in routine screening for and treatment of advanced adenomas for cancer prevention in this population. However, the likelihood of detecting an asymptomatic colon cancer on pre-transplant colonoscopy is extremely low, suggesting that it may not be necessary to require a patient to undergo screening colonoscopy before being listed for transplant.

## ***Dysrhythmias as Predictors for Implantable Cardioverter Defibrillator Outcome***

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**Segueni A, MD**, Department of Internal Medicine, Aurora Sinai Medical Center will be presenting the following **FOUR** abstracts:

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**Remmouche I, MD**, Department of Internal Medicine, Aurora Sinai Medical Center

**Rahman M, MD**, Department of Cardiology, Aurora Sinai Medical Center

**Mori N, PhD**, Center for Urban Population Health, Aurora Sinai Medical Center

**Bangash A, MD**, Department of Cardiology, Aurora Sinai Medical Center

**Mortada, MD, MD**, Department of Cardiology, Aurora Sinai Medical Center

### **Background/ significance:**

Atrial fibrillation (AF) is associated with significant morbidity and mortality, especially in patients with cardiomyopathy. Patients with an implantable cardioverter defibrillator (ICD) might have the same increased risk of morbidity and mortality when AF is present, especially if AF causes rapid ventricular response and possible inappropriate ICD shocks.

### **Purpose:**

To recognize atrial fibrillation does not necessarily indicate worse outcome for ICD implantation.

### **Methods:**

We reviewed 1,555 consecutive patients ( $66.8 \pm 13.4$  years, 72.7% male) who received an ICD at our institution between Jan. 2007 and June 2009. We divided patients into two groups, those with AF (653) and those without AF (902), and analyzed baseline characteristics, adverse reactions, ICD shocks, readmission, cardiac events, and mortality in each. A subgroup analysis was also completed in which we compared single-lead ICD (144) versus dual or atrial-biventricular ICD (509) in patients with AF.

### **Results:**

The group with pre-existent AF was older ( $71.7 \pm 10$  vs.  $63.3 \pm 14.3$  years,  $p < 0.001$ ), included more males (77% vs. 69.6%,  $p = 0.001$ ) and more Caucasians (88.4% vs. 75.2%,  $p < 0.001$ ), had more patients with hypertension (79.6% vs. 71.4%,  $p < 0.001$ ), heart failure (91.3% vs. 84.3%,  $p < 0.001$ ), and CVA (22.7% vs. 14.4%,  $p < 0.001$ ), and had a longer average length of hospital stay after implantation ( $2.0 \pm 3.2$  vs.  $1.5 \pm 0.95$  days,  $p < 0.001$ ). After median follow-up of 503 days, in-hospital and after-discharge adverse reactions and acute MI, ICD shocks, and in-house mortality were the same in both groups. Out-of-hospital mortality (17.2% vs. 9%,  $p < 0.001$ ) and readmission (38.9% vs. 32.1%,  $p = 0.006$ ) were higher in patients with pre-existent AF, but those differences became insignificant when multivariate analysis was performed, resulting in  $p$  values of 0.66 for out-of-hospital mortality and 0.36 for readmission. In patients with pre-existent AF, the single-lead ICD subgroup had the same outcomes as the dual-lead or biventricular ICD subgroup.

### **Conclusion:**

While comorbidities present in patients with AF can negatively impact outcome after ICD implantation, AF itself is not an independent predictor of worse outcome in patients receiving an ICD.

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- Background/significance:** An implantable cardioverter defibrillator (ICD) has been approved for primary and secondary prevention of sudden cardiac arrest. Yet, outcome after an ICD implantation between the two (primary vs. secondary prevention) is not clear.
- Purpose:** To recognize that whether an ICD is implanted for primary or secondary indications carries no difference in outcome.
- Methods:** We reviewed 1,555 consecutive patients ( $66.8 \pm 13.4$  years, 72.3% male), who received an ICD at our institution between Jan. 2007 and June 2009, and divided them into two groups: Group A, 1,159 patients who received an ICD for primary prevention of sudden cardiac arrest, and Group B, 396 patients who received an ICD for secondary prevention of sudden cardiac arrest. The two groups were compared for occurrence of adverse reactions, cardiac events (acute MI, arrhythmia), hospital readmission, and mortality.
- Results:** Both groups had similar demographics and comorbidities (CAD, history of coronary artery bypass surgery, hypertension, diabetes mellitus, renal failure on dialysis, cerebrovascular accident, and COPD). Group A had more patients with heart failure (95.4% vs. 63.4%,  $p < 0.001$ ), most of which were designated NYHA class III. Median follow-up was 503 days, during which time we found no differences in in-hospital adverse reaction (1.7% vs. 1.5%,  $p = 0.96$ ), out-of-hospital adverse reaction (5.6% vs. 7.6%,  $p = 0.2$ ), in-hospital all-cause mortality (0.7% vs. 1%,  $p = 0.51$ ), out-of-hospital all-cause mortality (12.1% vs. 13.4%,  $p = 0.49$ ), readmission (35.9% vs. 32.1%,  $p = 0.19$ ),  $\leq 30$  days post implant acute myocardial infarction (0.4% vs. 0.5%,  $p = 0.65$ ), and  $> 30$  days post implant acute myocardial infarction (2.1% vs. 1.8%,  $p = 0.37$ ) between Group A and Group B, respectively.
- Conclusion:** Outcome in patients following ICD implantation is the same regardless of whether the indication for implant is primary or secondary prevention of sudden cardiac arrest.



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**Background/  
significance:**

Implantable cardioverter defibrillator (ICD) is indicated in patients with high risk of sudden cardiac arrest. Some of these patients have already experienced ventricular tachycardia (VT) prior to ICD implantation. Should this VT be considered an independent predictor for worse outcomes after ICD implantation?

**Purpose:**

Recognize sustained monomorphic VT is an independent predictor for worse ICD outcomes.

**Methods:**

We reviewed 1,555 consecutive patients (age  $66.8 \pm 13.4$  years, 72.3% male) who received an ICD at our institution between Jan. 2007 and June 2009, and divided them into two groups. Group A: 734 patients with history of VT [non-sustained (NSVT) 608, sustained monomorphic (MMVT) 114, or polymorphic (PMVT) 12] prior to ICD implant, and Group B: 821 patients with no history of VT prior to implant were compared for occurrence of adverse reactions, cardiac events, hospital readmission and mortality. Additional subgroup analyses compared the three aforementioned types of VT.

**Results:**

Group A had more male (75.9% vs. 69.9%,  $p = 0.01$ ), Caucasian (83.9% vs. 77.8%,  $p = 0.003$ ), and prior CAD (69.1% vs. 62.9%,  $p = 0.01$ ) patients than Group B. Other demographics and comorbidities were similar. Median follow-up was 503 days, and there were no differences in in-hospital and out-of-hospital adverse reactions, in-hospital all-cause mortality, readmission, and acute MI post implantation between both groups. However, Group A had higher all-cause mortality (14.3% vs. 10.7,  $p = 0.033$ ), due more to non-cardiac mortality (11.7% vs. 8.5%,  $p = 0.045$ ) than cardiac (2.6% vs. 2.2%,  $p = 0.6$ ). When comparing subgroups of VT, only sustained MMVT was associated with significantly higher mortality (21.9%,  $p = 0.002$ ), also due to non-cardiac causes, compared to NSVT (13.2%) and PMVT (0%). This finding could be related to two major factors found more frequently in the MMVT subgroup: recent ( $\leq$  months) CABG surgery (1.8% vs. 0.5% in the other VT subgroups combined,  $p = 0.004$ ), and use of antiarrhythmic therapy (primarily amiodarone) (49.1% vs. 25%,  $p < 0.001$ ).

**Conclusion:**

Sustained MMVT is an independent predictor of worse outcome after ICD implantation, especially if a patient underwent recent CABG surgery and was on antiarrhythmic therapy.

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<b>Background/ significance:</b>	Implantable cardioverter defibrillator (ICD) implantation has proven superior to amiodarone therapy in preventing sudden cardiac death.
<b>Purpose:</b>	Concomitant use of ICD and amiodarone has not been evaluated, especially in patients with arrhythmia (atrial or ventricular).
<b>Methods:</b>	We reviewed 1,554 consecutive patients who received ICD between January 2007 and June 2009 for primary or secondary prevention of SCD (age $66.8 \pm 13.3$ years, 72.2% male, EF $29.2 \pm 11\%$ ). Of these, 285 patients (18.3%) were receiving amiodarone for cardiac arrhythmia. We divided all patients into three groups: Group I, patients on amiodarone therapy (285 patients), Group II, patients on other antiarrhythmic medications (109 patients), and Group III, patients with no antiarrhythmic therapy (1,161 patients) and compared them for occurrence of adverse reactions, cardiac events (acute MI, arrhythmia), hospital readmission, and mortality. They were followed for a median of 503 days.
<b>Results:</b>	Group I had more males (81.4% vs. 74.3% in Group II and 70.5% in Group III, $p < 0.001$ ). The comorbidities were similar between the three groups, except that Group I had more coronary artery disease (71.9% vs. 56.9% in Group II and 65.1% in Group III, $p = 0.012$ ), and as expected, Group III had less arrhythmia (34.4% vs. 63.9% in Group I and 66.1% in Group II, $p < 0.001$ ). Group I had longer hospital stay ( $2.5 \pm 5.2$ days vs. $1.4 \pm 1.7$ days in Group II and $1.5 \pm 2.3$ days in Group III, $p < 0.001$ ). All three groups had the same rate of adverse reaction from ICD implant (6.7% vs. 3.7% vs. 6.2% in Group I, II, and III, respectively, $p = 0.52$ ), acute MI (2.5% vs. 0% vs. 2.1% in Group I, II, and III, respectively, $p = 0.63$ ), and hospital readmission (38.6% vs. 35.8% vs. 34% in Group I, II, and III, respectively, $p = 0.34$ ). Group I had more mortality (17.2% vs. 11.9% in Group II and 11.3% in Group III, $p = 0.025$ ) due to non-cardiac causes (14% vs. 10% in Group II and 9% in Group III, $p = 0.036$ ).
<b>Conclusion:</b>	Patients with an ICD and concomitant amiodarone therapy had a higher mortality rate, due to non-cardiac causes, compared to patients taking either no antiarrhythmic or antiarrhythmics other than amiodarone.

# ***Prevalence of Lifetime Lead Poisoning Among Young Women Entering Childbearing Years***

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## **Background/ significance:**

Milwaukee has numerous risk factors associated with an increased prevalence of lead poisoning. Not only is this a concern for children, but also pregnant women as adverse obstetrical and pediatric effects are well documented which include spontaneous abortion, preterm labor, preterm birth, elevated blood pressures in pregnancy, low birth weight, impaired extrauterine growth and cognitive performance.

## **Purpose:**

This study investigates the prevalence of lifetime lead poisoning (lead levels of 10 micrograms/dL or more) in girls entering reproductive age and the associations with various risk factors.

## **Methods:**

Secondary analysis of historical lead levels in 217 females ages 13–18 from a linked cohort of 3,899 children born 1986–1999 having maximum lifetime lead levels from the State database occurring within the Aurora system (87% capture rates of subjects in both sets; 16 counties represented). Geocoded street address and individual demographic data were linked to block group level U.S. Census 2000 data including population density; and household size, home ownership and income. Comparison was made to the 303 males in this sub-cohort. Univariate analysis was performed by chi-square test, Mann-Whitney U test or regression; and multivariate analysis by logistic or binary regression.

## **Results:**

In Southeastern Wisconsin, the proportion of adolescent girls (mean age 14.7 years) with history of lead poisoning was 11.5%, compared to 12.9% in males ( $p = 0.7$ ). The mean and median lifetime lead levels also did not vary between girls and boys (mean  $5.7 \pm 4.1$ /median 5.0 vs.  $5.7 \pm 4.3/4.0$ ), but were above current national averages for both sexes. Lower linked median household income was significantly associated with lead levels of 10 or greater (\$27,201 vs. \$43,923;  $p = 0.000$ ). Milwaukee County represented 50 % of the girls; the prevalence of lifetime lead poisoning in this subset was 18.4%. In a binary regression model, female lead poisoning was significantly associated only with lower linked median household income in Southeastern Wisconsin ( $p = 0.000$ ) and in the Milwaukee County subset ( $p = 0.001$ ).

## **Conclusion:**

The prevalence of lifetime lead poisoning in Southeastern Wisconsin females entering childbearing age is significant, and associated with lower neighborhood median household income. Prospective prevalence and intervention studies of pregnant women and lead toxicity in Milwaukee hospitals are warranted.

# Oral Presentation Session III

## ***Aberrant Fetal Growth and Mortality (Early, Late, and Postneonatal): An Analysis of Milwaukee Births, 1996–2007***

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### **Background/ significance:**

Birth weight (BW) < 10% for gestational age (GA), small for gestational age (SGA) and of at least 4,500 grams (Boulet et al) are linked with perinatal mortality. We wanted to ascertain if LGA (BW > 90% for GA) and SGA influence early (<7; E), late (7–28; L) and postneonatal mortality (death during 29–365 days/1,000 live births; PN) rates.

### **Purpose:**

The three objectives of this study were to: 1) examine the association between aberrant growth and 3 types of mortality; 2) ascertain temporal trends for 12 years, and; 3) identify risk factors linked with E, L, and PN mortality.

### **Methods:**

Birth vital data for the City of Milwaukee, Wisconsin from 1996–2007 were obtained from the City of Milwaukee Health Department. Inclusion criteria were singleton, non-anomalous, live births. We excluded mothers who live outside Milwaukee City, gestational age <24 weeks, implausible BW (Alexander et al 1996), and unknown time of death. The outcome of interest was E, L and PN mortality (dead vs. alive). Multivariate logistic regression analyses were performed to examine the association between fetal growth and 3 types of mortality, adjusted for 19 potential confounding variables. Results of the multivariate logistic regression are presented as odds ratios (OR) and 95% confidence intervals (CI). All data are presented for E, L, and PN, in respective order.

### **Results:**

(93%) met inclusion criteria. While 11% of the newborns were SGA (n = 13,601), 7% (8,957) were LGA and the remaining 82% (100,825), AGA. Overall, the mortality rates were 1.3, 0.9, and 3.5 for E, L, and PN, respectively. For SGA the corresponding rates were 3.9, 2.0, 5.1; for AGA 1.0, 0.8, 3.4, and; for LGA 0.8, 0.3, 1.6. The overall 3-year moving average mortality, as well as mortality for LGA, AGA and SGA did not change significantly from 1996–1998 to 2005–2007 (p = 0.86, 0.35, 0.94, 0.95).

Multivariate analysis indicated that only 5 factors were statistically significantly (p < 0.05) associated with E, L and PN mortality: 1) preterm birth ; 2) no father on record; 3) hydramnios/oligohydramnios; 4) cesarean delivery, and 5) abnormal condition of newborn at birth.

### **Conclusion:**

Maternal demographics, social habits and obstetric complications variably influence early, late and postneonatal mortality. If other investigators confirm these findings, clinicians managing mothers and neonates can undertake measures to rectify the mortality.

# ***Effectiveness of a Single Session of High-Velocity-Low-Amplitude Thrust Manipulations Performed by Physical Therapists for Individuals with Mechanical Neck Pain: A Systematic Review and Meta-Analysis***

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## **Background/ significance:**

Neck pain is estimated to occur in 70% of the population within their lifetime and women have a higher prevalence than men. Neck pain can account for up to 25% of all outpatient visits for physical therapy. A variety of interventions including thrust manipulations can be used to treat neck pain. Several systematic reviews evaluating the effectiveness of spinal manipulation have been published, however, none to date, have specifically reviewed the effectiveness manipulations performed by Physical Therapists (PTs).

## **Purpose:**

Complete a systematic review of the literature to evaluate the effectiveness of a single session of cervical or thoracic high-velocity low-amplitude(HVLA)thrust manipulations performed by PTs for individuals with mechanical neck pain (MNP).

## **Methods:**

A comprehensive literature search for randomized controlled trials (RCTs) across multiple databases was conducted prior to August 2009. RCTs were selected if they were published in a peer-reviewed English language journal, contained subjects with MNP, reported results of a single session of cervical or thoracic region HVLA manipulations and had all interventions performed by a clinician credentialed as a PT. Articles also had to include a detailed description and/or photograph of the HVLA technique used as the intervention and reports at least one outcome measure.

## **Results:**

Six RCTs met the inclusion criteria and all favored manipulations for treatment. Evidence was analyzed based on the region that the HVLA manipulations were performed to (cervical or thoracic), then sorted by dosage (single versus multiple levels manipulated) or outcome measure used. A meta-analysis proved manipulation was an effective intervention to reduce pain (standardized mean difference -1.09; 95% confidence interval -1.42 to -0.75;  $p < 0.00001$ ). For dosage, evidence supported use of single level cervical or multi-level thoracic region thrust manipulations within a single treatment session. Other outcomes had significant and clinically relevant results as well.

## **Conclusion:**

Reduced pain intensity scores were the most common outcome measure cited in the 6 RCTs. Manipulations performed by PTs produced short term clinically relevant results, with no adverse effects noted and was superior to sham or placebo interventions. Other outcomes measures related to range of motion and disability rating showed significance and other positive changes but pain reduction was the most impressive result found.



# ***Clinical Outcome of Endovascular Versus Open Repair of Abdominal Aortic Aneurysm: A Single-Center Experience***

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## **Background/ significance:**

Endovascular repair (EVR) of abdominal aortic aneurysm (AAA) is an alternative to open surgical repair in anatomically suitable candidates.

## **Purpose:**

To assess clinical outcomes of endovascular repair of abdominal aortic aneurysm as compared to open surgical repair.

## **Methods:**

Between February 2003 and February 2009, 227 consecutive patients underwent elective EVR of AAA, while 109 consecutive patients underwent elective open repair of AAA. We retrospectively compared clinical outcomes in these two groups.

## **Results:**

Patients in the EVR group were older with higher Euroscores. There were no other statistically significant differences in baseline characteristics. Median follow-up was 16 months. All-cause mortality at 30 days was lower in the EVR group (0.4% vs. 8.3%,  $p < 0.001$ ). Beyond 30 days up until 16 months post repair, all-cause mortality was similar in both groups (2.2% vs. 0.0%,  $p = 0.179$ ) and there were no aneurysm-related deaths. There was no difference in re-intervention rate (2.6% vs. 0.0%,  $p = 0.183$ ). Need for blood transfusion, acute renal failure, perioperative MI, mesenteric ischemia, and bowel obstruction were higher in the open repair group. Type 2 endoleak occurred in 5.3% of the EVR group patients. Length of hospital stay was shorter in the EVR group (2 days vs. 7 days,  $p < 0.001$ ). More patients were discharged directly home in the EVR group (93.4% vs. 73.4%,  $p < 0.001$ ).

## **Conclusion:**

Compared to open repair, endovascular repair of abdominal aortic aneurysm is associated with lower short-term mortality and morbidity, shorter length of hospital stay, and greater likelihood of discharge directly home.

## ***Unoperated Patients with Severe Symptomatic Aortic Stenosis***

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### **Background/ significance:**

Limited data is available for patients with symptomatic severe aortic stenosis (AS) who do not undergo aortic valve replacement (AVR).

### **Purpose:**

We examined why symptomatic patients with severe AS did not undergo AVR.

### **Methods:**

We reviewed Aurora St. Luke's Medical Center's echocardiography database and identified all adult patients with evidence of severe AS (defined as valve area of <1.0 cm<sup>2</sup>) documented between January 1, 2006 and December 31, 2008. Medical records were reviewed for demographic and clinical characteristics and diagnostic procedures. If AVR was not performed, records were reviewed to determine the reason. Anticipated operative risk for patients who did not undergo AVR was calculated using the logistic EuroSCORE.

### **Results:**

Between January 2006 and December 2008, 448 patients had severe AS on echocardiogram. Of these, 115 patients (26%; median age 74 years) underwent AVR. The 333 unoperated patients included 272 patients (82%) over the age of 75 years (median age 84) and 200 patients (60%) who were symptomatic with AS; 308 (92.5%) had multiple comorbidities; 91 (27%) had undergone previous coronary artery bypass grafting; 132 (40%) had heart failure; 46 (14%) had angina pectoris alone; while 30 (9%) had syncope or presyncope (table). For the unoperated patients, median logistic EuroSCORE (mortality %) was significantly lower among asymptomatic than symptomatic patients (33.1% vs. 67.5%,  $p < 0.001$ ). Among asymptomatic patients, the most common reason for not operating was asymptomatic status (90%), while age alone (43%), age and multiple comorbid conditions (50%), and patient refusal (4%) were also cited as reasons for not operating. In another 3%, no reason was cited at all. At a median follow-up of 13 months, only 174 of the 333 (52%) unoperated patients were alive.

### **Conclusion:**

Surgery was denied in 60% of patients with severe, symptomatic AS. Older age and multiple comorbidities were the most often cited characteristics of patients denied surgery.

## *Prognostic Implications of Low-Level Elevations of Ultra-Sensitive Troponin*

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### **Background/ significance:**

Hospitalized patients are often found to have low-level elevations in ultra-sensitive troponin (UST). The clinician must decide in which clinical scenario this low-level elevation carries prognostic significance to warrant more aggressive work-up and therapies.

### **Purpose:**

This study determined if hospitalized patients with low-level UST elevations (0.06–0.09 ng/ml), with and without concomitant elevations in BNP (>100) and serum creatinine (>1.5), have a worse prognosis at two years when compared to those with a negative UST.

### **Methods:**

Data was collected on 6328 patients admitted to the hospital from Feb. 2007 to Feb. 2008 who had UST levels checked (2809 patients with at least one elevated troponin during the hospitalization, and 3519 patients with only negative UST during the hospitalization). Patients with peak UST > 0.1 ng/ml were excluded from the study. Social Security Death Master File was used to determine two-year mortality in all studied patients. A multivariate logistic regression analysis was used to obtain adjusted odds ratios to evaluate the risk of UST, BNP and creatinine elevations while adjusting for age and gender differences between the groups.

### **Results:**

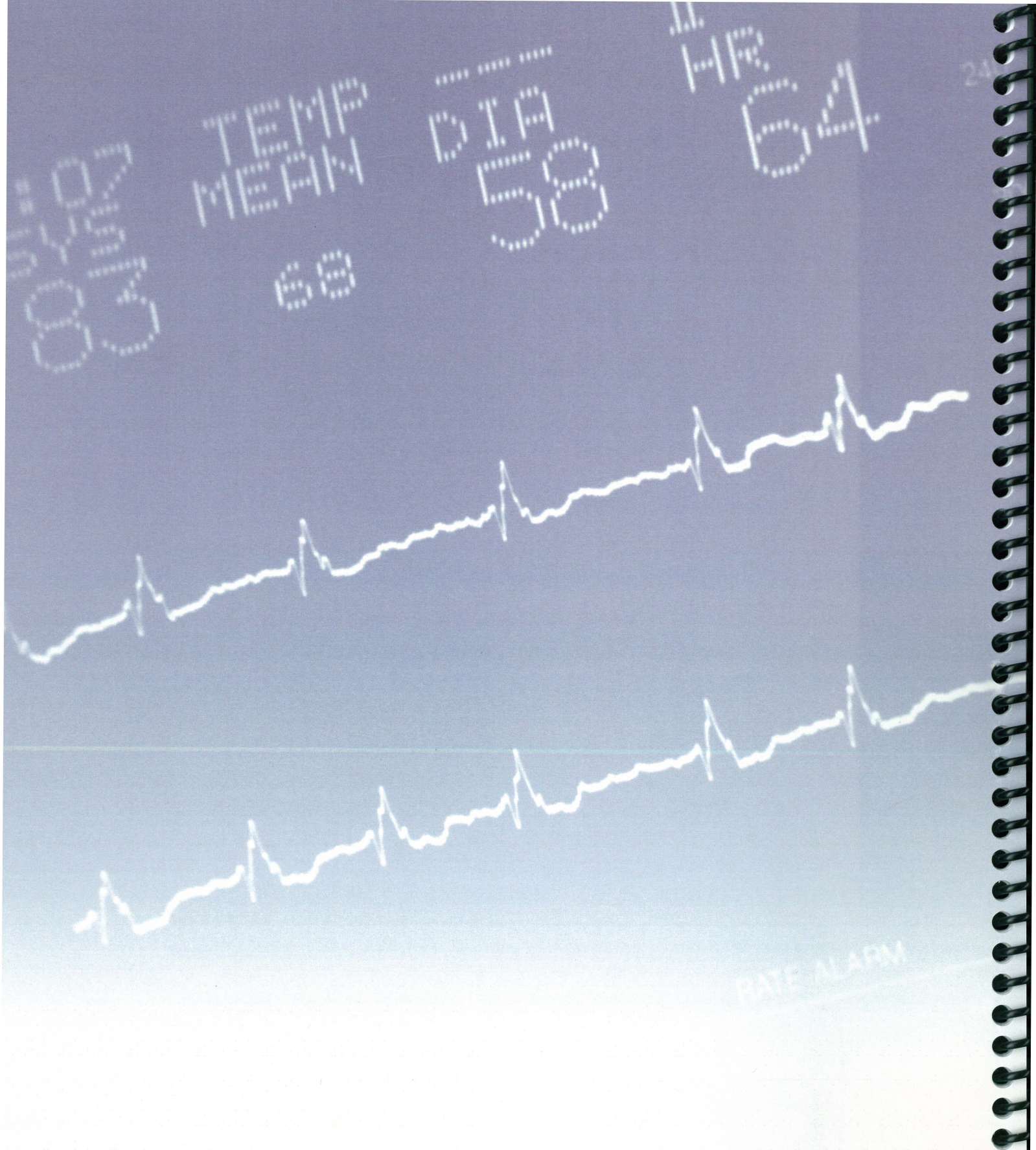
When looking at UST and creatinine, the control group (negative UST and creatinine <1.5) had a two-year mortality of 18.8% (451/2405). Two-year mortality was significantly higher (36.7%, 237/646) in patients with elevated creatinine and negative UST, and increased to 51.8% (115/228) for the population with elevations in both UST and creatinine ( $p < 0.001$  for all). Adjustment for age and gender differences in these three groups was performed, and found that the odds ratio (OR) for the group with elevated creatinine and no UST elevation was 2.51 (2.08–3.04), while the OR for the group with elevated creatinine and UST 0.06–0.09 was 4.66 (3.51–6.18), when compared to the control group ( $p < 0.001$  for all).

When looking at UST and BNP, the control group (negative UST) had a two-year mortality of 22% (775/3318). Patients with low-level UST elevation and BNP < 100 had a two-year mortality of 30.6% (70/229), and patients with low-level UST elevations and BNP > 100 had a two-year mortality of 45.5% (180/396) with  $p < 0.001$  for all. Adjustments for age, gender, and creatinine level were performed. The OR for the group with low-level UST elevation and BNP < 100 was 1.42 (1.05–1.92) with  $p = 0.022$ , while the OR for low-level UST elevations and BNP > 100 was 2.36 (1.89–2.95) with  $p < 0.001$  when compared to the control group.

### **Conclusion:**

Low-level UST elevation in hospitalized patients imparts a significantly worse prognosis at two years, especially if the BNP level is >100, and even when there is concomitant elevated creatinine.





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