

**MSRD**

Medical Student Research Day

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**JOHNS HOPKINS**  
M E D I C I N E

**ABSTRACT BOOK**

01.05.2011

**We are pleased to welcome you to the 3<sup>rd</sup> annual Medical Student Research Day of the Johns Hopkins University School of Medicine. Our mission is to provide a forum for students to present and discuss their scholarly endeavors, and foster further collaboration between students and faculty.**

## SCHEDULE

11 – 2	MSRD Poster Session	1 <sup>st</sup> *
2 – 4	Podium Presentations	1 <sup>st</sup> floor lecture hall
	Scholarly Concentrations Poster Session	2 <sup>nd</sup> and 3 <sup>rd</sup> floors
4 – 4:30	Keynote Address: Dr. Henry Brem	1 <sup>st</sup> floor lecture hall
4:30	Reception	

\*All students **other** than 2<sup>nd</sup> years will be judged between 11 AM and 1 PM.  
2<sup>nd</sup> years will be judged between 1 and 2 PM.

*Food will be served at all levels from 11 AM to 2 PM.*

*Please join us at 4:30 PM on the 4<sup>th</sup> floor for dessert and coffee.*

## **Keynote Speaker: Professor Henry Brem, MD**

Dr. Henry Brem is the Harvey Cushing Professor of Neurosurgery and Chairman of the Department of Neurosurgery at the Johns Hopkins Hospital. Dr. Brem, who also holds appointments in Oncology and Ophthalmology, is a world renowned expert in the surgical treatment of pituitary tumors, meningiomas, gliomas, acoustic neuromas, skull base tumors and other solid brain tumors.

Dr. Brem is also the director of the Hunterian Neurosurgical Research Laboratory and he has pioneered new treatments for brain tumors, including the direct delivery of chemotherapy to the brain, anti-angiogenesis therapies and the development of new computer navigation systems used during surgeries.

Dr. Brem graduated with Honors from Harvard Medical School in 1978, and then completed a residency in neurosurgery at Columbia University. He did a fellowship in neurosurgery and ophthalmology at Johns Hopkins and then joined the faculty in 1984. He rapidly rose to the rank of full professor and helped build one of the leading Brain Tumor Centers in the United States. In 2000, he was appointed the Harvey Cushing Professor, Neurosurgeon-in-Chief and Chairman of the Department of Neurosurgery.

**FACULTY JUDGES**

Janet Serwint, M.D.

*Professor of Pediatrics*

Lorraine Racusen, M.D.

*Professor of Pathology*

Thomas Koenig, M.D.

*Associate Dean of Student Affairs*

*Assistant Professor of Psychiatry*

*and Behavioral Sciences*

Roy Ziegelstein, M.D.

*Executive Vice-Chairman,*

*Department of Medicine*

*Professor of Medicine*

Craig Hendrix, M.D.

*Professor of Medicine*

Adam Hartman, M.D.

*Assistant Professor of Neurology*

Andrew Cameron, M.D., Ph.D.

*Surgical Director of Liver Transplantation*

*Assistant Professor of Surgery*

Arjun Chanmugam, M.D., MBA

*Associate Professor of Emergency*

*Medicine*

David Kass, M.D.

*Professor of Medicine*

*Abraham & Virginia Weiss Professor*

*of Cardiology*

Lawrence Nogee, M.D.

*Professor of Pediatrics*

Jon Lorsch, Ph.D.

*Professor of Biophysics and  
Biophysical Chemistry*

Khalil Ghanem, M.D.

*Assistant Professor of Medicine*

Michael Choi, M.D.

*Professor of Medicine*

Charles Flexner, M.D.

*Professor of Medicine*

Peter Maloney, Ph.D.

*Associate Dean of Graduate  
Student Affairs*

*Professor of Physiology*

Leisha Emens, M.D., Ph.D.

*Associate Professor of Oncology*

Albert Jun, M.D., Ph.D.

*Associate Professor of  
Ophthalmology*

Thomas Traill, M.D., FRCP

*Professor of Medicine*

Ahmet Hoke, M.D., Ph.D.

*Professor of Neurology*

## Schedule of Podium Presentations

2:00	Scott Parker, MS IV <i>Preoperative grading scale to predict survival in patients undergoing resection of malignant primary osseous spinal neoplasms</i>
2:10	Brett Wanamaker, MS II <i>Detecting Delirium in the Post-Anesthesia Recovery Room: Diagnostic Characteristics of Screening Instruments in Elderly Patients</i>
2:20	Tom Heflin, MS II <i>The Access Partnership (TAP) Permanently Grounds Emergency Department "Frequent Flyers"</i>
2:30	Sarah Wallace, MS II <i>Global health in conflict: Deconstructing opposition to vitamin A supplementation in modern India</i>
2:40	Daria Nikolaeva, MS II <i>Unstimulated Primary CD4+ T Cells from HIV Type 1 Positive Elite Suppressors are Fully Susceptible to HIV-1 Entry and Productive Infection</i>
2:50	Richa Gupta, MS II <i>A Feasibility Study of Combination Therapy with Trastuzumab (T), Cyclophosphamide (CY), and an Allogeneic GM-CSF-secreting Breast Tumor Vaccine for the Treatment of HER-2+ Metastatic Breast Cancer</i>
3:00	Andrea Christman, MD, PhD candidate <i>Hyperglycemia Does Not Add to Diabetes Status in Predicting Cognitive Decline: Results from the Atherosclerosis Risk in Communities (ARIC) Study</i>
3:10	YaoYao Guan, MS II <i>HPV DNA testing from self-collected vs. clinician-collected swabs: relative acceptability, preference and accuracy of HPV DNA collection</i>
3:20	Ian Hsu, MS II <i>Providing Support to Patients in Emotional Encounters: Recognizing Opportunities for Empathy and Problem-Solving</i>
3:30	Alexander Harding, MS II <i>Using limes and synthetic psoralens to enhance solar disinfection of water (SODIS): A laboratory evaluation with mouse norovirus, E. coli, and MS2</i>
3:40	Ravi Pandit, MS II <i>The Impact of Electronic Health Record (EHR) Transition on Outpatient Ophthalmology</i>

**Poster Presenters**

*Listed by assigned poster number*

1	Heather Lyu	13	Eric A. JohnBull	25	Heather Chalfin	37	Steven Menez
2	Brian Goldner	14	Ralph Passarella	26	Risheng Xu	38	John Pang
3	Trang M . Vu	15	Eric Mills	27	HeeWon Lee	39	Matthew Huddle
4	Worawan Limpitikul	16	Jason Solus	28	Jessica Yang	40	Eric Momin
5	Minghao Liu	17	Rajesh Babu Sekar	29	Yasmin Zerhouni	41	Ani Ramesh
6	Yuen-Ting Kwong	18	Rwo-Wen Huang	30	Camilo A. Molina	42	Megan Rybarczyk
7	Priya Mathews	19	Courtney Pendleton	31	Kurun Oberoi	43	Dianna Liu
8	Atul Nakhasi	20	Daniel Zabransky	32	Mona Rezapour	44	Hormuzdiyar Dasenbrock
9	Carmel Mercado	21	Jacob Ruzevick	33	Kelly Sloane	45	Haoming Qiu
10	Jonathan Dudley	22	Peter McCaffrey	34	Neal Bhutiani	46	Katherine Y. Fan
11	Eben Clattenburg	23	Rohan Joshi	35	Euphemia Mu		
12	David Liu	24	Nathan Skelley	36	Jason Liebowitz		



## PODIUM PRESENTATIONS

**Scott Parker, MS4**  
Neurosurgery

### **Preoperative grading scale to predict survival in patients undergoing resection of malignant primary osseous spinal neoplasms**

**Objective:** Using a 30-year U.S. national cancer registry, we introduce a novel grading scale that predicts survival in patients undergoing surgical resection for malignant primary osseous spinal neoplasms.

**Background:** Malignant primary osseous spinal neoplasms are aggressive tumors which remain associated with poor outcomes despite aggressive multidisciplinary treatment measures. To date, prognosis is based upon small single center series and controlled trials. Large population-based observational studies of malignant primary osseous spinal neoplasms are lacking and are necessary for sufficient power to determine histology specific prognostic factors.

**Methods:** The Surveillance, Epidemiology, and End Results (SEER) registry was queried to identify patients undergoing surgical resection of histologically confirmed primary spinal chordoma, chondrosarcoma, or osteosarcoma. Variables independently associated with survival were determined via Cox proportional-hazards regression analysis for all tumor types. A grading scale comprised of these independent survival predictors was then developed and applied to each histology specific tumor cohort.

**Results:** 342 patients were identified that underwent surgical resection of a malignant primary osseous spinal neoplasms (114 chordoma, 156 chondrosarcoma, 72 osteosarcoma). Overall median survival after surgical resection was histology specific (osteosarcoma: 22mo; chordoma: 100mo; chondrosarcoma: 160mo). Increasing age and increasing tumor extension were the only variables independently associated with decreased survival ( $p < 0.05$ ) for all tumor types. Utilizing variables of patient age, extent of local tumor invasion, and metastasis status in a five-point grading scale, increasing score (1-5) closely correlated ( $p < 0.001$ ) with decreased survival for chordoma, chondrosarcoma, and osteosarcoma.

**Conclusion:** In our analysis of a U.S. population based cancer registry, a grading scale consisting of age, metastasis status, and extent of local tumor invasion was highly predictive of overall survival after surgical resection of chordoma, chondrosarcoma, and osteosarcoma of the spine. This grading scale may offer valuable prognostic data to the surgeon and patient based on variables available prior to surgery and may help guide level of aggressiveness in subsequent treatment strategies.

## PODIUM PRESENTATIONS

**Brett Wanamaker, MS2**

Pulmonary & Critical Care, Anesthesia, and Psychiatry

**Detecting Delirium in the Post-Anesthesia Recovery Room: Diagnostic Characteristics of Screening Instruments in Elderly Patients**

**Objective:** To evaluate the diagnostic test characteristics of two screening instruments for the detection of delirium in elderly patients in the post-anesthesia recovery room.

**Background:** Delirium occurs in up to 45% of elderly patients in the post-anesthesia recovery room. Of these, 75% also have delirium later in their post-operative hospital stay. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Nursing Delirium Scale (NuDESC) are two screening instruments for detecting delirium in the ICU. These instruments have been considered for use in the recovery room, but not rigorously validated in this setting.

**Methods:** IRB approval was granted to evaluate consenting patients  $\geq 70$  years old who received general anesthesia for any type of surgery at the Johns Hopkins Bayview Hospital. After patients reached an Aldrete score  $\geq 8$  in the recovery room, the NuDESC, CAM-ICU, and a neuropsychiatric “gold standard” evaluation for delirium (using DSM-IV criteria) were performed. Each assessment was conducted independently by trained research staff, blinded to the outcome of the other evaluations.

**Results:** Between July 1 and August 31, 2010, 91 subjects received a neuropsychiatric evaluation with 91 also receiving NuDESC and 89 receiving CAM-ICU assessments. The prevalence of delirium was 45%. CAM-ICU’s sensitivity and specificity were 28% (95% confidence interval: 17-44%) and 98% (90-100%) respectively. The respective positive and negative predictive values (PPV, NPV) were 92% (60-100%) and 64% (52-74%). NuDESC’s sensitivity, specificity, PPV and NPV were 32% (20-47%), 92% (81-97%), 76% (50-92%), and 62% (50-73%), respectively.

**Conclusion:** Almost half of elderly patients undergoing surgery with general anesthesia experienced delirium in the recovery room. ICU delirium screening instruments had poor sensitivity, but good specificity in this patient population. Revision of existing delirium instruments or development of new screening tools is needed to accurately detect delirium in the recovery room.

## PODIUM PRESENTATIONS

**Tom Heflin, MS2**

Johns Hopkins School of Public Health

### **The Access Partnership (TAP) Permanently Grounds Emergency Department “Frequent Flyers”**

**Objective:** It is hypothesized that the TAP program reduces the barriers to care faced by uninsured patients.

**Background:** Uninsured residents of East Baltimore have few healthcare options outside of the Emergency Department (ED). The Access Partnership (TAP) of the Johns Hopkins Department of Medicine provides and facilitates access to specialty care for uninsured residents by coordinating financially expedient healthcare with aggressive follow-up. This study explores the extent to which the TAP program has increased specialty care access and healthcare satisfaction while decreasing appointment no-shows and ED use among uninsured residents with more than 5 ED visits/year, commonly known as “frequent flyers.”

**Methods:** 138 TAP participants were surveyed by phone. The oral questionnaire consisted of 31 variables that examined pre/post-TAP healthcare satisfaction, ability to see a specialist, & ED visits. The participants were screened using self-reported admission data to Johns Hopkins Hospital and Johns Hopkins Bayview EDs to identify 21 individuals with  $\geq 5$  ED visits in the year before TAP enrollment. We then compared this subpopulation’s pre and post-TAP enrollment data for Hopkins ED admissions, specialty appointment referral rates, referral attendance rates, and satisfaction with healthcare.

**Results:** Specialty appointment referral rates differed in the pre and post-TAP enrollment; 47.6% received  $\geq 1$  referral pre-TAP versus 95.2% post-TAP. Specialty referral attendance rates also improved; 18% pre-TAP versus 100% post-TAP. Self reported healthcare satisfaction increased as well; 33% were mostly or completely satisfied pre-TAP versus 86% post-TAP ( $p < 0.001$ ). Finally, rates of ED use dropped significantly; 0.56 visits/month pre-TAP versus 0.24 visits/month post-TAP ( $p < 0.001$ ).

**Conclusion:** The survey results show that the Access Partnership improves specialty care access and attendance rates, and significantly improves healthcare satisfaction and rates of ED use in high traffic, uninsured ED users. Evaluation of long-term effects of TAP is needed. Continuation and expansion of the program for this subpopulation seems prudent according to the preliminary results.

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## PODIUM PRESENTATIONS

**Sarah Wallace, MS2**

Institute of the History of Medicine

### **Global health in conflict: Deconstructing opposition to vitamin A supplementation in modern India**

**Objective:** This historical project analyzes the complex set of interests shaping India's response to the international movement to include vitamin A supplementation (VAS) among basic health services for children.

**Background:** VAS is a public health intervention that clinical trials conducted by Johns Hopkins investigators have suggested can significantly improve child survival in the developing world. WHO claims that one high-dose capsule of vitamin A costing just two cents per child can reduce overall mortality by 23%. However, prominent nutritionists in India have consistently questioned VAS's scientific validity, opposed its implementation, and accused its advocates of corruption and greed. Ironically, these same Indian opponents were among the pioneers of population-wide VAS for ocular health in the 1970's, a revolution that paved the way for modern programs.

**Methods:** Historical sources, including oral interviews, scientific articles, popular press accounts, and court documents relevant to the debate were collected and analyzed for content, evidence used, style, tone, word choice, and themes. Other historically significant public health resistance movements in India were surveyed. A rich secondary literature was employed to put opposition to VAS in its historical and scholarly context.

**Results:** The VAS debate in India represents much more than an isolated disagreement between scientists; at stake is the legitimacy of medicalized public health technologies and evidence-based paradigms. Geopolitics, social and nutritional revolutions in India, and changing international paradigms of global health have all played a role in the anti-VAS movement's construction. Supporting this point, other Indian resistance movements, such as those against BCG and Hib vaccine, were structured around strikingly similar themes.

**Conclusion:** Public health resistance movements are shaped by the cultural and political contexts in which they develop. Armed with knowledge of the social history of a region and patterns of past resistance, public health practitioners can better understand how to negotiate conflicts in global health.

## PODIUM PRESENTATIONS

**Daria Nikolaeva, MS2**

Pharmacology

### **Unstimulated Primary CD4+ T Cells from HIV Type 1 Positive Elite Suppressors are Fully Susceptible to HIV-1 Entry and Productive Infection**

**Objective:** We address the intrinsic susceptibility of HIV-1 elite controller or suppressor (ES) CD4+ T cell samples to infection.

**Background:** ES are HIV-1-infected individuals who maintain viral loads below the detection limit of commercial assays without antiretroviral therapy. The mechanisms behind this remarkable control are under intense study. Previous in vitro analysis has been confounded by exogenous activation of CD4+ T cells prior to infection. In order to avoid changes in chemokine receptor expression, we infected purified CD4+ T cells directly after isolation from the peripheral blood of ES, viremic patients, and uninfected donors.

**Methods:** We utilized a GFP-expressing proviral construct pseudotyped with CCR5-tropic or CXCR4 tropic envelope to compare viral entry of unstimulated primary CD4+ T cells using a Fluorescence Resonance Energy Transfer (FRET) based, single round virus-cell fusion assay. The frequency of productive infection was also compared by assessing GFP expression. CCR5 and activation marker analysis was performed by flow cytometry.

**Results:** CD4+ T cells from ES were equally or more susceptible to HIV-1 entry and productive infection than cells from viremic patients and uninfected donors. In addition, there was no significant difference in the levels of CCR5 expression on the surface of CD4+ T cells from ES as compared to uninfected donors or viremic patients.

**Conclusion:** This is the first study to compare the rate of infection of unstimulated primary CD4+ T cells in patients with different clinical outcomes. The finding that CD4+ T cells from some ES are as susceptible to infection as those from viremic patients implies that inherent differences in primary CD4+ cells cannot explain elite control of HIV-1 infection and, as such, it may be possible to develop effective therapeutic vaccines or therapies based on HIV-1-specific immune responses.

## PODIUM PRESENTATIONS

**Richa Gupta, MS2**

Department of Oncology, Johns Hopkins University School of Medicine

### **A Feasibility Study of Combination Therapy with Trastuzumab (T), Cyclophosphamide (CY), and an Allogeneic GM-CSF-secreting Breast Tumor Vaccine for the Treatment of HER-2<sup>+</sup> Metastatic Breast Cancer**

**Objective and Background:** Granulocyte-macrophage colony-stimulating factor (GM-CSF)-secreting tumor vaccines are bioactive, but limited by disease burdens and immune tolerance. Cyclophosphamide (CY) augments the activity of a GM-CSF-secreting breast tumor vaccine in ER<sup>+</sup> metastatic breast cancer (MBC) patients. HER-2-specific monoclonal antibodies given with GM-CSF-secreting HER-2-targeted vaccination enhance CD8<sup>+</sup> effector T cell function and tumor-free survival in immune tolerant *neu* transgenic mice. Here, we test the hypothesis that CY-modulated vaccination with weekly Trastuzumab (T) can induce clinically-relevant HER-2-specific immunity in HER-2<sup>+</sup> MBC patients.

**Methods:** We conducted a single arm, open label, two-stage feasibility study of CY, an allogeneic HER-2<sup>+</sup> GM-CSF-secreting breast tumor vaccine, and standard T in patients with measurable/evaluable HER-2<sup>+</sup> MBC. Vaccinations were given every 4-6 weeks for 3 cycles, with a 4<sup>th</sup> vaccination given 6-8 months from trial entry. Primary objectives included safety, bioactivity, and clinical benefit rate (CBR=CR+PR+SD). A secondary outcome was delayed type hypersensitivity (DTH) to the MHC Class II HER-2 epitopes p369 and p776. This study has a power of 0.86 to detect a CBR of 0.45 from a null hypothesis rate of 0.20 at an alpha level of 0.08.

**Results:** Twenty patients were vaccinated. 75% received at least 3 vaccinations, and 40% completed all 4 vaccinations. Toxicities were limited to low grade fever, myalgias, injection site reactions, and urticaria. No dose limiting toxicities were observed. The vaccine was bioactive, with serum GM-CSF levels peaking at day 2. The CBRs at 6 months and 1 year were 10/20 (50%, 95% CI:27-73%) and 7/20 (35%, 95%CI:15-59%) respectively. HER-2-specific DTH developed in 7/20 subjects (35%); four (57%, 95% CI:18-90%) of these had a CB.

**Conclusion:** CY-modulated immunotherapy with an allogeneic, HER-2<sup>+</sup> GM-CSF-secreting breast tumor vaccine and weekly T is safe, bioactive, and induces new HER-2-specific DTH in HER-2<sup>+</sup> MBC patients. The 50% CBR at 6 months supports further investigation of CY-modulated vaccination with standard T.

## PODIUM PRESENTATIONS

**Andrea Christman, MD/PhD candidate**  
Epidemiology

### **Hyperglycemia Does Not Add to Diabetes Status in Predicting Cognitive Decline: Results from the Atherosclerosis Risk in Communities (ARIC) Study**

**Objective:** We hypothesized that hyperglycemia, as assessed by glycated hemoglobin (HbA1c), would be positively associated with decline in cognition in persons with and without diabetes.

**Background:** Diabetes is associated with an increased risk of cognitive decline and dementia. It is unclear if hyperglycemia is an independent predictor of cognitive decline in persons with and without diabetes.

**Methods:** Prospective cohort study of 516 participants with and 8,442 without a history of diagnosed diabetes in the ARIC Study. We examined the association of categories of HbA1c (<5.7, 5.7-6.5, ≥6.5% in nondiabetics; <7, 7-8, ≥8% in diabetics) with 6-year change in three measures of cognition: the Digit Symbol Substitution Test (DSST), Delayed Word Recall Test (DWRT), and Word Fluency Test (WFT). Our primary outcomes were the quintile with the most annual cognitive decline for each test.

**Results:** Mean age was 56 years; the participants were 56% female and 21% African American. Mean HbA1c was 5.7% overall, and 8.5% in persons with and 5.5% in persons without diabetes. In adjusted logistic regression models, diagnosed diabetes was associated with cognitive decline only as assessed by DSST (OR 1.42, 95% CI (1.14, 1.75),  $p = 0.002$ ), but HbA1c was not a significant independent predictor of cognitive decline when stratifying by diabetes history (diabetes,  $p$ -trend = 0.320; no diabetes,  $p$ -trend = 0.566). Similarly, trends were not significant for the DWRT or WFT in either the presence or absence of diabetes.

**Conclusion:** Over 6 years of follow-up, we found that hyperglycemia, as measured by HbA1c, did not predict cognitive decline beyond diabetes status in this middle-aged, community-based population. These findings are consistent with recent clinical trial data demonstrating that tight glycemic control does not prevent cognitive decline in diabetes. In conclusion, additional work is needed to identify the non-glycemic risk factors by which diabetes may contribute to cognitive decline.

## PODIUM PRESENTATIONS

### **YaoYao Guan, MS2**

Johns Hopkins University School of Public Health, Cancer Institute & Hospital, Chinese Academy of Medical Science, National Cancer Institute

### **HPV DNA TESTING FROM SELF-COLLECTED VS. CLINICIAN-COLLECTED SWABS: RELATIVE ACCEPTABILITY, PREFERENCE, AND ACCURACY OF HPV DNA COLLECTION**

**Objective:** To assess the relative acceptability, preference, and accuracy of HPV self-collected samples versus clinician-collected samples among women in rural China

**Background:** Cervicovaginal self-collected sampling has been shown to be as sensitive as physician-obtained sampling to detect HR-HPV. The application of self-collection holds great promise for population-based HPV screening, especially in developing countries with a lack of trained practitioners. However, few data exist assessing the acceptability of self-collection in developing countries.

**Methods:** Twenty five hundred patients were randomly selected from the general population in Xiangyuan County, China, to undergo VIA/VILI. All 74 VIA/VILI-positive patients and 100 random VIA/VILI-negative patients were called back for HPV self-collection, HPV clinician-collection, colposcopy exam, and questionnaire session. The questionnaire assessed the patients' preference and general acceptability for testing including trust of the result, comfort, convenience, ability to collect a specimen, and perceived effect of screening. HPV DNA testing was done using Roche HPV Linear Array Test.

**Results:** The acceptability scores for self-collection and clinician-collection were not significantly different on scales measuring comfort and convenience ( $p > 0.05$ ). The scores were significantly lower for self-collection on scales measuring trust of the result, ability to collect specimen, and perceived effects of testing ( $p < 0.01$ ). Of all patients surveyed, 74% preferred clinician to self-collection. Of those who preferred clinician-collection, 86% chose it because they think the results are more accurate. HPV DNA type specific concordance assay between self and clinician-collection showed 64% negative concordance, 19% total type specific concordance, 8% partial type concordance, and 9% complete type discordance.

**Conclusion:** Our results demonstrate that even though self-collection is just as sensitive, comfortable, and convenient as clinician-collection, this sample of women still preferred clinician-collection to self-collection because of a lack of trust in the results of self-collection. This indicates that self-collection is an effective potential method for population-based screening; however, more education about the validity of the self-collection method is needed.



## PODIUM PRESENTATIONS

Ian Hsu, MS2  
Division of GIM

### **Providing Support to Patients in Emotional Encounters: Recognizing Opportunities for Empathy and Problem-Solving**

**Objective:** Our study sought to describe how physicians respond to patient emotions and to examine what influences physician response.

**Background:** Patients frequently express emotions, to which physicians are expected to respond empathically. Yet, many studies have found that physicians often fail to do so.

**Methods:** We conducted a qualitative analysis of 47 audio-recorded encounters between HIV-infected patients and their providers. We first defined empathic opportunities as instances where patients expressed a strong emotional response to a negative situation. We then examined physician response, generated a coding scheme, and applied it to transcripts.

**Results:** Twenty-one of 47 encounters contained at least one empathic opportunity. In these 21 encounters, there were 29 distinct opportunities; 20 involved psychosocial issues (logistical life problems, family strain, or death/illness of loved one), and nine involved the patient's own biomedical concerns. Physicians typically offered more than one type of response to each empathic opportunity. These responses were coded as dismiss/minimize, ignore/change topic, elicit information, problem-solve ("Have you thought about a support group?"), or empathize ("Sorry it's been such a tough month"). Empathic statements occurred in response to 13 of 29 opportunities; problem-solving occurred in 12. Both problem-solving and empathy appeared to be explicit attempts to address the empathic opportunity – problem-solving focused on circumstances surrounding emotion whereas empathy acknowledged emotion itself. When problem-solving was the initial response, empathic statements rarely occurred subsequently. Logistical life problems (e.g. unemployment) and biomedical problems elicited more problem-solving and less empathy, whereas family strain or death/illness tended to elicit more empathy.

**Conclusion:** We found a significant number of missed opportunities to respond empathically to patient emotion. Often physicians missed these opportunities when they were attempting to address the situation by focusing on solving the problem underlying the emotion. With enhanced awareness of patient emotions, clinicians may better recognize situations where they can offer empathy in addition to problem-solving.

## PODIUM PRESENTATIONS

### Alexander Harding, MS2

Center for Water and Health, School of Public Health

### Using limes and synthetic psoralens to enhance solar disinfection of water (SODIS): A laboratory evaluation with mouse norovirus, E. coli, and MS2.

**Objective:** We investigated use of limes and lemons to enhance solar disinfection of water (SODIS) through the activity of psoralens and low pH.

**Background:** Diarrheal illness causes 2.2 million deaths annually. In low-income regions, household water treatment (HWT) has been used to prevent waterborne illness. SODIS is a HWT method that requires exposure of water bottles to sunlight for 6 hours. To make SODIS a more popular HWT method, it is necessary to find ways to reduce the duration of treatment.

**Methods:** We imitated realistic SODIS conditions by using 2L bottles and dechlorinated tap water in solar experiments. SODIS + lime juice bottles contained approximately one-half lime in 2L water. 5-Methoxypsoralen was used as a control for naturally occurring psoralens. Treatment efficacy was evaluated for E. coli, MS2 bacteriophage, and mouse norovirus.

**Results:** E. coli was ablated  $>6.08\log$  by SODIS + lime slurry,  $>5.98\log$  by SODIS + lemon juice, and  $5.59\log$  by SODIS + lime juice in 30-minute solar exposures, compared with  $1.50\log$  for SODIS alone. MS2 was inactivated  $>5.77\log$  by SODIS + lime slurry,  $3.10\log$  by SODIS + lime juice, and  $2.73\log$  by SODIS alone in a 2.5-hour solar exposure. In contrast, mouse norovirus, a surrogate for human norovirus, was highly resistant to all forms of SODIS, with  $<2\log$  reductions in all treatment bottles after a 6-hour solar exposure.

**Conclusion:** Psoralens and acids both interact synergistically with ultraviolet radiation to accelerate inactivation of microbes. A pH of 3.40 appears to account for all inactivation of E. coli, while psoralens appear to play a larger role than pH in inactivating viruses. SODIS + citrus dramatically reduces E. coli levels in just thirty minutes, a treatment time on par with boiling. Furthermore, familiarity with citrus juice may make this method appealing to potential users. The efficacy of SODIS against human norovirus should be investigated further.

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## PODIUM PRESENTATIONS

**Ravi Pandit, MS2**

Wilmer Eye Institute (Glaucoma Division)

### **The Impact of Electronic Health Record (EHR) Transition on Outpatient Ophthalmology**

**Objective:** The goal of this study was to quantify the short-term impact of EHR switch on patients/physician encounters in an outpatient ophthalmology setting.

**Background:** In 2008, less than 1/3 of ophthalmologists were using, implementing, or planning to implement Electronic Health Records (EHR). Starting in 2011, physicians who treat Medicare/Medicaid patients and demonstrate meaningful use of EHR will be eligible for incentive payments. Thus, it is posited that ophthalmology will see a sharp increase in EHR adoption. Despite pending demand, there have been no studies examining the short-term effects of EHR transitions on an ophthalmology subspecialty practice.

**Methods:** We observed patients of the outpatient glaucoma clinic at the Wilmer Eye Institute for 6 weeks during EHR switch. The impact of the EHR was assessed by collecting data during the pre and post-transition periods. A researcher observed 45 and 55 randomly selected pre and post patient encounters, respectively. The nature and timing of the actions of physicians during those encounters were electronically recorded. Seventy-three patients in the pre and 56 patients in the post-implementation phase completed a survey about their perception of care and attitudes regarding EHR after their visit. Patients and physicians were masked to the nature of the study.

**Results:** We found that the average minutes spent with physicians were unchanged (10.8 vs 12.1,  $p = 0.15$ ). However, the nature of that encounter changed dramatically—physicians spent more seconds at the computer (54.69 vs 126.82,  $p = .002$ ), talking while looking at the computer (85.07 vs 122.18,  $p = .032$ ), referring to paperwork (13.04 vs 41.55,  $p = .000$ ), and less time teaching (4.33 vs 1.08,  $p = .048$ ).

**Conclusion:** These results represent an unexpected, hidden shift that was heretofore uncharacterized in ophthalmological literature. Whether these changes persist and how they are perceived by patients/physicians is the subject of our ongoing research and analysis.

## POSTER PRESENTATIONS

### Poster 1

#### Heather Lyu, MS2

Gastroenterology, Department of Internal Medicine, Asan Medical Center, Seoul, South Korea

#### **Genomic Changes in Hepatitis B Virus Closely Associated with the Development of Hepatocellular Carcinoma: a Cohort Study in Patients with Chronic Hepatitis B of Genotype C2**

**Objective:** In this study, we aim to determine the genomic changes in the X, S, basal core promoter (BCP), and precore regions of HBV, and evaluate their role in the development of HCC in Korean patients with CHB of C2 genotype.

**Background:** Individual mutations within the HBV genome have been suggested to play significant roles in the development of Hepatocellular carcinoma (HCC). However, the effects of individual or combined mutations in the HBV genome on the occurrence of HCC are still controversial.

**Methods:** A total of 240 cases of patients diagnosed as CHB were subjected. The median age was 48 years (range, 27-86), and 194 cases (81%) were male. All patients were followed regularly at 3-6 month intervals for a median of 105 months (range, 1 - 237). At every visit, serum biochemistry, AFP, HBV-DNA levels, and HBeAg/anti-HBe as well as imaging studies such as CT or MRI were conducted for all patients. HCC was diagnosed in accordance with AASLD guidelines. The whole X, S, BCP, and precore regions of HBV in their sera or tissues were sequenced using the direct sequencing method.

**Results:** All subjects had HBV of genotype C2 in their sera. Out of 240, 25 (11.6%) had the T1653 and 33 (15.3%) had the V1753 mutation in the X region; 139 (66.5%) had the T1762 and 154 (73.7%) had the A1764 mutation in the BCP region, 50 (23.5%) had the A1896 mutation in the precore region and 67 (27.9%) had pre-S deletions. In our series, HCC occurred in 6 patients (2.6%) eventually. The prevalence of the V1753 mutation in the BCP region of the X gene was significantly higher in patients who developed HCC than in those without HCC. Also, the overall cumulative occurrence rates of HCC were 4.8% and 19.3% at 10 and 15 years, respectively, in patients with the V1753 mutant of HBV, which were significantly higher than 1.3% at both 10 and 15 years in those with the wild type of HBV ( $p < 0.001$ ). Very interestingly, although other individual mutations in the X, S, BCP, and precore regions of HBV did not affect the occurrence of HCC, the T1762/A1764 mutations in the BCP region appeared to have a close association with the occurrence of HCC in cases combined with the V1753 mutation in the X region ( $p = 0.01$ ), the G1896A mutation in the PC region ( $p = 0.02$ ), and the pre-S deletion ( $P = 0.04$ ). Multivariate analysis also revealed that the V1753 mutation is an independent risk factor for HCC development [ $p = 0.033$ , RR (95%CI range) = 11.2 (1.22-103)]. The patient's age also significantly increased the risk of HCC development ( $p = 0.04$ ).

**Conclusion:** The presence of the V1753 mutation in the BCP region of HBV X gene as well as the patient's age significantly increases the risk of HCC development in patients with CHB of genotype C2. Also, the BCP mutation may act in synergy with the V1753 or G1896A mutation, and also with the pre-S deletion to significantly increase the development of HCC in patients with chronic hepatitis B.

## POSTER PRESENTATIONS

### Poster 2

**Brian Goldner, MS2**

Pediatric Infectious Disease

#### **Methicillin-resistant *Staphylococcus aureus* (MRSA) colonization increases risk of subsequent infection in children hospitalized in the pediatric intensive care unit (PICU)**

**Objective:** Objective: To determine the risk of MRSA infection in children admitted to a pediatric intensive care unit.

**Background:** Background: MRSA colonization is a known risk factor for hospital-acquired MRSA (HA-MRSA) infections in adults, with up to 25% of adults colonized with MRSA on hospital admission developing a HA-MRSA infection. However, little is known about the short and long term risk for the development of MRSA infections in hospitalized children colonized with MRSA.

**Methods:** Methods: We followed a prospective cohort study of children admitted for at least two days to the Johns Hopkins Hospital PICU between 3/1/07 to 3/1/10. Nasal swabs were cultured to identify children colonized with MRSA on admission. We conducted a chart review to identify children who subsequently developed clinically significant MRSA infections later during the admission or within the study period.

**Results:** Results: Of 3,620 children admitted, 55.5% were male and the median age was 6 years. Nasal swabs were collected on admission for 3,147 patients (87%). The MRSA admission prevalence of screened children was 6.4%. During the hospitalization, 11 screened children (0.3%) developed a HA-MRSA infection over 31,214 patient days, including 3 of 204 children (1.5%) colonized on admission and 8 of 2,943 children (0.3%) not colonized on admission (RR 5.4; 95% CI 1.7,17.6,  $p < .01$ ). During the entire follow-up period, 46 screened children (1.5%) developed an MRSA infection, including 10 children (4.9%) colonized on admission and 36 children (1.2%) not colonized on admission (RR 3.7; 95% CI 1.9, 7.0,  $p < .001$ ). During the study period, 17 of 1387 children who were in the PICU for >48 hours acquired MRSA colonization. Six of these children (35%) developed a subsequent HA-MRSA infection and 8 (47%) developed a MRSA infection over the follow-up period.

**Conclusion:** Conclusions: Our data suggest that MRSA colonization is a risk factor for subsequent MRSA infection in children admitted to the PICU. Although children may have lower overall risks of infection compared with adults, children who acquire MRSA in the hospital have similarly high rates of infection. As more children are identified as MRSA carriers, interventions are needed to reduce the risk of developing subsequent MRSA infections.

## POSTER PRESENTATIONS

### Poster 3

Trang M . Vu, MS4. Poster 3.

Department of Medicine

#### **Baseline Liver Stiffness Measured by Transient Elastography is Independently Associated with Risk of End-Stage Liver Disease and Death among HIV/HCV Co-infected Adults**

**Objective:** We prospectively assessed the incidence of clinical outcomes according to liver stiffness measurement (LSM) in HIV/HCV co-infected adults. We hypothesized that higher LSMs will correlate with increased risk adverse clinical outcomes, such as end stage liver disease or death.

**Background:** Liver stiffness measured by transient elastography (TE) has been shown to correlate with histologic staging; however, the degree to which liver stiffness measurements predicts clinical outcomes is unknown.

**Methods:** HIV/HCV co-infected adults in the Johns Hopkins HIV clinic underwent LSM and were prospectively observed for clinical outcomes (hepatocellular carcinoma, HCC; end stage liver disease, ESLD; all-cause mortality). LSMs were performed using TE by experienced technicians; clinical outcomes were abstracted from medical records and the National Death Index. The primary endpoint was progression to severe liver disease (HCC, ESLD) or death according to baseline LSM classifications: no fibrosis, < 8.0 kPa; fibrosis, 8.0-12.3 kPa; cirrhosis >12.3 kPa.

**Results:** Between 10/2005 and 9/2009, 293 HIV/HCV co-infected adults underwent LSM and were followed for a median of 1.9 years (interquartile range, IQR, 0.9-2.7 years). Patient characteristics at baseline included: median age, 49.6 years; male, 67.6%; Black, 87.4%; history of injection drug use (IDU), 77.5%; median CD4 cell count, 420/mm<sup>3</sup>; HIV RNA level < 400 copies/ml, 75.2%. Median baseline LSM was 8.3 kPa (IQR 6.1-12.0). 48.8% of participants had no fibrosis, 27.3% had fibrosis and 23.9% had cirrhosis. Incidence rates of HCC, ESLD, or death (per 1000 person-years) varied according to LSM strata (Figure): < 8.0 kPa = 14.9 (95% confidence interval, CI, 5.6-39.8); 8.0-12.3 kPa = 32.6 (13.6-78.4); >12.3 kPa = 75.8 (39.4-145.6). Multivariate analysis and Poisson regression modeling showed LSM >12.3 kPa (incidence rate ratio, IRR: 3.9; 95% CI: 1.1-13.3) and age >50 years old (IRR 4.5; 1.3-15.4) were independently associated with increased incidence of HCC, ESLD, or death, while CD4 cell count >350/mm<sup>3</sup> was protective (IRR 0.1; 0.05-0.5).

**Conclusion:** In HIV/HCV co-infected adults, liver stiffness was independently associated with increased risk of important clinical outcomes, including liver failure and death. These data validate LSM as a prognostic marker and suggest the potential role of LSM for clinical decision making related to treatment and HCC screening.

## POSTER PRESENTATIONS

### Poster 4

Worawan Limpitikul, MD/PhD candidate. Poster 4.

Cardiology

### High Levels of Serum Biomarkers for Inflammation (C-reactive Protein, Interleukin-6) and Myocardial Injury (cardiac Troponin T, myoglobin) Are Strong Predictors for Sudden Cardiac Death.

**Objective:** To assess ability of level of serum biomarkers to predict sudden cardiac death.

**Background:** Yearly, 295,000 Americans suffer from sudden cardiac death (SCD). The most effective therapy for SCD is implantable cardioverter defibrillator (ICD). SCD risk stratification is used to determine whether patients will benefit from ICD. Current guideline for ICD placement is left ventricular ejection fraction (LVEF)  $\leq$  35%. However, accuracy of this risk predictor is low; one third of SCD cases had LVEF  $\leq$  35% at enrollment and within the first 3-5 years, only one third of implanted ICD's actually fired. Considering financial burden and medical complications- psychological trauma from inappropriate firing, risk of defective device, and device's proarrhythmogenicity, more accurate SCD risk predictors need to be developed.

**Methods:** This is a case-control study nested within Prospective Observational Study of ICD (PROSE-ICD) in patients with high risk of SCD. Level of serum biomarkers for (a) inflammation: interleukin (IL)-6, IL-10, tumor necrotic factor- $\alpha$ , C-reactive protein (CRP); (b), myocardial injury: creatinin kinase-MB, cardiac troponin (cTn)-T, cTn-I, myoglobin; and (c) myocardial wall stress: B-type natriuretic peptide, were measured before ICD implantation. Odd ratio of each biomarker was calculated using logistic regression model adjusted for demographics (age, sex) and clinical characteristics (heart failure severity, history of myocardial ischemia).

**Results:** Of 646 subjects, 93 had cardiac events, which are defined as adjudicated cardiac deaths (n=37) and/or appropriate firings of ICD (n=58) (2 cases of unsuccessful cardioconversion which lead to death). Logistic regression showed statistically significant increase in risk of having cardiac events with increasing levels of CRP, IL-6, cTnT, and myoglobin with odd ratios of 1.3, 1.3, 1.2, and 1.5 ( $p < 0.05$ ), respectively. After adjusted for demographics and clinical characteristics, all biomarkers but cTnT maintained strong association with SCD with the same odd ratios.

**Conclusion:** High levels of serum CRP, IL-6, cTnT, and myoglobin are strong predictors for SCD and could be used to determine optimal candidates for ICD implantation.

## POSTER PRESENTATIONS

### Poster 5

Minghao Liu, MS2

Transplantation

#### **Frailty is Associated with Short Term Outcomes after Kidney Transplantation.**

**Objective:** To quantify the relationship between frailty and short-term outcomes of kidney transplantation.

**Background:** Frailty is a phenotype of decreased physiological reserves and lowered resistance to stressors that was originally described and validated in populations of community-dwelling older adults. Because of the accelerated physiologic decline associated with dialysis, we hypothesized that frailty would be detectable in patients with kidney failure, regardless of age. We further hypothesized that frailty would be independently associated with adverse events after kidney transplantation.

**Methods:** In this prospective study of 207 kidney transplant recipients, pre-transplant frailty was measured using previously validated components: weight loss, grip strength, walking speed, physical activity, and exhaustion. Additional information was abstracted from patient records, including pre-transplant factors such as demographics and comorbid conditions, and transplant-related factors such as donor type and age, HLA match, and cold ischemia time. Outcomes included delayed graft function and hospital readmission. A multivariate generalized linear model was used to analyze the association of frailty with these outcomes.

**Results:** Among the study participants, 37.7% were female, 43.1% were African American, and the mean age was 53.7. Frailty prevalence was 21.5%. Frailty was independently associated with an 84% higher rate of delayed graft function (needing dialysis in the first post-operative week), controlling for BMI, race, and transplant-related factors (RR=1.84, 95% CI: 1.04-3.26,  $p = 0.04$ ). Frailty was also associated with a 61% higher rate of readmission in the first month (RR=1.61; 95% CI: 1.04-2.51,  $p = 0.03$ ), controlling for age, BMI, and pre-op co-morbidities (diabetes, stroke, and myocardial infarction).

**Conclusion:** Frailty was independently associated with short term post-operative outcomes such as delayed graft function and readmission. Thus, it may be a valuable evaluation criterion for patients being considered for kidney transplantation.



## POSTER PRESENTATIONS

### Poster 6

Yuen-Ting Kwong, MS2

Johns Hopkins School of Medicine Department of Gynecology & Obstetrics, Johns School of Medicine Department of Radiology

**Sacral Neuromodulation and MRI Safety: A hot topic? An investigation of MRI, sacral neuromodulation, and potential effect on patient safety.**

**Objective:** To assess the effect of magnetic resonance imaging (MRI) on the Interstim® sacral neuromodulator regarding the following American Society for Testing and Materials (ASTM) criteria: displacement force, torque, radio frequency heating, imaging artifact, and basic device functionality.

**Background:** The InterStim® sacral neuromodulation device is indicated for treatment of urinary retention and overactive bladder symptoms. Patients with implanted devices may require subsequent MRI. Currently, MRI is not recommended due to possible risks including mechanical displacement, burn injuries, and electrical malfunction. However, the evidence supporting this claim is lacking.

**Methods:** The InterStimI (model 3023) and InterStimII (model 3058) were studied. Displacement force, torque, imaging artifact, and device functionality were assessed at 3-Tesla. Artifact was assessed using T1-weighted, spin echo and gradient echo pulse sequences. MRI-related heating at 1.5 and 3-Tesla (SAR standardized to 4-W/kg) was evaluated for three different configurations (straight, half-bent, and fully bent) of the device while submerged in a saline gel phantom.

**Results:** At 3-Tesla, the average deflection angle indicative of displacement force was 37° and 17° for the InterStimI and II devices, respectively (safe defined as <45°). Torque was qualitatively categorized as moderate for the InterStimI and mild for the InterStimII. Both devices exhibited temperature elevations >2°C, the upper-limit of safe, in all but one configuration, at 1.5 and 3 Tesla. Furthermore, both devices created sufficient artifact to potentially reduce the ability to accurately interpret radiologic images. After each round of heat testing, both devices demonstrated basic functionality, as they could be returned to “on” position.

**Conclusion:** Although both InterStim devices met the ASTM safety guidelines for displacement force and demonstrated basic functionality during MRI, neither device achieved ASTM standards with regard to torque, heating, and radiologic artifact. This raises concern about the safety of the InterStimI and II sacral neuromodulation devices in an MR environment.

## POSTER PRESENTATIONS

### Poster 7

Priya Mathews, MS2

Gastrointestinal Department of Internal Medicine, Asan Medical Center, Seoul, Korea

#### **Predisposing Factors for Poor Clinical Outcome of Hepatitis B Virus Associated Hepatocellular Carcinoma Following Curative Resection: Focused on the Genomic Changes in Hepatitis B Virus**

**Objective & Background:** It has been reported that several mutations in the hepatitis B virus (HBV) genome are associated with the development of hepatocellular carcinoma (HCC). In this study, we intended to examine whether the genomic changes in HBV can affect the clinical outcomes of HCC in patients with HBV-associated HCC treated with curative surgical resection.

**Methods:** A total of 247 HBV-associated HCC patients treated with curative surgical resection (Age: 55 years [30-74], median [range]; M:F=197:50) were subjected. They were followed regularly for a median of 30 months. HCC was diagnosed in accordance with AASLD guidelines. The whole X, S, basal core promoter (BCP), and precore regions of HBV were sequenced using direct sequencing method.

**Results:** All the subjects had HBV of genotype C2. The genomic changes such as the G1896A at precore, the A1762T/G1764A at BCP, the C1653T and the T1753V at X-gene, and Pre-S2 deletion were not significantly associated with postoperative recurrence of HCC or survival of patients after curative resection. However, in univariate analysis, younger age, elevated serum AFP level, elevated serum ALT level, larger tumor size, microvascular invasion, and higher CLIP stage were closely associated with shorter survival after surgical resection. In multivariate analysis, only microvascular invasion revealed to be an independent risk factor of post-surgical recurrence (RR=5.406;  $p < 0.001$ ); the independent risk factors of shorter survival appeared to be infiltrative type (RR=5.110;  $p=0.032$ ), larger size (RR=1.976;  $p=0.047$ ), and microvascular invasion (RR=6.118;  $p < 0.001$ ).

**Conclusion:** Our data suggest that the postoperative recurrence or survival period may not be affected by the genomic changes at the precore, BCP, X and Pre-S2 regions in HBV of genotype C2 in patients with HBV-associated HCC treated with curative surgical resection, and that it may rather be closely associated with other tumor characteristics such as the size and type of HCC, or microvascular invasion.

## POSTER PRESENTATIONS

### Poster 8

Atul Nakhasi, MS1

Department of Neurology, Johns Hopkins School of Medicine

#### Usability of Self-Administered Computer-Assisted Interviewing for Medical Diagnosis in Acute Care Settings

**Objective:** As a first step toward workflow-sensitive diagnostic decision support, we sought to determine the usability (ease of use, likelihood of error, efficiency of data collection) of our self-administered computer-assisted interviewing system (SACAI) focused on gathering basic chief complaint data from unselected patients in the ED.

**Background:** Misdiagnosis may be frequent in the emergency department (ED). Diagnostic decision support is one potential systems-oriented solution. SACAI gathers reliable clinical data from patients and could facilitate ED diagnostic decision-making.

**Methods:** Cross-sectional study at two urban academic EDs. Convenience sample recruited daily during a six-week period. All adult, non-level I trauma patients were eligible, including those awaiting medical care in the ED. Data on ease, error, and efficiency were gathered both by self-report and direct observation by trained research assistants (RAs). We calculated the time elapsed per question during the SACAI interview. Regression analysis was used to evaluate the impact of demographic factors on ease of use and efficiency.

**Results:** 841 participants completed this portion of the interview. Fewer than 1% of participants rated using a computer to gather medical information as “somewhat hard” or “very hard” and 86% required no assistance to complete the interview. Participant data entry errors were infrequent with a misclick rate for age of 1.92%. Mean SACAI interview time for completion was 5.8 minutes. Participants needing help from others or taking more time per response were older and lacked internet access at home.

**Conclusion:** Participants in the ED were able to interact with a SACAI system, even at a busy, urban ED serving an indigent population. Patients found the system easy to use and the vast majority required no assistance. Demographic factors associated with slower interviews and need for assistance could identify those in need of human support for SACAI during implementation.

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## POSTER PRESENTATIONS

### Poster 9

Carmel Mercado, MS2

Institute of the History of Medicine

#### **Setting the Stage for Kampo in Modern Japanese Society, 1976-present: Different Actors, Varied Motivations, One Goal**

**Objective:** To understand how Kampo medicine became integrated into Japan's current medical system since 1976 by examining the roles of physicians, the pharmaceutical industry, government, and patients.

**Background:** Kampo, Japanese traditional medicine, originally from ancient China, but which developed uniquely in Japan, was the main form of medicine practiced until 1874 when Japan adopted the German model for healthcare and stopped all Kampo-related education and research. However, in the last fifty years, a renaissance in Kampo has occurred. Today, 83.5% of Japanese physicians integrate Kampo into daily practice.

**Methods:** Oral narratives and primary literature were obtained at the Keio University School of Medicine Center for Kampo Medicine. Primary literature included publicity materials from Japan's leading Kampo-manufacturing pharmaceutical company, medical textbooks, educational materials, and Kampo-related scientific journal articles. Data analysis involved the use of two sociological concepts, "boundary objects" and "social re-networking."

**Results:** Physicians have played the main role in advocating for Kampo to be accepted as an official component of the national medical system. The ability to practice Kampo represented their autonomy in the clinic. For the pharmaceutical industry, business incentives fueled company efforts to research and develop Kampo products. For patients, Kampo provides more options for care. The government's relationship with Kampo is more complex: although there is government support for preserving Kampo as a cultural tradition, it is also seen as a costly part of the medical system leading to conflict over integrating Kampo into the Japanese healthcare system. Through the interaction amongst these groups, Kampo underwent conceptual, material, and clinical transformations by being placed within a biomedical framework, and standardizing use in patient care and manufacturing practices.

**Conclusion:** Despite differences in motivation amongst the social groups, the intersection of activity created an environment in which the knowledge of Kampo could spread, allowing for its gradual integration into Japan's medical system.

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## POSTER PRESENTATIONS

### Poster 10

Jonathan Dudley, MS2

Yale University's Interdisciplinary Center for Bioethics

#### **How Life Began Beginning at Conception: Evangelical Christian Thought on Embryos from 1960 to Present**

**Objective:** This presentation critically examines the shift in popular evangelical Christian thought on when moral life begins that took place over the late 1900s and the impact this shift has had on restricting human embryonic stem cell research.

**Background:** Evangelical Christian political organizations such as Focus on the Family, and the evangelical lay people who support them, are among the chief opponents of human embryonic stem cell research in America. Indeed, the restriction on federal funding for human embryonic stem cell research in 2001 was widely credited to the influence of evangelicals on the Bush Administration. Evangelical opponents of such research argue that moral life begins at conception, and thus, human embryonic stem cell research relies on the destruction of human beings. Despite the prevalence of the belief that life begins at conception among lay evangelicals, however, it is relatively recent in Christian history. Indeed, nearly all theologians prior to the mid-1800s believed that life begins when the developing embryo acquires a human form and rudimentary brain activity. This Christian belief was reflected in early American law's allowance of abortion up until the time of "quickening," when the developing fetus is first felt to move in the womb. In the late 1960s, the leading evangelical magazine in America favored looser abortion laws, with contributors arguing that life does not begin until birth. By the mid-1980s, the same magazine was arguing, reflecting the new evangelical consensus, that the embryo has the same moral value as an adult human being. This presentation is based on a chapter from a book I finished this past summer about evangelical Christian political activism on topics involving science. The book began as a thesis I wrote for a master's degree in bioethics at Yale University and is being published by Random House/Doubleday on April 5, 2011.

## POSTER PRESENTATIONS

### Poster 11

**Eben Clattenburg, MS2**

Johns Hopkins Bloomberg School of Public Health.

#### **Unplanned Cigarette Purchases and Tobacco Point of Sale Advertising: A barrier to reducing cigarette smoking**

**Objective:** This study seeks to fill this knowledge gap through post-purchase surveys with the following objectives: assessing the number of individuals making unplanned cigarette purchases and understanding how POS advertising impacts the decision to purchase cigarettes.

**Background:** The US restricted tobacco advertising following the Master Settlement Agreement of 1998, eliminating radio, television, and billboard tobacco advertising. Tobacco companies shifted their advertising efforts to point-of-sale (POS). To date, two non-US studies examined the rate of unplanned tobacco purchases precipitated by tobacco POS advertising.

**Methods:** Post-purchase surveys were administered at two grocery stores in Windsor and Springfield, VT. Individuals who purchased cigarettes were asked to complete a “consumer choices” survey. Measures included intention to purchase cigarettes before entering the store, perceived reason of the unplanned purchase, demographic data, smoking history, and support for tobacco POS ban.

**Results:** The sample (n=301) was composed of 18-76 years old smokers (147 males, 154 females) primarily of White, non-Hispanic descent (94.7%). The response rate was 79%. Most respondents were daily smokers (n=285), smoked more than ten cigarettes per day (n=181), and smoked their first cigarette within one hour of waking (n=284). Of the participants making unplanned purchases (n=34, 11.3%), 76.5% reported that tobacco POS advertising prompted their decision (n=26). Groups making the highest proportion of unplanned purchases include 18-24 year olds (17.2%, p=0.038) along with less than daily smokers (37.5%, p=0.001), smokers planning to quit within the month (23.9%, p=0.007), and smokers quitting 3 or more times in the past year (17.2%, p=0.043). Forty-one percent of respondents did not oppose a POS tobacco advertising ban.

**Conclusion:** POS tobacco advertising prompted the majority of unplanned purchases. Smokers attempting to quit, 18-24 year olds, and less-than-daily smokers made the highest proportion of unplanned purchases. Removing POS tobacco advertising and marketing may help to reduce unplanned purchases, especially among these groups.

## POSTER PRESENTATIONS

### Poster 12

David Liu, MS4

Brady Urological Institute

#### Active Surveillance for Low-Risk Prostate Cancer: A Clinical Decision Analysis

**Objective:** To quantify the comparative effectiveness of active surveillance (AS) vs. immediate radical prostatectomy (RP) for men diagnosed with low-risk prostate cancer.

**Background:** There is significant overdiagnosis and overtreatment of prostate cancer with significant treatment-associated side effects. Thus, active surveillance (monitoring with intervention only on disease progression) is an option for low-risk prostate cancer. However, the comparative effectiveness of active surveillance vs. immediate radical prostatectomy is unknown.

**Methods:** A Monte Carlo simulation using a Markov Model was used to simulate the life course of men diagnosed with low-risk prostate cancer in the modern PSA era when treated with radical prostatectomy or monitored with active surveillance, for varying ages and health statuses. Primary outcomes were quality adjusted life expectancy (QALEs) and a clinical incremental cost effectiveness ratio (ICER) representing the tradeoff between treatment side effects and increased life expectancy with treatment. Disease progression and treatment side effect probabilities and utilities were determined by literature review.

**Results:** For a man age 56 years in excellent health, immediate RP vs. AS resulted in 0.69 additional quality-adjusted life years (QALYs), with 1.2 years increase in life expectancy and 3.9 additional years of erectile dysfunction or incontinence, yielding a clinical ICER of 3.3 years of side effects per additional year of life. For a man age 67 years in poor health, RP vs. AS resulted in -0.31 QALYs, 0.01 years increase in life expectancy, and 2.0 additional years of treatment side effects, yielding an ICER of 542. Threshold ages above which AS resulted in more QALYs than RP for men in excellent, average, and poor health were 71, 58, and <50 years, respectively.

**Conclusion:** Age and health status are critical determinants for optimal management following a diagnosis of low-risk prostate cancer. For older men and men with reduced life expectancies, active surveillance should be a strong alternative to immediate treatment.

## POSTER PRESENTATIONS

### Poster 13

Eric A. JohnBull, MS2

Department of Urology

### Gleason Score Upgrades and Non-Organ Confined Disease Are More Common At Surgery in Low-Risk Compared to Very Low-Risk Prostate Cancer

**Objective:** We hypothesized that non-organ confined disease (NOCD) and increases in pathology Gleason score (GS) between initial biopsy and surgery are both more common in radical retropubic prostatectomy specimens of men with low-risk (LR) compared to very low-risk (VLR) prostate cancer.

**Background:** Current guidelines for treatment of prostate cancer stratify based on low- and very low-risk disease states, with active surveillance as the sole recommendation for low-risk disease. However, there is little published data on whether these two classifications are pathologically distinct and warrant use as treatment differentiators.

**Methods:** An institutional database of men who underwent radical retropubic prostatectomy was used to select men with low-risk (PSA $\leq$ 10 ng/mL, GS $\leq$ 6 and Stage T1a-c/T2a) and very low-risk disease (PSA density  $\leq$ 0.15 ng/mL/g, GS $\leq$ 6, Stage T1a-c,  $\geq$ 12 cores sampled on biopsy,  $\leq$ 2 cores positive,  $\leq$ 50% involvement of positive core). The relative risks (RR) of GS upgrade and NOCD at time of surgery stratified by risk classification were evaluated in a multivariable model using Poisson regression.

**Results:** 7,322 patients with complete data for GS upgrade had LR disease and 153 patients had VLR disease. The unadjusted RR of GS upgrade for LR vs. VLR disease was 1.67 (95%CI=1.07-2.59, P-value=0.023). When controlling for year of surgery, age, white race, PSA at surgery and BMI, the adjusted RR was 1.89 (95%CI=1.21-2.95, P-value=0.005). 7,335 patients with complete data for NOCD had LR disease and 153 patients had VLR disease. The unadjusted RR of NOCD for LR vs. VLR was 2.71 (95%CI=1.57-4.69, P-value $<$ 0.001). When controlling for the above variables, the adjusted RR was 2.064 (95%CI=1.193-3.571, P-value=0.010).

**Conclusion:** LR and VLR disease have significantly different pathologic characteristics. This may support the use of these risk groups to stratify treatment.



## POSTER PRESENTATIONS

### Poster 14

Ralph Passarella, MS1

Institute of Genetic Medicine, Broadway Research Building

#### **Functional characterization of novel class large noncoding RNAs regulated by the tumor suppressor p53 and their role in cancer.**

**Objective:** The goal of this project is to functionally characterize a novel class of p53-regulated lincRNAs in a variety of cancerous and non-cancerous tissues.

**Background:** Noncoding RNAs (ncRNAs) are becoming increasingly significant in normal cell biology and disease etiology. One new class of ncRNA, large intergenic noncoding RNA (lincRNA), has recently been shown to play integral roles in global chromatin modification and cancer progression. However, most lincRNAs lack functional characterization.

**Methods:** We used DNA sequence analysis to identify human orthologs to murine lincRNAs. We treated p53 wild type(WT) or null(-/-) HCT116 colorectal cancers with Adriamycin and used Real-Time PCR (qPCR) to identify p53-dependent lincRNAs overexpressed in response to Adriamycin treatment. siRNAs were designed to target one p53-regulated lincRNA, lincRNA-Seq\_J, and administered to HCT116s treated +/- Adriamycin. Cells were harvested and (i) Propidium Iodide-stained for flow cytometry or (ii) RNA purified for qPCR analysis.

**Results:** Sequence homology analysis and qPCR identified 23 novel lincRNAs overexpressed following Adriamycin treatment in HCT116 p53WT cells but not p53-/. Following Adriamycin treatment, control HCT116s arrest in G2 phase (>80% of total cells). However, siRNA knockdown of one p53-regulated lincRNA, lincRNA-Seq\_J, reduced G2 arrested HCT116s from >80% to 55% and tripled G1 arrested HCT116s compared to controls. qPCR analysis confirmed siRNA knockdown of lincRNA-Seq\_J.

**Conclusion:** Thus, we have identified a novel class of p53-regulated lincRNAs. The phenotypic response of HCT116s following siRNA-knockdown of lincRNA-Seq\_J recapitulates the phenotype of HCT116s deficient for the p53-mediated G2 checkpoint. This suggests an integral role for lincRNA-Seq\_J in the p53-dependent stress response. In the future, we will characterize lincRNA-Seq\_J and other p53-regulated lincRNAs using cancerous and non-cancerous tissue in vitro and using tumor xenografts in vivo. Also, we expect to use this study as a model for characterizing clinically relevant lincRNAs that can be used to aid in the diagnosis and treatment of diseases.

## POSTER PRESENTATIONS

### Poster 15

Eric Mills, MS2

Genetics

#### Role of the microRNA cluster miR-143/145 in vivo

**Objective and Background:** MicroRNAs (miRNAs) are an abundant group of ~22-nucleotide, single stranded noncoding RNAs that regulate gene expression by pairing to mRNAs of protein-coding genes and destabilize target transcripts. Physiologic roles for most miRNAs, however, remain poorly defined. miR-143 and miR-145, make up a co-transcribed microRNA cluster that, in humans, is lost early in colorectal tumorigenesis. In tissue culture, miR-143/145 appear to function as endogenous tumor suppressors, inhibiting proliferation, migration, and invasion.

**Methods:** To investigate the role of miR-143/145 in normal intestinal homeostasis, we adapted a bromodeoxyuridine (BrdU)-pulse labeling assay to quantify intestinal epithelial cell (IEC) proliferation and migratory kinetics in miR-143/145<sup>+/+</sup> and miR-143/145<sup>-/-</sup> mice. In parallel, we quantified the pattern of activation of both canonical (extracellular signal-regulated kinase; ERK1/2) and non-canonical (c-jun N terminal kinase; JNK) arms of the MAPK signaling pathway in the intestinal epithelia of wild type and knockout mice.

**Results:** Our data did not demonstrate a difference in IEC proliferation/migration rate between miR-143/145<sup>+/+</sup> and miR-143/145<sup>-/-</sup> mice. Canonical MAPK activity, quantified by protein levels of phosphorylated ERK1/2 did not differ between wild type and knockout animals. To our surprise, phosphorylated JNK levels appear ~4-fold higher in the intestinal epithelium of miR-143/145<sup>-/-</sup> mice. Furthermore, the upstream JNK kinase responsible for activation of JNK, MAP2K4, is a predicted target of the miR-143/145 cluster.

**Conclusion:** Taken together, these data suggest miR-143/145 is not a critical regulator of intestinal proliferation at rest, but suggests that miR-143/145 may play a role in the normal GI stress response by targeting MAP2K4 and regulating JNK signaling in the intestinal epithelium.

## POSTER PRESENTATIONS

### Poster 16

Jason Solus, MS4

Wilmer Eye Institute

### Success and Complications After Fornix-Based versus Limbus-Based Trabeculectomy

**Objective:** To compare fornix-based and limbus-based conjunctival closure during trabeculectomy surgery.

**Background:** Trabeculectomy is the most commonly performed operative treatment for glaucoma. The operative technique has changed significantly over the past decade with the introduction of fornix-based and limbus-based conjunctival closures. Previous studies aiming to characterize the success and complications of these closures are limited and only include small case series.

**Methods:** From January 1999 to October 2008, two Wilmer Institute glaucoma specialists performed 753 trabs not combined with another operation. Of these, 439 eyes in 346 persons that had not had subsequent surgery underwent quantitative grading by the Indiana Bleb Grading System.

Nearly all limbus-based operations were performed before 2005, and all fornix-based from 2005-2008; thus, this was a sequential case series analysis accounting for time since surgery in all data.

**Results:** The grading system rates height, extent, vascularity and leak. Interobserver and intraobserver agreement was good (weighted kappas, 0.63, 0.66).

Avascular blebs were more than 3 times more common after limbus-based surgery (odds ratio = 10.37,  $p < 0.0001$ ).

Limbus-based blebs were nearly 3 times more likely to be graded medium or high than fornix-based blebs ( $p < 0.0001$ ). The majority of blebs were 1-4 clock hours in extent, not different between limbus and fornix types.

Previously undetected leaking blebs were found in 0.9% (fornix) and 1.9% (limbus) operations (n.s.).

Fornix-based surgery had significantly fewer infections within 4 years of operation (2% vs 8%;  $p = 0.001$ ).

**Conclusion:** Fornix-based closure had fewer high blebs, the same success rate, and fewer late infections.

## POSTER PRESENTATIONS

### Poster 17

**Rajesh Babu Sekar, MS2**

Division of Cardiac Surgery, Department of Surgery, The Johns Hopkins Medical Institutions, Baltimore, MD.

### **Quality of life after aortic root replacement in Marfan syndrome: A comparison of valve sparing versus Bentall procedures.**

**Objective and Background:** Valve sparing aortic root replacement (VSRR) and the Bentall procedure are both lifesaving procedures for Marfan syndrome patients with aortic aneurysm. While operative risks are similar for both procedures, the postoperative quality of life (QOL) may differ because of anticoagulation needs in Bentall patients. The goal of this study was to determine the QOL outcomes after aortic root replacement for VSRR vs. Bentall operation.

**Methods:** Marfan syndrome patients undergoing aortic root replacement at our institution from 2000-2009 were identified. Follow-up data were extracted from the hospital record, and phone interviews were conducted using the Short Form-12 (SF-12) Health Survey QOL questionnaire.

**Results:** Of 190 Marfan root replacement patients, 101 were available for telephone interviews: 61 had VSRR and 40 had Bentall procedures. Comparing VSRR vs. Bentall, there was no difference in the ratio of male to female patients (70.5% vs. 70%,  $p=0.95$ ) and mean time to follow-up (75 months vs. 80 months,  $p=0.61$ ). VSRR patients were younger than Bentall patients (30 years vs. 41 years,  $p<0.001$ ). The postoperative QOL data measured as the mean SF-12 summary score also did not differ between the groups (VSRR 16.2 vs. Bentall 17.3,  $p=0.14$ ). Importantly, these scores were comparable to a mean score of 16 for a representative sample of US population. Also, the number of patients developing endocarditis, valve thrombosis, or requiring later surgical interventions did not differ between the groups. However, the impact of anticoagulation was significantly different. None of the VSRR patients preferred the Bentall procedure, whereas 40% of the Bentall patients would have preferred the VSRR operation. Also, all the Bentall patients reported an impact of anticoagulation (low 62.5%, moderate 32.5%, and high 5%) on their daily life.

**Conclusion:** QOL outcomes after VSRR and the Bentall procedures are similar, but nearly half of Bentall procedure patients would have preferred VSRR to avoid anticoagulation.

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## POSTER PRESENTATIONS

### Poster 18

Rwo-Wen Huang, MS2

The Institute of the History of Medicine (Scholarly Concentration)

#### **The influence of venereal disease on practitioner-patient relationship in early modern London**

**Objective:** Examine how the diagnosis of VD affected the doctor-patient relationship in late 17th to early 18th century London.

**Background:** Historians have demonstrated that medical practice in 17th century London was built upon a marketplace model. Healers of all types competed with each other for customer, and patients picked and chose amongst practitioners. Nor was medical knowledge exclusive to doctors; medical consults were a collaborative process between healer and sufferer.

This project examines how well this model of a patient-centered medical marketplace explains the doctor-patient encounter in venereal diseases (VD), rife in the 17th century London, when almost any genito-urinary ailment might be VD. VD was an acute illness that was painful and extremely visible, as well as very stigmatizing, since it was associated with illicit sexual activity.

**Methods:** Advertisements and case histories are the two main sources. The former provides a wealth of information on marketing mechanisms and strategies, the latter offers detailed accounts of doctor-patient interactions, and is the main focus of analysis.

**Results:** In contrast to a cordial relationship in which healers and patients cooperated in diagnosis and treatment in non-VD ailments, the two sides were constantly in conflict in VD. First, sufferers tried to conceal the sexual nature of their disease or rejected the diagnosis entirely. Practitioners tricked or forced patients into admitting/accepting they had VD. Further conflict ensued when treatment did not meet expectations. Doctors blamed patients for non-compliance or previous ineffective healers. The medical encounter in VD was a tug-of-war from beginning to end, quite different from that in other diseases.

**Conclusion:** The doctor-patient relationship in VD cases was not collaborative but instead highly conflictual. Shameful diseases have always complicated interactions between healers and sufferers. Even today, we see conflicts in diagnosis and treatment for stigmatizing illnesses such as obesity or addiction.

## POSTER PRESENTATIONS

### Poster 19

Courtney Pendleton, MS4

Neurosurgery, and Division of Plastic and Reconstructive Surgery

#### **The Overlooked Contributions of Harvey Cushing to Craniofacial Surgery, the Johns Hopkins Hospital 1896 to 1912**

**Objective:** We believed a review of Harvey Cushing's surgical files would offer insight into the development of general surgery and its subspecialties at the turn of the century.

**Background:** The breadth of Cushing's contributions to the field of craniofacial surgery has not been documented.

**Methods:** Following IRB approval, the surgical records for the Johns Hopkins Hospital, 1896 to 1912, were reviewed.

**Results:** Craniofacial Approaches to the Skull Base:

Three patients underwent craniofacial approaches for skull base lesions. The patients had diagnoses of osteochondroma of the sphenoid sinus, sarcoma of the maxillary sinus invading the skull base, and osteoma of the frontal sinus. One patient underwent three operations over two admissions; the remaining patients underwent one procedure each. There was one instance of mortality in the immediate post-operative period, and no post-operative surgical site infections or meningitis.

Craniofacial Reconstruction:

Four patients underwent facial reconstruction. There was no inpatient mortality; at last follow-up one patient had died, two patients were improved, and one patient had a persistent open wound from the operation. Cushing employed advancement flaps for lip reconstruction, rotation flaps for scalp and nasal reconstruction, and recognized the need to advance a flap to prevent an ectropion after excision of an eyelid tumor.

Cleft Lip and Palate Repair:

Three patients underwent repair of cleft lip and palate. The mean age was 2.47 years. There was no inpatient mortality, and no instances of surgical site infection.

**Conclusion:** Cushing performed complex reconstructive surgical techniques for repair of defects following resection of bony and soft tissue tumors, and provided the innovative solution of combining cleft lip and palate closure into a single operation. Although current literature credits neurosurgeons of the 1950s and 1960s with developing craniofacial approaches to the skull base, the cases reported here demonstrate that Cushing pioneered this field at the turn of the twentieth century.

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## POSTER PRESENTATIONS

### Poster 20

Daniel Zabransky, MS2

Immunology, Department of Oncology

#### Identification of Highly Suppressive Natural Regulatory T Cells

**Objective and Background:** Regulatory T cells (Treg) are a subset of CD4 cells that suppress autoimmunity as well as anti-tumor immune responses. In previous studies, we found that Helios, an Ikaros family transcription factor, is preferentially expressed in thymic-derived (natural), as opposed to peripherally induced, Treg. Understanding the phenotypic differences between natural and induced Treg has been hampered by a lack of cell surface markers that can reliably distinguish the two populations.

**Methods:** To study the function of these natural Treg in tumor-bearing mice, we utilized an in vivo BrdU incorporation assay, as proliferating Treg generally represent the active population of Treg in vivo.

**Results:** We found that CD103 and GITR are expressed at high levels on a subset of Helios+ natural Treg and that this population can be significantly enriched by FACS sorting. qPCR analysis revealed increased expression of TGF- $\beta$ , a critical Treg effector cytokine in Helios+ (natural) Treg. In tumor-bearing mice, we found that natural Treg were strikingly over-represented in the tumor mass. In all tissues studied, natural Treg showed greater ongoing proliferation than induced Treg, suggesting that these cells might exert the majority of suppressive function in vivo. In vitro studies confirmed this hypothesis; using standard suppression assays, we found that Treg function appeared to be conferred almost entirely by the natural (Helios+) population.

**Conclusion:** Taken together, our data suggest that Helios+ Treg represent the active subset in vivo and may serve as a target to enhance an anti-tumor immune response.

## POSTER PRESENTATIONS

### Poster 21

Jacob Ruzevick, MS2

Neurosurgery

#### **Low dose radiation is a novel method for decreasing phosphorylated Signal Transducer and Activator of Transcription 3 (pSTAT-3) and phosphorylated-Akt expression and results in altered cytokine expression in the HS683 human glioma cell line**

**Objective:** The aim of this study is to determine if low dose radiation decreases pSTAT-3 and pAkt protein expression and if this change results in alterations in downstream cytokine expression.

**Background:** The Signal Transducer and Activator of Transcription 3 (STAT-3) and PI3K/Akt pathways are both implicated in immunoresistance of Glioblastoma (GBM) tumor cells. Overexpression of pSTAT-3 and pAkt, often occurring in GBM, causes a decrease in immunostimulatory cytokines and a resulting immunosuppressive tumor microenvironment.

**Methods:** HS683 cells were cultured using standard methods and irradiated with a single dose of 10 Gy at a rate of 0.5 Gy/min. Cells were incubated for 8, 24, 48, 72, and 144 hours at 37 °C. Western blots assessed for pSTAT-3, Akt, and pAkt expression levels. Flow cytometry with annexin staining evaluated apoptosis in the first 48 hrs following irradiation. To assay for changes in downstream cytokine gene expression qPCR was used.

**Results:** 10 Gy radiation decreased expression levels of pSTAT-3 and pAkt in a time dependent manner but did not change Akt expression levels. pAkt levels were decreased 8 hrs to 24 hrs post irradiation while pSTAT-3 levels were decreased starting at 48 hrs post irradiation and remained decreased at 144 hrs. No significant apoptosis was seen at 8, 24, or 48 hrs post irradiation. Using qPCR, it was found that transcription of IL-6, IL-8, IP-10, MMP-9, and RANTES increased in a time dependent manner from 8-48 hrs, while STAT-3, VEGF, and TNF-alpha mRNA levels did not change.

**Conclusion:** These results suggest that radiation, commonly used as adjuvant therapy for patients with GBM, may be a novel method to provide a short period of decreased GBM immunoresistance via downregulation of the STAT-3 and Akt signaling pathways and upregulation of immunostimulatory cytokines. This alteration could be exploited using immune-based anti-tumor therapies to improve survival of patients with GBM.



## POSTER PRESENTATIONS

### Poster 22

Peter McCaffrey, MS2

Center for Tuberculosis Research, Department of Medicine, Division of Infectious Diseases

### Natural product screen for novel small molecule inhibitors of *M. tuberculosis*: 3 promising leads derived from plant endophyte fungi

**Objective:** This experiment examines natural products as potential candidates for novel anti-tubercular antibiotics.

**Background:** According to World Health Organization estimates, tuberculosis (TB) bacilli inhabit the lungs of as much as one third of the global population [1]. With a prevalence of 14 million reported active cases, TB accounted for 1.5 million deaths in 2009 [2]. Adding to this, inadequate chemotherapy has promoted the emergence of drugresistant strains, many of which show equal—if not greater—virulence than their drugsusceptible predecessors [3-5]. To date, the prevalence of multidrug-resistant tuberculosis (MDR-TB), which cannot be effectively treated with mainstay antibiotics such as isoniazid and rifampin, has reached an all-time high[6]. Improving the diagnosis, treatment and prevention of TB is a critical public health concern and will rely on improved therapeutic drugs.

**Methods:** In this experiment, we screened a library of 114 fungal extracts for inhibition of *M. tuberculosis* in vitro using the Alamar Blue cell health indicator protocol. 96-well microplates were inoculated with 50µL of a sample tuberculosis strain grown to an OD of 0.04 and diluted to 100µL total volume with a mixture of 7H9 growth media and sample fungal extract. Extract to total-volume concentrations ranged from 1:40 to 1:10240 by 2-fold serial dilutions.

**Results:** From an initial screen using drug-susceptible *M. tuberculosis*, three extracts showed significant inhibitory potential. Furthermore, one of these, Extract #75, showed aggressive inhibition of multidrug-resistant (MDR) and extensively drug-resistant (XDR) variants as well.

**Conclusion:** Once isolated, the active compounds of these inhibitory extracts may be potential candidates for treating tuberculosis in humans.

## POSTER PRESENTATIONS

### Poster 23

Rohan Joshi, MS2

Orthopaedic Oncology

#### **MIP3-Alpha (CCL20) and Bone Disease: A novel mechanism for Renal Cell Carcinoma Activation of Osteoclasts in Metastatic Bone Cancer**

**Objective:** In this study, we explored the role of a little studied ligand, MIP3-Alpha (CCL20), in Renal Cell Carcinoma (RCC) models to determine its impact on the bone microenvironment.

**Background:** Scientists have been working for decades to elucidate the mechanisms by which tumor metastasis to bone results in increased osteoclast activity and thus, net bone resorption.

**Methods:** First, an ELISA for CCL20 was performed on samples obtained from human RCC bone metastases (RBM) as well as normal human bone marrow (BM). Next, an osteoclast differentiation assay was performed using mouse osteoclast precursors, BM-MNC and BMM cells. Lastly, a migration assay to determine the chemoattractiveness of CCL20 was performed using the previously mentioned cell lines.

**Results:** A comparison of human RBM to BM samples revealed that RBM expression of CCL20 protein was increased, on average, approximately 6-fold over baseline ( $p=.02$ ). Furthermore, a PCR for the CCL20 receptor, CCR6, revealed its presence on both BM-MNC and BMM (cycles  $<35$ ). The osteoclast differentiation assay demonstrated that at a concentration range of CCL20 1-10pg/ml plus Rank Ligand (RankL) 5 ng/ml, CCL20 resulted in a 5-fold increase ( $p=.07$ ) in the number of osteoclasts for the BM-MNC cell line and a two-fold increase ( $p=.0008$ ) for BMM when compared to RankL alone. A fusion index demonstrated that CCL20 0.5pg/ml plus RankL 5.0ng/ml produced osteoclasts capable of increased resorption with an average of 16.7 nuclei/cell/20x magnification compared to 9.4 nuclei/cell/20x magnification for RankL alone. The migration assay demonstrated that, at a concentration range of 1pg/ml-100pg/ml, CCL20 produced maximum chemoattractivity in BM-MNC and BMM and resulted in a nine-fold ( $p=.03$ ) and four-fold ( $p=.0006$ ) increase in migration when compared to the control.

**Conclusion:** These findings implicate CCL20 in the bone resorption and increased osteoclast differentiation and migration that is typical of RCC. Further investigation in vivo will confirm the paracrine signaling model and bone resorptive capacity of this chemokine. These initial findings show promise in exposing another target for therapy in late stage RCC patients.

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## POSTER PRESENTATIONS

### Poster 24

**Nathan Skelley, MS4**

Orthopaedics

#### **Biomechanical Evaluation of Open Suture Anchor Fixation versus Interference Screw for Biceps Tenodesis**

**Objective:** The purpose of the current study was to test the hypothesis that the strength of a two-suture-anchor technique with closing of the transverse ligament is equal to that of interference screw fixation for biceps tenodesis.

**Background:** Biceps tenodesis provides reliable pain relief for patients with biceps tendon abnormality. Previous cadaver studies have shown that, for biceps tenodesis, an interference screw provides biomechanical strength to failure superior to that of suture anchors. This finding has led some providers to conclude that screw fixation for biceps tenodesis is superior to suture anchor fixation.

**Methods:** In six paired, fresh-frozen cadaveric shoulder specimens, we excised the soft tissue except for the biceps tendon and the transverse ligament. We used two different methods for biceps tenodesis: (1) suture anchor repair with closing of the transverse ligament over the repair, and (2) interference screw fixation of the biceps tendon in the bicipital groove. Each specimen was preloaded with 5 N and then stretched to failure at 5 mm/second on a materials testing machine. The load-to-failure forces of each method of fixation were recorded and compared.

**Results:** Mean loads to failure for the suture anchor and interference screw repairs were 263.2 N (95% confidence interval, 221.7 -- 304.6) and 159.4 N (95% confidence interval, 118.4 -- 200.5), respectively.

**Conclusion:** Biceps tenodesis using suture anchors and closure of the transverse ligament provided superior load to failure than did interference screw fixation.

## POSTER PRESENTATIONS

### Poster 25

Heather Chalfin, MS2

Brady Urological Institute

#### IMPLICATIONS OF SURGICAL MARGIN STATUS ON PROSTATE CANCER-SPECIFIC SURVIVAL

**Objective and Background:** A positive surgical margin (PSM) status is associated with an increased risk of biochemical recurrence following radical prostatectomy (RP). However, the impact of PSM on long-term prostate cancer-specific mortality (PCSM) following RP has not been well elucidated. We examined the impact of PSM on PCSM in a large retrospective cohort of RP patients.

**Methods:** Between 1982 and 2009, 4,381 men underwent RP by a single surgeon. The median age was 58 years (range 33-81) and the median PSA was 5.5 ng/ml. Cox proportional hazards models were utilized to determine the impact of a PSM on PCSM.

**Results:** Of the patient population, 4,228 (96.5%) met complete inclusion criteria. RP Gleason score was 6 or below in 2,701 (63.9%), 7 in 1,263 (29.9%), and 8-10 in 264 (6.2%). PSM was found in 487 (11.5%). With a median follow-up of 9 years (range 1-27), 173 men (4.1%) died of prostate cancer. Compared to those with negative surgical margin, men with PSM were more likely to be older (59.2 vs. 57.1) and to have RP in the pre-PSA era (34.9% vs. 12.5%). Additionally, they were more likely to have higher PSA level (11.6 vs. 6.6), Gleason score of 7 or above (60.4% vs. 33%), non-organ-confined tumor (90.8% vs. 31.6%), and postoperative adjuvant or salvage therapy (35.3% vs. 7.4%) ( $p < 0.001$  for all). In a univariate model for PCSM, PSM was highly significant, HR=4.23 (95% CI 3.13-5.73),  $p < 0.0001$ . However, in a multivariable model adjusting for RP Year, RP Gleason, stage, and (as time dependent covariates) adjuvant or salvage treatment, PSM was no longer significant: HR=1.03 (95% CI 0.73- 1.44),  $p=0.880$ .

**Conclusion:** Prostate cancer-specific survival following RP is excellent. PSM was associated with increased PCSM in a univariate analysis. However, in a multivariable analysis, a PSM was not an independent predictor of PCSM.

## POSTER PRESENTATIONS

### Poster 26

Risheng Xu, MD/PhD candidate

Neurosurgery

#### **Safety and efficacy of rhBMP2 in posterior cervical spinal fusion for subaxial degenerative spine disease: Analysis of outcomes in 204 patients.**

**Objective:** Compare outcomes of bone morphogenic protein versus non-BMP usage in patients undergoing posterior cervical spinal fusion for subaxial degenerative etiologies.

**Background:** Currently, many studies have demonstrated BMP's ability to enhance fusion rates in anterior/posterior lumbar surgery; more recently, BMP has also been shown to increase arthrodesis rates in anterior cervical surgery. To date, however, few studies have investigated the safety and efficacy of BMP use in cervical surgeries approached posteriorly.

**Methods:** We retrospectively reviewed 204 consecutive patients with degenerative cervical spinal conditions necessitating posterior cervical fusion at a single institution over the past 4 years. The incidence of post-operative mechanical neck pain, fusion rates, as well as neurologic outcomes were compared between patients who received BMP versus no BMP.

**Results:** 134 (65.7%) patients presented with mechanical neck pain, 82 (40.6%) radiculopathy, 157 (77.7%) motor weakness, 110 (54.5%) sensory deficits, and 44 (21.9%) bladder dysfunction. There were no significant differences in pre-operative variables between the two cohorts. Intra-operatively, there were no significant differences in blood loss, vertebral levels fused, or rates of incidental durotomy. Over an average follow-up of 24.2 months, there were no significant differences between the two cohorts in hospitalization length, CSF leakage, DVT, PE, hyperostosis, infection, pneumonia, hematoma, C5 palsy, wound dehiscence, reoperation rates, or Nurick/ASIA scores. Patients receiving BMP had a significantly increased rate of fusion both via Chi-squared ( $p=0.01$ ) and log-rank tests ( $p=0.02$ ). However, patients receiving BMP also had the highest rates of recurrent/persistent neck pain via Chi-squared ( $p=0.003$ ) and log-rank tests ( $p=0.01$ ).

**Conclusion:** Successful arthrodesis is instrumental in reaping the benefits of spinal fusion surgery. To date, the safety and efficacy of BMP in the posterior cervical spine is unknown. Here, we show that BMP usage does not increase complication rates, significantly increases arthrodesis rates, but also may increase the rate of recurrent/persistent neck pain.

## POSTER PRESENTATIONS

### Poster 27

#### HeeWon Lee, MS3

Johns Hopkins School of Medicine; Institute for Health Promotion, Graduate School of Public Health, Yonsei University, Seoul, Korea; The National Health Insurance Corporation, Seoul, Korea; Department of Preventive Medicine, Keck School of Medicine, University of Southern California

#### **Duration of ovarian hormone exposure and breast cancer risk in Korean women**

**Objective and Background:** Breast cancer is a disease of rising incidence and mortality in Korea. While reproductive and hormonal factors such as early menarche and late menopause are well established as independent risk factors, the effect of the duration of ovarian hormone exposure on breast cancer remained unknown.

**Methods:** The risk related to the duration of ovarian hormone exposure was examined in a 14-year prospective cohort study of 71,809 Korean women ages 30-95 insured by the National Health Insurance Corporation who had a biennial medical evaluation in 1992-1995. Cumulative incidence and hazard ratios for breast cancer were examined in relation to the participants' age at menarche-menopause using the LIFETEST Kaplan-Meier Method and the Cox proportional hazards model. In the second part of our study, we examined the risk associated with the total duration of ovarian hormone exposure.

**Results:** Incidence was highest for women in the early menarche, late menopause group (ages <15, >55; incidence 1.3%) with 2.3 times greater risk of developing breast cancer compared to women in the late menarche, early menopause group (ages >15, >55; incidence 0.7%). Women with over 41 years duration between menarche and menopause have 2.6 times greater risk of breast cancer compared to those with less than 26 years of duration.

**Conclusion:** Our study provides evidence that the combination of early menarche and late menopause as well as an increase in the absolute duration in years between menarche and menopause or the total exposure time to ovarian hormones increase the risk of breast cancer in Korean women.

## POSTER PRESENTATIONS

### Poster 28

Jessica Yang, MS2

Department of Surgery

#### Low-Cost Mesh for Inguinal Hernia Repair in Resource-Limited Settings

**Objective:** To assess the efficacy and safety of using low-cost mesh for inguinal hernia repair in resource-limited settings.

**Background:** More than half of inguinal hernias may be untreated in African countries that lack adequate and affordable surgical care. When treatment is provided, fewer than 5% are repaired using implanted mesh due to its high cost, despite the demonstrated improvement in clinical outcomes with tension-free repair.

**Methods:** An extensive literature review was performed using PubMed and the Cochrane Library to locate pertinent studies that employed low-cost alternatives to commercial mesh. A total of four studies were selected for review.

**Results:** Three of the studies compared postoperative outcomes for repairs using sterile mosquito nets of varying composition (polyethylene-co-polypropylene, nylon, polyester) with those using commercial surgical mesh (Prolene, Ultrapro). The fourth study randomized patients to receive either an indigenous bilayer device or the Prolene Hernia System. The range of wound complication rates for procedures with low-cost mesh (0-7%) was comparable to that obtained with commercial mesh (0-11.4%). Among all four trials, there was only one incident of recurrence. Follow-up time ranged from one month to five years. The price of low-cost mesh was consistently less than 1/1000 the price of commercial mesh. When evaluated for biocompatibility, only the polyethylene-co-polypropylene mesh satisfied the recommended guidelines for pore size, filament type and tensile strength. Alternative ways to obtain low-cost mesh are proposed.

**Conclusion:** Limitations: The size of the study populations and the limited time for follow-up preclude conclusive measures of effectiveness, recurrence rates, and long-term complications.

Conclusions: There were no significant differences in outcomes between repairs using low-cost and commercial mesh. While concerns with biocompatibility warrant further research, these studies demonstrate that providing an acceptable standard of surgical care need not be prohibitively expensive.

## POSTER PRESENTATIONS

### Poster 29

Yasmin Zerhouni, MS2

Center for Tuberculosis Research

#### **Tuberculosis Control: Active Case Finding In the Contacts Of Children Diagnosed With TB**

**Objective:** To evaluate if investigation of household contacts of children with active tuberculosis disease in Soweto, South Africa can identify infectious cases in the household. To confirm, by molecular fingerprinting of cultured bacteria, that the child was infected by the infectious household member. To document the rates of TB and HIV in households in Soweto.

**Background:** The WHO recommends intensified case finding of TB in high HIV prevalence settings like Soweto. Studies have estimated that 50% of HIV deaths are due to TB. 30% of pregnant women are HIV positive in Soweto Children infected with tuberculosis are likely to present earlier to healthcare settings than adults and are an indicator of an undiagnosed and untreated adult at home. This type of focused contact investigation could help identify and treat other infectious cases in the household.

**Methods:** 400 children under 7 years-old, diagnosed with active TB and their caregivers were recruited from the inpatient and outpatient wards of Chris Hani Baragwanath Hospital in Soweto. Visits were made to the households. Household members were tested for TB by collecting sputum and offered HIV voluntary counseling and testing. Positive household members were referred to the local clinics for care. Any TB positive culture samples from children and household members were molecularly fingerprinted.

**Results:** The study is ongoing. A similar study of contacts of adults found that 21% of households had at least one member with undiagnosed TB. Those who tested positive for HIV had higher CD4 counts than the index case, which means treatment interventions could prevent progression of disease and mortality.

**Conclusion:** Active case finding in contacts of children with tuberculosis helps to identify and treat undiagnosed infectious cases of TB in a household member.



## POSTER PRESENTATIONS

### Poster 30

Camilo A. Molina, MS3

Department of Neurological Surgery.

#### **In Situ Placement of High-dose rhBMP-2 within Spine Tumors Slows Tumor Growth and Decreases Onset to Paralysis in a Rat Model of Metastatic Breast Cancer**

**Objective:** High concentration rhBMP-2 placed in an intraosseous spine tumor rat model could show tumor suppression and delay paralysis.

**Background:** Recombinant human bone morphogenic proteins (rhBMPs) are FDA-approved for specific spinal fusion procedures, but use is contraindicated in spine tumor resection beds due to unclear interaction between tumor tissue and such growth factors. Interestingly, a number of studies suggest that BMPs may slow growth of adenocarcinomas in vitro, and adenocarcinomas represent the majority of histopathologies found in bony spine tumors. In this study, we evaluated the effects of rhBMP-2 on the tumor bed.

**Methods:** 21 female nude athymic rats were randomized into three groups. Group 1(n=7) underwent transperitoneal exposure and implantation of breast adenocarcinoma(CRL-1666) into the L6 lumbar spine segment, followed by implantation of 15 micrograms of rhBMP-2. Group 2(n=7) underwent exposure and tumor implantation on the lumbar spine, but no local treatment with rhBMP-2. Group 3(n=7) solely underwent exposure of the lumbar spine. The Basso-Beattie-Bresnahan(BBB) scale was used to monitor daily motor function regression and time to paresis(BBBscore < 7).

**Results:** No animals in Group 1 were paretic by day 40(median BBBscore of 20, $p < 0.0027$ ). All animals in Group 2 were paretic by day 15(median BBBscore of 0, $p = 0.0024$ ) with a mean time to paresis ( $\pm$ SD) of  $13.5 \pm 1.4$  days. Time to paresis was significantly different between Group 1 and Group 2 ( $p < 0.001$ ). Group 3(control) exhibited no neurological motor deficit. Gross and microscopic tumor volume was also significantly ( $p < 0.048$ ) different between Groups 1 and 2.

**Conclusion:** This study shows that high-dose administration of local rhBMP-2 in a rat-spine tumor model of breast cancer not only fails to stimulate local tumor growth, but also decreases local tumor growth and onset of paresis in animals. This is the first preclinical experiment showing that local placement of rhBMP-2 in a spine tumor bed slows tumor progression and delays associated neurological decline.

## POSTER PRESENTATIONS

### Poster 31

Kurun Oberoi, MS3

Department of Pediatrics, Institute of Genetic Medicine; Department of Molecular and Comparative Pathobiology

### Characterization and Treatment of Abnormal Skull Development in a Novel Mouse Model of Beare-Stevenson Syndrome

**Objective:** To elucidate the molecular pathogenesis and therapeutic strategies for craniosynostosis using the Beare-Stevenson syndrome mouse.

**Background:** Premature fusion of the skull bones (craniosynostosis) is one of the most common birth defects, having an incidence of 1/2000 newborns. Because patency of the cranial sutures is required to accommodate the rapidly growing brain, craniosynostosis can impede normal brain growth and lead to neurologic complications without appropriate surgical and medical care. Beare-Stevenson syndrome is an autosomal dominant condition with craniosynostosis as one of its defining features. Beare-Stevenson syndrome is also characterized by ocular proptosis, cutis gyrata, acanthosis nigricans, and anogential anomalies. The most common cause of this syndrome is a point mutation in FGFR2 that leads to a Tyr375Cys substitution in the protein. We generated the first, inbred Fgfr2+/Y394C transgenic mice using a knock-in strategy. The mouse Y394C substitution is analogous to the human Y375C substitution.

**Methods:** Skull morphology was examined by micro-CT. Histological sections of E17.5 embryos were made to analyze the coronal sutures. Immunohistochemical staining and in situ hybridization for KI67 and osteogenic markers were used to evaluate changes in cell proliferation and osteoblast differentiation. TUNEL staining was used to detect apoptosis. Protein was extracted from E17.5 skulls and western blots were performed to detect changes in signaling pathways downstream of FGFR2. To confirm the importance of p38 signaling in the abnormal skull development of Fgfr2+/Y394C mice, a p38 inhibitor was used to treat mice in utero.

**Results:** Micro-CT scans of Fgfr2+/Y394C mice revealed brachycephaly and coronal suture synostosis. Immunohistochemical staining and in situ hybridization illustrated abnormal proliferation and osteogenesis, but no change in apoptosis in mutant compared to wild-type sutures. Protein studies revealed increased phosphorylation of p38 MAP kinase in the Fgfr2+/Y394C skull. No significant difference in the activity of other downstream FGFR2 signaling pathways (ERK1/2, JNK, or AKT) was seen. Increased p38 phosphorylation was also seen in the epidermis and whole embryo lysates from mutants. Pharmacologic blockade of p38 activation during development led to partial rescue of the abnormal skull phenotype.

**Conclusion:** Fgfr2+/Y394C mice exhibited craniofacial and skin anomalies resembling those of Beare-Stevenson syndrome patients; thus providing a useful model to study the pathogenesis of this condition. The craniosynostosis is characterized by accelerated bone formation due to abnormal proliferation and differentiation. Molecular and therapeutic studies indicate that signaling through the p38 pathway contributes to observed skull and skin abnormalities.

## POSTER PRESENTATIONS

### Poster 32

Mona Rezapour, MS3

Cedars Sinai Medical Center

### Prospective Evaluation of Risk Factors for Symptomatic Hemorrhoids

**Objective:** We prospectively assessed which risk factors predispose to symptomatic hemorrhoids in a cohort of patients evaluated by colorectal surgeons.

**Background:** While hemorrhoids are common in the general population, risk factors have not been well defined in the literature. Previous studies have been plagued by their retrospective design and lack of objective assessment of hemorrhoidal disease by colorectal surgeons.

**Methods:** Based on a comprehensive review, we compiled a questionnaire encompassing over 80 factors possibly related to the development of hemorrhoids. This questionnaire was completed by patients presenting with anal symptoms to five colorectal surgeons in an urban setting. The incidence of these risk factors in patients with symptomatic hemorrhoids was compared to patients who did not have symptomatic hemorrhoids. Univariate analysis using chi square and Student's t-test was performed.

**Results:** Of the 907 patients studied, there were 646 (71%) patients with hemorrhoids. Univariate analysis revealed a statistically significant difference between the hemorrhoid and control group in percentage of individuals with income greater than \$100,000 per year (50% vs 39%,  $p=0.014$ ), positive family history of hemorrhoids (73% vs 63%,  $p=0.04$ ), moderate or high intake of spicy food (41% vs 31%,  $p=0.006$ ), one or more episodes of diarrhea weekly (16% vs 25%,  $p=0.003$ ), rushing to toilet when sensing urge to defecate (24% vs 35%,  $p=0.001$ ), exertion on the toilet (17% vs 12%,  $p=0.04$ ), and pain upon defecation (12% vs 19%,  $p=0.02$ ). On multivariate analysis, the only statistically significant differences between the hemorrhoid and control group were in the percentage of individuals with family history ( $p=0.01$ ; OR=2.0, 95%CI=1.2-3.3), and income over \$100,000 per year ( $p=0.02$ ; OR=1.9; 95%CI=1.1-3.2).

**Conclusion:** This first reported prospective study of patients examined by a group of experienced colorectal surgeons revealed that both family history and income greater than \$100,000 per year were independently associated with symptomatic hemorrhoids.

## POSTER PRESENTATIONS

### Poster 33

Kelly Sloane, MS2

Neuropsychiatry and Memory Group, Department of Psychiatry

### A Preliminary Analysis of the Dementia Disability Rating in Frontotemporal Dementia and Alzheimer Disease

**Objective:** Estimation of the reliability of the Dementia Disability Rating in the measurement and staging of illness severity in Frontotemporal Dementia and Alzheimer disease.

**Background:** Present-day measures of dementia symptoms do not track the progression of disability in non-Alzheimer's dementias well. Instruments that measure cognitive deficits are not sensitive to functional impairment at all stages of disease. The Dementia Disability Rating (DDR) was developed to measure capacities critical to everyday life, such as communication or problem-solving. In contrast to the widely used Clinical Dementia Rating (CDR), which is anchored in cognitive domains, the DDR emphasizes disability, an 'etiologically neutral' approach that offers measurement of dementia severity across phenotypes.

**Methods:** 48 consecutive patients of the Johns Hopkins FTD and Young-Onset Dementias Clinic were retrospectively scored on the CDR and DDR by three raters, based on initial evaluation reports. DDR case severity ratings derive from the median of domain rankings.

**Results:** Reliability was analyzed in three-way and pair-wise comparisons of the three raters. Results were also analyzed by diagnoses of AD or FTD. Kappa for the total sample ranged 0.53–0.72 for the DDR ( $p < 0.001$ ), and was equivalent to reliability estimates for the CDR. The correlation between DDR and CDR ratings was high ( $\rho = 0.93$ ,  $p < 0.0001$ ). Both instruments showed equivalent correlation ( $-0.65$ ) with MMSE scores.

### Conclusion:

The Dementia Disability Rating (DDR) aims to measure severity and progression of dementia and the evolution of dysfunction in order to understand the natural history of disease and to facilitate comparisons of dementia phenotypes. By more accurately tracking disability over time, prognostication could be improved and disease management strategies developed.

These preliminary data indicate that the DDR measures disability with reliability comparable to the CDR and validity to capture functional impairment, apart from cognitive impairment. This is an ongoing DDR characterization study that plans optimization of training, larger samples and longitudinal analyses.

## POSTER PRESENTATIONS

### Poster 34

Neal Bhutiani, MS2

Department of Neurosurgery

### MULTIPLE MICROVASCULAR DECOMPRESSIONS FOR TRIGEMINAL NEURALGIA: OUTCOMES ANALYSIS AND COMPARISON TO SINGLE-TREATMENTS

**Objective:** We hypothesized that patients undergoing Microvascular Decompression as primary treatment for Trigeminal Neuralgia would experience greater time to recurrence of TGN symptoms and fewer post-operative complications compared to those patients undergoing MVD as secondary treatment for TGN.

**Background:** In 80-90% of cases, TN results from compression of the nerve root of CNV near the entry of the nerve into the pons. MVD is currently performed either as primary surgical treatment for TGN or as secondary treatment in cases where microvascular compression on the trigeminal nerve is suspected and pharmacologic management or minimally invasive surgical treatment fails to resolve TGN symptoms. Previous work assessing the efficacy of repeat MVDs following recurrence of TGN symptoms indicated better overall pain relief and durability of treatment compared to minimally invasive procedures. However, no authors have studied the efficacy of MVDs as primary versus secondary surgical treatment for TGN.

**Methods:** In this retrospective cohort study, we constructed a comprehensive database of 1042 patients with TGN receiving treatment at Johns Hopkins between 1998-2010 and examined differences in outcomes and response to MVD treatment for TN between patients who undergo this procedure as primary versus secondary treatment. We assessed MVD outcomes with respect to TGN pain relief, facial hypesthesia, likelihood of MVD-related complications, and TGN symptom recurrence.

**Results:** TGN patients experienced greater symptom relief ( $1.295 \pm 0.887$  vs.  $1.513 \pm 1.006$ ,  $p=0.0648$ ), less average facial hypesthesia ( $1.105 \pm 0.499$  vs.  $1.372 \pm 0.605$ ,  $p=0.000902$ ), and a decreased likelihood of TGN symptom recurrence (OR = 0.486, 95% CI = 0.26-0.88,  $p=0.018$ ) following MVD if it is employed as primary versus secondary surgical treatment. However, we found no significant difference in overall procedure success ( $X^2=0.75$ ,  $p=0.387$ ) or incidence of or likelihood of developing MVD-related complications ( $X^2=0.926$ ,  $p=0.336$ ; OR = 0.77,  $p=0.480$ ) when comparing primary versus secondary MVD.

**Conclusion:** While MVD may result in greater TGN symptom relief, less hypesthesia, and decreased likelihood of TGN symptom recurrence if employed as primary versus secondary surgical treatment for medically resistant TGN, the lack of difference in overall procedure success and complication likelihood do not favor more aggressive employment of MVD as primary surgical treatment for TGN.

## POSTER PRESENTATIONS

### Poster 35

Euphemia Mu, MS2

Dermatology and Pediatric Oncology

#### Sentinel Lymph Node Biopsy for Pediatric Melanoma: Are Adult Guidelines Appropriate?

**Objective:** Aim: To compare the use of sentinel lymph node (SLN) biopsy in pediatric melanoma to the National Comprehensive Cancer Network (NCCN) guidelines for use in adult melanoma and to identify predictors of positive SLN biopsies in children with melanoma.

**Background:** Sentinel lymph node biopsies are the standard for detecting lymphatic metastasis and predicting prognosis in patients with melanoma. Guidelines for sentinel lymph node biopsy use in melanoma have been established based on adult data and have not been rigorously evaluated for children.

**Methods:** We identified 613 children (age less than 20 years) and 1,159 young adults (age 20 to 24 years) with melanoma diagnosed from 2003 to 2007 using the 2007 Surveillance Epidemiology and End Results (SEER) databases. Univariate and multivariate analyses of these cases were conducted based on surgical procedure, tumor presentation, and patient demographics.

**Results:** Pediatric patients with tumor ulceration, nodular histology, thicker melanomas, and lesions around the face were more likely to receive a SLN biopsy. Factors associated with a positive SLN biopsy include age, tumor ulceration, histology, and thickness. Multivariate analyses showed the odds ratio of young adults having a positive SLN biopsy compared to children was 0.4 (95% CI 0.23 to 0.76) and the odds ratio of an ulcerated to non-ulcerated lesion having a positive SLN was 5.1 (95% CI 2.59 to 10.11). The average tumor thickness of pediatric patients was 2.49 for those who received a SLN biopsy and 1.99 mm for those who did not receive any LN surgery. A positive SLN biopsy was associated with poorer survival outcome in both adult and pediatric populations.

**Conclusion:** Younger children are more likely to present with a positive SLN and advanced stage of melanoma. Thickness and ulceration were strong predictors of a positive SLN biopsy in both children and young adults with melanoma. Overall, adult guidelines appear appropriate to use in pediatric melanoma. Greater adherence to NCCN guidelines should be advocated based on average thickness of patients who did not receive the procedure.

## POSTER PRESENTATIONS

### Poster 36

Jason Liebowitz, MS2

The Johns Hopkins Center on Aging and Health (COAH)

#### **Modification of the relationship between Vitamin D levels and Physical Function according to body mass index status in community-dwelling Older Women.**

**Objective:** Examine the relationship between vitamin D status and objectively-assessed physical performance and investigate whether the association differs according to body mass index (BMI).

**Background:** Vitamin D status has been investigated as a potentially modifiable risk factor for decreased physical function in older adults. Whether body mass index acts as an effect modifier for that relationship is not known.

**Methods:** We analyzed cross-sectional data from 683 community-dwelling women 70-80 years-old (mean age=74±0.1) in the Women's Health and Aging Studies I and II. The outcome was Short Physical Performance Battery (SPPB) index, with scores dichotomized as 10-12 (best performance) versus ≤9. Vitamin D status was measured using radioreceptor assay of serum 25-OH-vitamin D [25(OH)D], with deficiency defined as 25(OH)D≤20 ng/ml. Logistic regression was used (adjusted for age, race, education, cardiovascular disease, diabetes, and depressive symptom burden).

**Results:** The proportion of SPPB 10-12 was higher among those with 25(OH)D>20 ng/ml than those with 25(OH)D≤20 ng/ml (38.0% vs. 23.5%, p<.0001). Participants with BMI<25 had better health status profiles than those with BMI≥25; e.g., the proportion of SPPB 10-12 was higher in the former than the latter (40.2% vs. 28.1%, p=.002). Interaction between vitamin D status and BMI was statistically significant (interaction term p-value=0.025). Among subjects with BMI≥25, those with 25(OH)D≤20 ng/ml were less likely to have SPPB 10-12 than those with 25(OH)D>20 ng/ml (odds ratio [OR]: 0.41, 95% confidence interval [CI]: 0.24-0.67). There was no association of vitamin D status and having SPPB 10-12 among those with BMI<25 (OR: 1.0, 95%CI: 0.54-1.9).

**Conclusion:** An association was seen between vitamin D status and physical function in those who are overweight/obese (BMI≥25), but not in those with normal BMI. These data suggest that the adverse impact of vitamin D deficiency on physical function may be enhanced by being overweight/obese, potentially through synergistic fat- and vitamin-D-mediated actions on muscle quality.

## POSTER PRESENTATIONS

### Poster 37

Steven Menez, MS2

JH Weight Management Center

#### **Perspectives on Obesity and Its Treatment: Health Care Providers and the General Public in Urban and Rural Locations**

**Objective:** This research was conducted in rural West Virginia and Baltimore, MD, to determine and compare the perspectives of the general public and health care providers (HCP's) on obesity and its treatment.

**Background:** Obesity is a growing epidemic in the U.S.A., and an understanding of patients' views on obesity and its treatment is necessary for effective health management. Previous studies in the U.S.A. have not investigated possible differences in perspective between urban and rural populations from similar socioeconomically disadvantaged situations.

**Methods:** Surveys were distributed to the general public and HCP's in Baltimore, MD, and WV between 6/2010 – 8/2010 at physician offices, clinics, and community food markets. Participants responded to survey statements using a 5-point Likert scale of agreement. Data were analyzed for  $\chi$ -square association 1) within populations by BMI and education, and 2) between populations.

**Results:** Significant differences in perspective were seen between and within rural (n=200) and urban (n=171) populations. BMI>30 (n=94 in WV, n=58 in Baltimore) was associated with a stronger belief in the heritability of obesity in WV (P=0.008) and with the ability to control obesity by controlling food cost in Baltimore (P=0.004) compared to those with BMI<25 (n=42 in WV, n=57 in Baltimore). Those with a H.S. education or less (n=112 in WV, n=113 in Baltimore) were less likely to agree that obesity is a problem in the community in WV (P=0.001) and that proper diet and exercise are realistic expectations in Baltimore (P=0.042). Perspectives of HCP's (n=25 in WV, n=15 in Baltimore) on obesity differed significantly from the general public, particularly those with BMI>30.

**Conclusion:** Many differences in perspective on obesity exist between and within the general public, and between HCP's and the general public, regardless of location. These findings suggest that a better understanding of patient views is important, especially for obese patients, to guide effective control of obesity.



## POSTER PRESENTATIONS

### Poster 38

John Pang, MS2

Lab of Cardiovascular Science - N.I.A. Baltimore

#### **The use of sRAGE to attenuate arterial restenosis in the rat – dose and effect.**

**Objective:** 1) To determine the dose-response curve of sRAGE administration  
2) To determine the pharmacokinetics of sRAGE administration

**Background:** Restenosis is a potential complication of percutaneous coronary interventions, such as stenting and angioplasty. Previous data have shown that the soluble receptor for advanced glycation endproducts (sRAGE) can attenuate restenosis in the rat, presumably through its inhibition of inflammatory pathways. However, sRAGE dosing and pharmacokinetics are not well understood.

#### **Methods:**

Male Wistar rats (n=44) were randomly assigned to receive an intraperitoneal injection of saline, 0.5, 1.0, or 1.5 ng sRAGE/g rat after balloon angioplasty of the left common carotid artery (CCA). Rats were sacrificed 2 weeks after injury. LCCA tissue slides were prepared and stained with hematoxylin and eosin. Imaging software was used to measure the following indicators of restenosis: mean cross-sectional area of the tunica intima, thickness of the tunica intima, and diameter of the LCCA. The ANOVA test was used to test for significant differences between groups. Pharmacokinetics was studied in 2 rats. The right femoral vein was cannulated and serial blood samples were taken before and after intraperitoneal injection of 7 ng sRAGE/g rat. Serum concentrations of sRAGE were measured using a commercial ELISA kit.

**Results:** The mean cross-sectional area of tunica intima, thickness of tunica intima, and LCCA diameter were significantly lower in sRAGE-treated rats compared to saline-treated controls. Treatment with sRAGE attenuated restenosis in a dose-dependent manner. The mean half-life of sRAGE was calculated to be 17.3 min.

**Conclusion:** Administration of sRAGE treatment after balloon angioplasty attenuated restenosis in a dose-dependent manner. Future investigation into higher dosages of sRAGE is warranted.

## POSTER PRESENTATIONS

### Poster 39

**Matthew Huddle, MS2**

Quality and Safety Research Group

#### **Development of a three-part tool to improve cardiovascular surgical team communication**

**Objective:** To apply a methodological approach to communication tool development, with pilot testing in a group of hospitals to improve workflow and organizational culture.

**Background:** Good communication is vital to surgical success. However, the structure of the health care system predisposes teams to communication failures potentially disastrous to patient care. Briefing/debriefing tools include team meetings prior to and following each surgery, and their use has been linked to decreases in surgical complications and communication failures. Though some communication improvement tools exist, the methodology of communication tool development is in its infancy.

**Methods:** To identify hazards in the cardiovascular operating room, 40 cardiovascular surgeries were observed in Johns Hopkins Hospital. Potential safety hazards were entered into an NVIVO 8 database. A multi-disciplinary panel of experts designed a communication improvement tool to address the most common hazards. Focus groups at 6 hospitals were used to create a final version before pilot testing at 15 participating hospitals. Efficacy of the tools will be assessed using workflow measures and organizational culture changes.

**Results:** Infection risk and intraoperative communication were identified as major hazards. Four existing briefing/debriefing tools and 6 additional evidence-based interventions were combined to form a three-part briefing/time out/debriefing tool with 95 checklist items. The briefing, which occurs before the patient enters the room, includes an introduction of team members and their roles, discussion of the procedure and patient, and conversation of known potential complications and contingency plans. The time out is similar to existing time out protocols. The debriefing occurs postprocedure and involves a discussion of opportunities for improvement. Focus group data was positive and is being compiled. A final version of the tool will be used for the pilot study.

**Conclusion:** A three-part communication improvement tool was developed. It is expected to improve process and organizational culture measures during the pilot study.

## POSTER PRESENTATIONS

### Poster 40

Eric Momin, MS4

Neurosurgery

### **Morbidity and Mortality Differs by Insurance Status after Surgical Resection of Brain Tumors in Adults in the United States**

**Objective:** The aim was to investigate how socioeconomic indicators are predictive of health outcomes. We hypothesized that uninsured patients and Medicaid recipients experience higher in-hospital mortality and complication rates after surgery for brain cancer.

**Background:** Non-privately insured patients may experience poor surgical outcomes due to suboptimal care or impaired access to care. We investigated how insurance status influences in-hospital mortality and complication rates after surgery for brain cancer.

**Methods:** We conducted a retrospective cohort study of 50,777 patients, ages 18-65 years, who underwent craniotomy for brain cancer in the United States from 1999 to 2008. The data source was the Healthcare Cost and Utilization Project's Nationwide Inpatient Sample. Two outcomes were analyzed: in-hospital death and in-hospital complication. Associations between the outcomes of interest and insurance status were examined using multivariate logistic regression models adjusting for patient demographics, comorbid conditions, and hospital characteristics.

**Results:** Lack of private insurance was found to be associated with poor post-surgical outcomes. Patients with Medicaid experienced in-hospital complications more often than privately-insured patients (Odds Ratio [OR] 1.18; 95% Confidence Interval [CI], 1.01-1.37, P=0.033). Postoperative death was more likely in patients with Medicaid (OR 1.57, CI 1.22-2.03, P less than 0.001) and uninsured patients (OR 1.60, CI 1.17-2.18, P=0.003) than privately-insured patients. These disparities appeared to be more pronounced in patients with benign tumors. Notably, Medicaid receipt was associated with nearly the same mortality rate as having no insurance. Disparities in mortality were attributable to acuity of presentation, but not differing burden of comorbid disease.

**Conclusion:** Among patients undergoing craniotomy for a brain tumor, those without private insurance were at greater risk for in-hospital complications and death compared to privately-insured patients. Insurance status, a known socioeconomic indicator, may influence neuro-oncological care in the United States.

## POSTER PRESENTATIONS

### Poster 41

Ani Ramesh, MS2

School of Medicine, School of Nursing

#### **The Role of Religion and Spirituality in Living Kidney Donors' Decision Making Process**

**Objective:** The purpose of this study is to evaluate the prevalence of spiritual and/or religious (S/R) values in living kidney donors, assess whether donors identify a higher degree of S/R values compared to a cohort non-donors, and to describe how S/R values influence a donor's decision to donate.

**Background:** Over 3,000 kidneys were donated by living donors in 2009. Medical and psychosocial criteria, including religious or spiritual motivations, are used to determine whether or not a donor is eligible to donate.

**Methods:** The Johns Hopkins Kidney Transplantation Center enrolled 445 potential donors between 2004 and 2008. These individuals completed an entry survey assessing daily spiritual experiences, values/beliefs, forgiveness, private religious practices, coping, support, and meaning. Statistical analysis was performed to compare the degree of S/R values in donors versus non-donors. Donors were stratified according to their survey responses, randomly selected, and interviewed according to a semi-structured guide.

**Results:** 65% of donors were either "highly" or "moderately" spiritual, and 55% of donors were either "highly" or "moderately" religious. There was no significant difference between donors and non-donors regarding subscales in the MMR. Qualitative content analysis of 14 interviews with donors allowed division into three categories: no S/R values, strong S/R values that did not influence their decision, and strong S/R values that guided their decision. For individuals in the second group, an immediate need, such as imminent kidney failure in a relative, made the decision automatic. Individuals in the third group identified scriptures, the Holy Spirit, and a deep connection with others as elements that influenced their decision.

**Conclusion:** For some donors, S/R values play a prominent role in their decision-making process; for others, S/R values are a key component to their identity. This study provides context to ethical concerns that physicians have regarding donors who wish to donate for religious reasons. Knowing that S/R values are quite prevalent in this sample of donors allows us to better evaluate future donors.

## POSTER PRESENTATIONS

**Poster 42**

**Megan Rybarczyk, MS2**

School of Medicine, Scholarly Concentrations

**Documenting critical need: a preliminary survey of the medical resources essential for the care of victims of sexual violence in Eastern Democratic Republic of Congo**

**Objective:** In this study, preliminary questionnaires were developed to evaluate the content and management of medical supplies essential for the care of victims of sexual violence and to document the critical need for a formal and comprehensive Post-Conflict Needs Assessment (PCNA) in the Democratic Republic of Congo (DRC). It was expected that all of the medical resources included in the questionnaires would be found both necessary and accessible to health care providers in post-conflict DRC.

**Background:** A formal PCNA in the DRC is imperative, especially in light of the violence – most notably, the sexual violence – still pervasive in the eastern provinces despite the formal end of the Second Congo War.

**Methods:** The content of the questionnaires was largely based on the Reproductive Health Kit assembled by the Reproductive Health Response in Crises Consortium (RHRC) and the United Nations Population Fund (UNFPA). Designed for acute care during catastrophic events, the Reproductive Health Kit is composed only of the most fundamental materials, making it a suitable baseline for the evaluation of situations above the emergency level. The questionnaires were distributed to 47 health care providers in the South Kivu Province using a purposive sampling method. Results were analyzed using the one sample proportion exact test with the assistance of R statistical software.

**Results:** It was found that many of the items listed were considered necessary for the care of victims (hospital: 79%; community: 93%;  $p < 0.05$ ), but few were accessible (hospital: 35%; community: 9%;  $p < 0.05$ ).

**Conclusion:** Despite its limited scope, this study has definitively shown a critical need for appropriate medical resources to care for victims and for a more formal PCNA in the DRC. In addition, it has hopefully provided an impetus to change the current unacceptable situation – one in which providers do not have the most basic materials needed to care for victims.

## POSTER PRESENTATIONS

### Poster 43

Dianna Liu, MS2

Ophthalmology

#### AS-OCT Detects Primary Angle Closure Earlier Than Gonioscopy

**Objective:** To determine whether those with open angles on gonioscopy who had angle closure on AS-OCT are at higher risk of developing angle closure than those who had open angles on both AS-OCT and gonioscopy.

**Background:** Primary angle closure glaucoma (PACG) is a leading cause of blindness in Asia. Currently, gonioscopy is the gold standard for detecting primary angle closure (PAC). Anterior segment optical coherence tomography (AS-OCT) is an imaging device that could be used to reduce the need for gonioscopy. In a screening study carried out four years ago, AS-OCT detected PAC in 10% of the cohort in whom gonioscopy revealed open angles.

**Methods:** Phakic subjects with previously closed angles on AS-OCT who had open angles on gonioscopy were reexamined, as was a sample of patients with previously open angles on both AS-OCT and gonioscopy. The examination included gonioscopy, repeat AS-OCT scan, and detailed slit lamp evaluation. We compared the incidence of PAC based on gonioscopy diagnosis between the two groups.

**Results:** 146 Singaporeans from the 2006 screening participated, 80 patients with previously found angle closure on AS-OCT but open angles on gonioscopy and 66 patients with previously found open angles on both AS-OCT and gonioscopy. The 2006 AS-OCT findings were associated with risk of angle closure four years later; 32% (95% CI 22%-42%) of those with AS-OCT angle closure in 2006 now had gonioscopic angle closure versus 14% (95% CI 6%-22%) of those with open angles on AS-OCT in 2006 ( $p < 0.01$ ).

**Conclusion:** Of those patients with open angles on gonioscopy in 2006, those who were closed on AS-OCT four years ago were more likely to have developed gonioscopic angle closure than those who had open angles on AS-OCT four years ago. AS-OCT defined angle closure is predictive of future gonioscopic status.

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## POSTER PRESENTATIONS

### Poster 44

Hormuzdiyar Dasenbrock, MS4

Neurosurgery

#### **The Impact of Weekend Hospital Admission on the Timing of Intervention and the Outcomes after Surgery for Spinal Metastases in the United States, 2005-2008**

**Objective:** This is the first study to evaluate the impact of weekend admission on the timing of intervention and outcomes after surgery for metastatic spine disease.

**Background:** Many studies have found that patients admitted on the weekend have inferior outcomes compared to those admitted on a weekday, which may be partially due to decreased availability of procedures.

**Methods:** Data from the Nationwide Inpatient Sample (2005-2008) were retrospectively extracted. Patients were included if they had metastatic disease and underwent spine surgery; elective hospital admissions were excluded. Multivariate logistic regression analyses were conducted to calculate the odds of in-hospital death and the performance of early surgery for patients admitted on the weekend compared to those admitted on a weekday. All analyses were adjusted for differences in age, gender, co-morbid disease, primary tumor histology, the presence of myelopathy, other sites of metastatic disease, expected primary payer, as well as hospital volume, bed size and teaching status.

**Results:** 2,725 admissions were evaluated. The adjusted odds of in-hospital mortality were significantly higher for patients admitted on the weekend (OR: 1.50, 95% CI: 1.09, 2.04). Weekend admission was associated with significantly lower adjusted odds of receiving surgery within one day (OR: 0.69, 95% CI: 0.51, 0.92) and within two days (OR: 0.69, 95% CI: 0.51, 0.94) of admission.

**Conclusion:** In this nationwide study, patients with metastatic spine disease admitted on the weekend had a higher mortality and were less likely to receive early surgery. Future studies are needed to delineate the reasons for these differential outcomes.

## POSTER PRESENTATIONS

## Poster 45

Haoming Qiu, MS4

Radiation Oncology

**Hearing Loss and Tumor Control Following Fractionated Stereotactic Radiation Therapy (FSRT) for Vestibular Schwannoma (VS): The Johns Hopkins Hospital (JHH) Experience**

**Objective and Background:** VS are benign tumors of the myelin sheath of CN VIII. The purpose of this study was to identify factors predicting hearing loss and tumor control following FSRT for VS.

**Methods:** Data for 385 patients with newly diagnosed VS treated with FSRT at JHH between 1999-2007 was prospectively collected. Treatment plans were designed using BrainScan version 1.80 and 1.98 with a typical prescription of 5 Gy x 5 fractions to the 80% isodose line. The ipsilateral cochlea was delineated and maximum dose calculated. Conformity index (CI) was defined as the ratio of reference isodose volume to target volume. Serviceable hearing (Gardner-Robertson Class 1 or 2) was defined as having a Speech Discrimination Score (SDS) >50 and a Pure Tone Audiometry (PTA) reception threshold <50 db. Hearing failure was defined as deterioration of SDS to <50 or PTA threshold >50 db (GR class >3). Progression was defined as an increase in tumor volume at follow-up as compared to the volume at RT planning. Median time to progression (TTP) was calculated using the Kaplan Meier method and compared to baseline tumor volume and CI using log-rank test. Cox regression was used to identify predictors of TTP and examine the relationship between hearing loss and age, baseline audiometry scores, tumor volume, CI, and cochlear dose. Patients were censored at last follow-up. P-values were two sided and attained significance at  $p < 0.05$ .

**Results:** The median age at the time of RT was 56 years, median tumor volume was 780 mm<sup>3</sup>, median CI was 2.27, and median maximum ipsilateral cochlear dose was 5.69 Gy. Median follow-up for all patients was 41 months. Audiometry was collected for 79 patients for a median of 26.7 months. Pre-treatment, 84% patients had serviceable hearing. Post-treatment, 24% had stable or improved hearing and 29% had serviceable hearing. Multivariate analysis demonstrated that only age ( $p=0.024$ ) and baseline PTA scores ( $p=0.003$ ) were significantly lower and baseline SD scores ( $p=0.001$ ) higher in patients with preserved hearing. There was a trend towards preservation of serviceable hearing in patients with a maximum cochlear dose < 5.69 Gy ( $p=0.07$ ). On univariate analysis, patients with CI <2.27 showed increased TTP of 88 months compared to 50 months ( $p < 0.001$ ), however multivariate analysis demonstrated that only tumor size >1cc was independently predictive of greater time to progression (HR 0.44,  $p < 0.001$ ).

**Conclusion:** Our data suggests that preservation of serviceable hearing following FSRT for VS is independently predicted by better baseline audiometry and lower patient age while lower cochlear dose demonstrated a strong trend towards significance. TTP was delayed in patients with higher tumor volume, and no significant relationship was found between TTP and CI on multivariate analysis.



## POSTER PRESENTATIONS

### Poster 46

Katherine Y. Fan, MS2

Head and Neck Cancer

### Comparison of Two Primary Chemoradiation Regimens in the Treatment of Advanced Head and Neck Squamous Cell Carcinoma

**Objective:** To compare the toxicity and efficacy of two different cisplatin based CRT regimens.

**Background:** Concurrent chemoradiotherapy (CRT) has become the standard regimen for managing locoregionally advanced head and neck squamous cell carcinoma (HNSCC). This therapy is associated with significant toxicity, and the optimal chemotherapeutic regimen remains controversial.

**Methods:** A retrospective review was performed for all stage III and IV HNSCC patients with no evidence of distant metastasis treated with one of the two regimens at the Greater Baltimore Medical Center from 2000 to the present. All patients received bid radiation of 125cGy five days weekly as a split course over a 45 day period. Regimen A included concomitant cisplatin (12 mg/m<sup>2</sup>/1h) and 5-fluorouracil (600 mg/m<sup>2</sup>/20h) on days 1 through 5 and 29 through 33. Regimen B included concomitant cisplatin (30 mg/m<sup>2</sup>/1h) weekly for 6 cycles. Outcome measures included disease control at 12 months, acute toxicities (myelosuppression, mucositis, nephrotoxicity, ototoxicity, peripheral neuropathy), and treatment-related adverse events (unplanned hospitalizations, death). Comparisons were analyzed with chi-square test, Fisher's exact test, and logistic regression.

**Results:** We reviewed 105 patients on A and 50 patients on B. At one year, 86% of patients on A vs. 97% of patients on B were disease-free (P= 0.11). Patients on A vs. B were less likely to experience acute thrombocytopenia (26% vs. 46%, P=0.02), but the toxicity was not limiting (grade 1-2). Patients on B vs. A were less likely to experience ototoxicity (odds ratio=0.14, CI=-Inf-0.95, P=0.04). There were no significant differences in the frequency of other acute toxicities or unplanned hospitalizations.

**Conclusion:** With concurrent radiotherapy, low-dose weekly cisplatin is more likely than higher dose cisplatin plus 5-FU to be associated with thrombocytopenia but less likely to be associated with ototoxicity. There was a trend towards better 12 month disease-free status in the group treated with weekly cisplatin.

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