

# Physical Medicine and Rehabilitation Residents' Research Day

June 8, 2010

## Graduating Residents



**Kim Washington, M.D.**



**Joanne Wu, M.D.**

## **Congratulations!**

### **Kimberly Washington, M.D.**

#### *Discharge Summary: Assures Safety, Continuity and Quality of Care of Patient*

**Kimberly Washington, M.D.;** Priya Sreedharan, M.D.; Karen Genett, ANP; Douglas Fetkenhour, M.D.; Nithya Namassivaya, M.D. and Kanakadurga R.. Poduri, M.D.

**Objective:** To evaluate and improve the completeness of discharge summaries to assure patient safety, continuity and quality of care on inpatient rehabilitation units. Comprehensive communication regarding a hospitalized patient's status to outside medical providers is essential for continuity, quality and safety of patient care.

**Design:** As a quality improvement project, six physicians reviewed several discharge summaries independently of each other. As part of the quality assurance program, discharge summaries are regularly reviewed. There were several deficiencies noted during the past years. To correct this, a discharge summary template was created that fulfills the JCAHO standards and institutional requirements for patient discharge. The discharge template includes admission (ADM) and discharge (DC) dates, diagnoses, medications (ADM and DC), admission physical exam, history of present illness, past medical history, allergies, family history, review of systems and lab data. It also encompasses a summary of the hospital course and functional status of the patient, which includes treatments, procedures, and information about the discharge, such as condition, location and discharge instructions including follow up care by primary care and other providers.

**Results:** Prior to the creation of the new discharge summary template, 25% of the summaries reviewed did not have discharge dates or admission medications, 100% of the summaries lacked discharge diet instructions, as noted in the summaries, despite 75% of the patients having hypertension, 25% having diabetes, hypercholesterolemia and renal disease. Patients routinely receive a separate discharge instructions sheet that describes their diet in detail, and therefore was not included in the discharge summary. The new template is currently in use. Future summaries will be evaluated by the same six physicians for completeness.

**Conclusion:** We expect that future summaries will include all of the above components of the improved discharge summary template, which will assure patient safety, continuity and quality of care.

**Presented at AAP Annual Meeting, Feb 2009**

*Tai Chi for Low Back Pain in Health Care Workers: A Prevention Trial, a pilot study.*

**Kimberly Washington, M.D.;** K. Rao Poduri, M.D.; Annemarie Groth-Juncker, M.D.; Erin Howe, N.P.; Elizabeth McKinley, N.P.

**Objective:** The Purpose of the study was to evaluate the effectiveness of Tai Chi in preventing recurrence of low back pain in health care providers.

**Design:** Health care providers with a history of back pain were recruited. Prior to the intervention, subjects were given 4 survey forms: a health questionnaire, Roland Morris Disability Questionnaire, Oswestry disability index 2.0 and SF36 version 2. Subjects were asked to practice Tai Chi for 5-7 minutes before working and record their practice for 3 months. At the end of 3 months they were asked to complete the same questionnaires and report occurrence of any back pain.

**Results:** Ten subjects reported practicing most days, 3 sometimes and 7 did not practice at all. Of the 10 who practiced most days 3 reported back pain. The survey responses on Roland Morris Disability Questionnaire score decrease post to pre study are highly significant at p-value <0.00001 with a mean to pre st of 1.4, st. dev = 1.35 with a t9 = -3.28. The post to pre study score decrease on the Oswestry Disability Index is highly significant at p-value < 0.00001 with a mean of -0.1617, St. dev = 0.0922 and t5 = -4.30. On the contrary, we did not find any statistically significant differences in the post to pre study scores on the SF36V2.

**Conclusion:** Our study with a very small sample demonstrated that Tai Chi practice can prevent recurrence of back pain. A large sample study will confirm our findings.

**Presented at AAPMR Annual Conference, Nov 2008**

**Joanne Wu, M.D.**

### **1.Completed Project:**

*“ThermaLimb limb heating device for use with nerve conduction studies: a translational project”*

Timothy Rice B.S., David Ciufu B.S., Andrew Knight B.S., Will Eddington B.S., **Joanne Wu, M.D.**, Greg Gdowski Ph.D.

Nerve conduction velocity is a diagnostic measure of neuropathy, disorder of the nerves, completed with electromyography. A large problem, which can lead to misdiagnosis, is that the quantitative measure of nerve conduction velocity varies significantly as a function of the body's surface temperature. Not only does this temperature vary across individuals, but the problem is exacerbated by external factors such as ambient room temperature and apparel. The diagnosis of neuropathy will be greatly improved by developing effective methods for controlling and regulating the limb's surface temperature in order to more accurately quantify the measure of nerve conduction velocity with repeatable results. Millions of Americans are diagnosed with neuropathies every year, with 5% of the American population suffering from Carpal Tunnel Syndrome and about 1,000,000 new diagnoses annually for this single neuropathy. Peripheral neuropathy also affects over 60% of 23,600,000 Americans with diabetes, a number growing every year. Better tools that lead to potentially earlier diagnosis of these disorders will have great societal impact across the U.S. The device we have developed, ThermaLimb, not only solves the problems with heat regulation and inaccurate testing, but has the potential to significantly reduce the waste and costs associated with diagnosis, and currently misdiagnosis, of nerve conduction disorders. During nerve conduction studies (NCS) the American Association of Neuromuscular Electrodagnostic Medicine recommends the skin surface be maintained between 30-32°C to ensure accurate and repeatable results. Maintenance of this temperature is required to correctly expose existing neuropathies. Currently no product is available to regulate this temperature during the exam causing repeat testing frequency of up to 40%. Our solution to this problem is ThermaLimb, a radiant heating method with a bio-feedback system to regulate the temperature of the limb. A temperature probe is used to record and provide a signal to a control system for heat intensity control. ThermaLimb provides ample room for the clinician to work while regulating temperature effectively for the duration of an exam. Therefore, ThermaLimb is a product that can directly increase the diagnosis accuracy of NCS, reducing the number of repeated tests, unnecessary surgeries, and total costs and waste incurred by this procedure.

Preliminary results are very positive. We have shown even temperatures with success at a variety of distances from limbs. Initial testing has also shown that the regulated temperature (mean +/- SD) is held over at least a nine inch portion of the limb. We have obtained results for both arms and legs from both male and female subjects. Subjects have also stated that the device does not cause discomfort, either physically or psychologically. Also, we have tested the safety of the device and shown that it poses minimal risk to either the clinician or patient. In conjunction with solving the heating needs of nerve conduction diagnostic studies and improving patient, ThermaLimb also has the ability to provide medical practices directly with large financial and environmental benefits.

**Submitted for BMESStart competition, patent pending.**

## II. Publications:

### *“The Relationship Between Gender and Post Concussion Symptoms Three Months After Sport-related Mild Traumatic Brain Injury”*

Sarah Preiss-Farzanegan, M.D.; Ben Chapman, Ph.D.; **Joanne Wu, M.D.**; Tony Wong, Ph.D.; Jeff Bazarian, M.D: *PM&R Volume 1, Issue 3, March 2009, Pages 245-253.*

**Objective:** To examine the relationship between female gender and PCS three months after sport-related MTBI, and to determine how this relationship, if it exists, is affected by potential confounding factors (age, sport characteristics, source of reporting, previous head injury/LOC).

**Background:** Mild traumatic brain injuries (MTBI) are a significant public health issue and MTBI outcome research is sparse in sport-related injuries. In the general MTBI population, older women appear to be at higher risk for persisting post-concussion symptoms (PCS) 1-3 months after injury. Several hypotheses have been proposed to explain this gender difference, however the relationship (if any) between gender and PCS in sport-related MTBI is unknown. If this relationship does indeed exist, it is also unknown how it is affected by age, sport characteristics, source of reporting, or previous head injury/LOC.

**Methods:** Nested cohort study of a prospective, NIH-funded TBI registry designed to evaluate the epidemiology and three-month outcomes of MTBI.1 Individuals evaluated in a regional trauma center ED for MTBI between Feb 3 and Sept 20, 2003 (n=1438) were interviewed in the ED for baseline demographic, historical, physical exam, mechanism of injury, psychosocial factors and neuroimaging information. The main outcome measure was PCS, measured by the RPQ via telephone three months after the initial assessment. The sample of patients with sport-related mechanism of injury (n=215) were included in the present analysis.

**Results:** The effect of gender on RPQ score revealed a significant interaction (p=0.014) for females over the age of 18; adjustment for age in adults did not appreciably diminish this risk associated with female gender in adults. Adjustment for several potential confounders in minors, self-report in females (p=0.0195), history of LOC (p=0.012) and prior ED visit for head injury (p=0.172) in males, revealed no significant gender effect. The risk associated with female gender in adults could not be explained by characteristics of women’s sports participation; no sport type group in particular was associated with increased risk of PCS.

**Conclusions:** Our findings indicate that compared to males, females are at elevated risk for PCS symptoms in adulthood, but not as minors. Further, this increased risk cannot be explained by self, rather than proxy, report, prior head injury or LOC, age, or sport characteristics. Further research is needed to elucidate the risk of PCS after sport-related MTBI in minors versus adults, age-differential recovery from mild brain injury and how to most effectively incorporate appropriate psychiatric follow-up after ED evaluation.

## III. Paper & projects in Progress:

### *a. “Geriatric Rehabilitation and Palliative Care: Oxymoron or Opportunity for Collaboration?”*

**Joanne Wu, M.D.**; Christopher C. Battaglia, M.D.; Timothy Quill, M.D.

Hospice and Palliative Care is a field that is focused on maximizing quality of life for patient and family. Hospice focuses exclusively on the end of life, while palliative care extends to a much broader population of seriously ill patients. Over the past decade, there have been many collaborations between this field and a variety of different other medical specialties. Physical Medicine and Rehabilitation is no exception. With the field’s bread and butter being restoring function, coping with disability, and decreasing illness burden in chronic diseases, there is a natural compatibility of increasing clinical interface between these two fields in the comprehensive treatment plans in various palliative care settings. This is particularly true with the geriatric population. While medical technology and evolution has allowed many patients to live longer, there is a greater chance of struggle in managing a laundry list of diseases, symptoms and disabilities. This paper focuses on five sample cases and a discussion on how to strive for a delicate balance of improving mobility and minimizing pain in rehabilitation, while catering to the unique quality of life goals and possibly end of life goals for each palliative care patient.

### *b. “Patient-Centered Multidisciplinary Approach to Cost-Effective and Functional Pain Management in Comprehensive Spine Care”*

**Joanne Wu, M.D.**; Mary Dombovy, M.D.

**Aim 1:** Examine the feasibility of a multi-disciplinary spine care model. Estimates of feasibility are critical when testing new systems-based practice approach. We focus on three factors related to general adherence and tolerance of this care delivery model: treatment session attendance, completion of recommended treatment plan, and clinic drop-out. Our interest is whether the tailored treatment approach is either better or less well tolerated than a conventional care model. Because our study is preliminary and strives

to generate data for later larger, hypothesis-testing studies, we focus on specific research questions, rather than directional hypotheses. Question 1: Will patients differ in treatment/clinic/session attendance between the multidisciplinary tailored approach than the standard care model? Question 2: Will completion and compliance of recommended therapies/prescriptions/modalities/surgery be better than the standard care model? Question 3: Will rates of satisfaction differ between multidisciplinary tailored approach than the standard care model?

**Aim 2:** Generate preliminary estimates for the improvement of physical function and reduction of pain under a multidisciplinary spine care model. Our goal here is to examine whether patients who undergo a tailored therapeutic plan provided under a multidisciplinary spine model shows evidence of greater improvement in physical function and pain, relative to the standard care model as measured by the visual analog scale, the numerical pain scale, Oswestry Disability Index, and SF-36. We focus on generating an estimate of the direction, magnitude, and range of treatment. Effect estimates will provide critical data for power analyses of future, larger trials designed to establish statistical significance.

**Aim 3:** Generate preliminary estimates for the cost of providing quality patient care under a multidisciplinary spine care model. Our goal here is to examine the cost-effectiveness in delivery of quality spine care. We consider function and pain equally important and treat them both as primary outcomes; however, to effectively provide care under this multidisciplinary tailored approach, the model should also be financially feasible. We focus on generating an estimate of the direction, magnitude, and range of cost effect. Effect estimates will provide critical data for power analyses of future, larger trials designed to establish statistical significance.

### **Third Year Residents**

#### **Mathew Abraham, M.D.**

#### ***“Double Blind Placebo Controlled Trial to Evaluate Preservation of Bone Mineral Density of the Hip and Distal Femur by Bisphosphonate Therapy (Fosamax) Following Spinal Cord Injury: A Pilot Study”***

**Mathew Abraham, M.D.;** K. Rao Poduri, M.D. (PM&R); Susan Bukata, M.D.; ( Orthopedics) and Leslie Morse, D.O (PM&R, Harvard University).

**Objectives:** The goal of this clinical research study is to explore the effect of fosamax therapy in prevention of acute SCI induced osteoporosis. The primary outcome variable will be difference in bone mineral density at the distal femur and total hip from control to experimental group that will be measured by DEXA scan at 6 month intervals up to 12 months. The goal of this clinical research study is to explore the effect of fosamax therapy in prevention of acute SCI induced osteoporosis.

**Project Plan – Procedures and Methods:** The proposed project is a randomized, placebo controlled, double blinded study aimed at evaluation of the efficacy of oral fosamax in prevention of osteoporosis in acute spinal cord injury. The setting will be a tertiary care inpatient rehabilitation center. Patients with acute traumatic or ischemic spinal cord injury will be recruited to participate in the study during the acute phase of rehabilitation. Patients will be selected based on past medical and surgical history, history of medication allergies, and prior medication use. Patients will be enrolled according to the following inclusion criteria: volunteers age 18 or older sustaining an ASIA A or ASIA B SCI who are willing to give consent and sign an IRB approved informed consent form. Exclusion criteria will include patients with a history of hypersensitivity to alendronate or other bisphosphonates, esophageal abnormality, inability to sit/stand upright for 30 minutes, creatinine clearance less than 35 milliliters/minute, hypothyroidism, malignancy, pregnancy, or prolonged steroid use.

Subjects will be included up to two weeks after the initial injury or insult. Prior to initiation of the study, participants will undergo an initial screening to identify sub clinical thyroid disorders, Vitamin D deficiency, or pregnancy. TSH, 25-hydroxyvitamin D (25(OH)D), and, for all female participants, a serum B-hCG will be drawn. Patients with a 25(OH)D level below 20 ng/ml will have the deficiency corrected with 50,000 IU oral vitamin D each day for 8 days (Malabanan et al 1998). Renal function and serum calcium will be monitored during this treatment. 25(OH)D level will be redrawn and if below 20ng/ml, the patient will undergo another cycle of oral vitamin D until level normalizes. Patients with abnormal TSH or who are pregnant will be excluded from the study. Female patients will be advised against pregnancy for the duration of the study as little clinical data exists characterizing the prenatal effect of alendronate on mother or fetus. Subjects with osteoporosis will not be eligible for the study. Additionally, serum and urine biochemical markers of bone metabolism will be assessed including osteocalcin, PTH, 25(OH)D, serum calcium, 24 hour urinary calcium, 24 hour urinary creatinine, and C-telopeptide (CTX). Patients will be randomized and those assigned to the control group will receive oral placebo once weekly for a total of 12 months. Patients randomized to the experimental arm will receive oral fosamax 70mg in pill form once weekly for a total of 12 months. Fosamax will be administered according to packaging insert to optimize absorption. Serum calcium, phosphate, osteocalcin and PTH and 25(OH)D and urine CTX levels will be followed monthly after initiation of treatment. Patients in both control and experimental groups will be monitored for adverse reactions including hypersensitivity to the medication, headache, hypocalcemia, hypophosphatemia, gastrointestinal symptoms, and esophagitis. As esophagitis is a serious reaction to alendronate treatment with a reported incidence of 1.5%, treatment will be stopped for patients who develop symptomatic, persistent esophagitis. DEXA scan of the distal femur and total hip will be performed at 6 months and 12 months. Subjects that have rapid loss (greater than 10% loss from baseline) in BMD at the 6th month DEXA evaluation will be

discontinued from the study in order for them to receive active drug therapy. The sample for this study includes approximately 10 individuals with acute SCI. Individuals will be enrolled in one of two groups: experimental (receiving alendronate) and control (receiving placebo). Our sample will be stratified into these two groups. Based on the literature, a very conservative estimate is that individuals who do not receive any treatment for loss of bone density will experience at least 15% bone loss at the distal femur within the first year after injury. We expect that those who receive alendronate will not experience this bone loss. As this study has low statistical power given an enrollment of 10 individuals, we plan on using the data as pilot information for a larger powered study in the future.

**Expected results:**

The primary outcome variable will be difference in bone mineral density at the distal femur and total hip from control to experimental group that will be measured by DEXA scan at 6 month intervals up to 12 months.

**Winner of the 2009 Scott F. Nadler Foundation for PM&R PASSOR Musculoskeletal Research Grant for \$10,000.00 & Winner of the 2010 Merck, Sharp and Dohme Corporation Investigator Initiated Studies Program Grant (for full supply of Drug and Placebo)**

***“Inpatient Care: The Importance of Discharge Summaries in Assuring Safety, Continuity and Quality of Care of Rehab Patients”***

**Mathew Abraham, MD; Douglas Fetkenhour, MD, Karen Gennett, ANP; Arrash Kirkland, MD,; Nithya Namassivaya, MD; K.R. Poduri, MD**

**Objective:** To evaluate the adequacy of the contents of a discharge summary in assuring continuity, safety and quality of patient care.

**Design:** As part of our quality assurance program 100 discharge summaries were reviewed in a 4 month period using a template which met JCAHO and institutional requirements. The discharge template included the following items: 1. Admission (ADM) and discharge (DC) dates, diagnoses and medications; 2. Admission physical exam, history of present illness, past medical history, allergies, family history, review of systems and lab data; 3. Summary of the hospital course and functional status of the patient on admission and discharge, including condition of the patient, discharge location, physical activity, diet and follow up care.

**Setting:** An acute inpatient rehabilitation unit at a university hospital

**Results:** Prior to using the discharge summary template, deficiencies were noted in many areas, most notably discharge diet instructions (100%). Of the 100 charts reviewed with a template, improvements were noted in the area of discharge diet instructions (50%). However, missing elements still existed in the following areas: ADM Diagnoses 26%; ADM medications 14%; Chief Complaint 27%; ROS 35%; Procedures 26%; DC Diagnosis 36%; DC site 18% and physical activity at DC 31%

**Conclusion:** Our study showed gaps in documentation. These missing elements could potentially compromise patient safety. Hence, discharge summaries play a major role in assuring safety and quality of patient care.

**Presented at the 2009 Academy of PM&R Annual Assembly Poster Session in Austin Texas; Oct 2009  
Published in the Supplement to PM&R - The Journal of Injury, Function and Rehabilitation “Abstracts for AAPM&R’s 70<sup>th</sup> Annual Assembly: Oct 22-25, 2009”**

***“Atypical Presentations of Pulmonary Embolism on an Acute Inpatient Rehabilitation Unit: A Case Report”***

**Mathew J. Abraham, MD; Sirish Kondabolu, Nithya Namassivaya, MD; KR Poduri, MD**

**Case:** A 26-year-old female and a 50-year-old female

A 26 year old female with a history of CML diagnosed in 2008 presented with left groin/thigh pain which limited her ability to ambulate. She was not on OCP’s or estrogen-containing products and was a non-smoker. She was diagnosed with critical illness myopathy and transferred to the acute rehabilitation unit where she had an episode of sustained SVT which was converted to sinus rhythm with an adenosine push.

The second patient is a 60 year old female with no past medical history who presented with slurred speech and right hand/foot weakness. MRI of the brain revealed multiple acute infarcts in the frontal and parietal lobes bilaterally suggestive of embolic infarctions. The patient noted 3 days of vaginal bleeding prior to admission. She was transferred to the acute rehab unit where endometrial biopsy by OB/GYN revealed endometrial adenocarcinoma.

Tertiary care medical center acute rehabilitation unit

**Workup:** 26 year old with CML: Workup by CAT Scan revealed bilateral segmental pulmonary emboli in the lower lobes.

Ultrasound of the left lower limb showed thrombi in the left common femoral to mid-femoral veins.

60 year old with embolic stroke: Complete staging CT of her chest, abdomen, and pelvis to look for any systemic metastases of her primary cancer revealed a pulmonary embolism on the right base of the lungs.

**Discussion:** Acute Pulmonary Embolism (PE) is a common medical problem which is associated with a high degree of morbidity and mortality, especially if not promptly diagnosed. This is clinically relevant given that the clinical presentation of PE is often variable

and nonspecific, making accurate diagnosis challenging. Patients that are admitted to inpatient rehabilitation units are at high risk for developing venous thromboembolism (VTE) and possible resulting PE secondary to immobility. These patients often are not mobilized during the acute inpatient admission secondary to multiple fractures, stroke, spinal cord injury, traumatic brain injury, debility from prolonged hospitalization, and status post amputation, to name a few. According to the Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II) study, the most common presenting symptoms of patients with acute PE without prior cardiopulmonary disease are dyspnea at rest or with exertion (73%), pleuritic pain (44%), cough (34%), calf or thigh pain (44%), calf or thigh swelling (41%), wheezing (21%). The most common signs were tachypnea (54%), tachycardia (24%), rales (18%), decreased breath sounds (17%) (Stein et al). The difficulty in diagnosing PE arises due to the fact that the frequency of these symptoms and signs are similar in patients with and without PE.

**Conclusion:** There is the potential for significant morbidity from unrecognized pulmonary embolism and there should be a low threshold to evaluate PE especially in patients with history of cancer or newly diagnosed cancer. Due to the variety of presentations of PE, a patient with history of cancer that demonstrates any of the symptoms or signs mentioned in the PIOPED II study should be evaluated for PE.

**Abstract Submitted for the 2010 AAPM&R Annual Assembly in Seattle, WA**

**Christina M. Escobar, M.D.**

*Discharge summaries: A tool to assure continuity of care*

**Christina M. Escobar, MD; Mathew J. Abraham, MD; Kanakadurga R. Poduri, MD; Hiang L. To,**

**Objective:**

To evaluate discharge summaries as a tool to assure continuity of care of rehabilitation patients. Our discharge summaries followed a template that met JCAHO and institutional requirements, including the following: admission and discharge dates, discharge diagnoses/medications; admission physical exam; summary of the hospital course; procedures; discharge site; physical activity; diet and follow-up care among others.

**Design:**

As part of quality improvement and enhancement of continuity of care, a mail survey was sent to primary care physicians (PCP) of our rehab patients. The survey consisted of five questions regarding rehabilitation discharge summaries: 1) Was the summary available to you on time when you saw the patient in the first follow-up [item 1]; 2) Was adequate information provided to continue medical care [item 2]; 3) Was the discharge diagnoses list complete [item 3]; 4) Are there missing elements in the summary, if yes please specify [item 4]; 5) What would you suggest we include in our future summaries [item 5]. Primary care physicians of 72 consecutive discharges from an acute hospital-based inpatient rehab unit were mailed the survey.

**Results:**

Twenty four of the seventy-two surveys were completed and returned with the following results: 100% of the respondents indicated that the summary was available to them at the time of the first follow-up visit (item #1). 100% of respondents indicated that adequate information was provided to continue medical care (item #2). 100% of respondents noted that the discharge diagnoses list was complete (item #3). 87.5% (3 of 24) of respondents noted there were missing elements in the summary, however, the missing elements were not specified (item #4). None of the respondents suggested what could be included in future summaries (item #5). Of the seventy-two surveys mailed, twelve surveys were returned indicating that the summary was never received by the PCP. Four surveys were returned undelivered.

**Conclusion:**

Our small sample of survey results indicate adequacy of our discharge summaries in providing continuity of care by the primary care physicians of our rehabilitation patients. In an ongoing effort to improve quality of care, we will be mailing the surveys along with the discharge summaries in the future. In conclusion, the study demonstrates that discharge summaries are an effective tool in assuring continuity of care.

**Presented at Association of Academic Physiatrists Annual Meeting; Bonita Springs, Florida April 2010**

*“A Novel Approach To Physical Medicine and Rehabilitation Residency Education: Utilizing New Technologies To Harness Excellence In Upstate NY.”*

**K. Rao Poduri, MD; Christina Escobar, M.D; Hiang, M. To; Miriam Weber, Ph.D.**

**Background:** Residency education has always had didactic lectures as a mainstay of imparting expert knowledge to the resident in training. At large institutions with a vast faculty base it is easy to draw upon an expert to give a lecture on a particular topic, but in smaller training institutions this can pose difficulty when faculty members do not abound. The advent of teleconferencing has brought changes to the practice of medicine and medical education. Video teleconferencing has been utilized in several medical specialty residency training programs and has been met not only with acceptability by the trainees, but also with efficacy in their education.

**Hypothesis:** This study looks to evaluate the effect of videoconference technology on resident education in didactic teaching sessions between three Physical Medicine and Rehabilitation residency training programs in Upstate New York. We hypothesize that by increasing the pool of available expert lecturers by employing videoconferencing, this will not only be a satisfactory method of learning but will also increase the knowledge base of the resident trainees. We will describe the development of the videoconference program including challenges encountered and the solutions found, as well as offer data on satisfaction and efficacy of the program.

**Methods:** To describe the process of collaboration of three separate residency programs arranging for lecturers at each site, the technical aspects of video conferencing including cost, and the challenges overcome to make the videoconference possible. Satisfaction will be measured with a questionnaire based on a Likert scale. Efficacy will be measured by a pre and post lecture test to evaluate knowledge acquisition.

**Study in progress.**

### *Left Hip Degeneration vs. Hip Fracture after Gunshot Wound to the Buttocks: A Case Report.*

#### **Christina Escobar, MD**

An 18 year old male with a gunshot wound to the buttocks with small bowel enterotomies, rectal injury, left hypogastric artery injury, and bilateral ischial spine fractures.

An 18 year old male involved in a hunting accident where he was shot with a high powered rifle in the right buttock with the bullet exiting the left buttock. Small bowel resection and sigmoid colectomy were performed for multiple enterotomies and a rectal injury with fecal contamination of the abdomen and pelvis. Bilateral ischial spine fractures were treated nonoperatively, and a left hypogastric artery injury was embolized. The patient required multiple buttock debridements, including resection of gluteus medius, minimus, piriformis and short external rotators on the left, and a near complete transaction of the sciatic nerve was discovered. He had excruciating left hip pain throughout and worsened during rehabilitation. Physical examination showed left hip subluxation. Initially patient was thought to have a hip fracture, however review by radiologist showed no fracture and confirmed superior subluxation of the left femur, deformity with fragmentation of the femoral head, severe joint space narrowing of the femur with the acetabulum, and lytic changes of the acetabulum. Fluid collection in the joint space and the soft tissues anterior to the left hip were aspirated and no bacterial growth was found.

**Discussion:** Initial contamination of the hip joint with fecal material, in conjunction with pelvic abscesses, lead to the degenerative changes of the hip. The patient was also felt to be at high risk for avascular necrosis secondary to the ballistic injury to the piriformis, and likely the circumflex vessels. The patient was discharged at a wheelchair level and 2 options were offered for hip salvage in the hopes of improving his mobility: fusion of the hip and total hip arthroplasty. Both of these surgeries were deemed risky secondary to the damage to the sciatic nerve and the resected musculature.

**Conclusion:** Many unrecognized injuries can occur with gunshot wounds, and unless there is a high degree of suspicion for these injuries they will not be discovered. This case highlights the importance of the physiatrist as not only restoring function after injury, but as the diagnostician who discovers the extent of the injury.

**Submitted and Accepted for the Annual Assembly of the American Academy of Physical Medicine and Rehabilitation; Seattle Washington, November 2010**

#### **Arrash Kirkland, M.D.**

### *Discharge Summary: Assures Safety, Continuity and Quality Care of Patients*

Mathew Abraham, MD; Douglas Fetkenhour; MD, Karen Gennett, ANP; **Arrash Kirkland, MD,;** Nithya Namassivaya, MD; K.R. Poduri, MD

**Objective:** To evaluate the adequacy of the contents of a discharge summary in assuring continuity, safety and quality of patient care.

**Design:** As part of our quality assurance program one hundred discharge summaries were reviewed in a four month period using a template which met JCAHO and institutional requirements. The discharge template included the following items: 1. admission (ADM) and discharge (DC) dates, diagnoses and medications; 2. admission physical exam, history of present illness, past medical history, allergies, family history, review of systems and lab data; 3. summary of the hospital course and functional status of the patient on admission and discharge, treatments, procedures; 4. information about the discharge, including condition of the patient, discharge location, physical activity, diet and follow up care. Current data was compared with data obtained from D/C summary review prior to the development of the template.

**Setting:** An Acute Inpatient Rehabilitation Unit at a University Hospital.

**Results:** Prior to using the discharge summary template, deficiencies were noted in many areas, most notably discharge diet instructions (100%). Of the 100 charts reviewed with a template, improvements were noted in the area of discharge diet instructions (50% improvement), Chief Complaint (2% improvement), ROS (4% improvement), Procedures (3% improvement), Adm medications (11% improvement), and Physical Activity at Discharge (19% improvement). Remaining areas of deficiency included: Adm

Diagnoses 26%; D/C Diagnosis 36%; D/C Site 18%.

**Discussion:** Deficits in communication and information transfer at hospital discharge are common and may adversely effect patient care. The contents of discharge summaries without redundancy are essential for effective communication to assure quality of care and patient safety. Review of the summaries indicated improvement in information transfer at discharge after the use of a template.

**Conclusion:** Our study indicates that using a discharge summary template is an effective strategy in ensuring and improving the quality of patient care after discharge. Deficiencies were still noted in certain areas after the use of a template, which indicates that ongoing evaluation of strategies to improve information transfer after discharge is essential.

**Presented at the 2009 Academy of PM&R Annual Assembly Poster Session in Austin Texas; Oct 2009  
Published in the Supplement to PM&R - The Journal of Injury, Function and Rehabilitation “Abstracts for AAPM&R’s 70<sup>th</sup> Annual Assembly: Oct 22-25, 2009”**

*Atypical presentation of central cord syndrome: A case report*

**Kirkland, Arrash , M.D.;** Kuhar, Sonya M.D; Fetkenhour, Douglas R, M.D.

80 year-old man with atypical presentation of central cord syndrome. The patient with past medical history of osteoarthritis, chronic low back pain, hypertension, and pacemaker for sick sinus syndrome was serving trick-or-treaters when he fell forward hitting head on surface and had total body paralysis. He eventually recovered some lower and left upper limb mobility but remained flaccid in the right upper limb. Patient's head CT revealed no intracranial abnormalities. CT of the cervical spine showed no fracture or dislocation but slight C4-C5 and C6-C7 disc space narrowing. CT of the thoracic and lumbar spine revealed old T11 and L1 compression fractures. Cervical CT myelogram revealed C3-C4 disc bulging most prominent on the right as well as C4-C5 and C5-C6 disc bulging. Posterior osteophytes were also visualized at the C4-C5 and C6-C7 levels. The patient underwent methylprednisolone therapy and was transferred to the rehabilitation unit 3 days later. On admission, exam revealed an alert, oriented male with intact memory and speech, intact cranial nerves, 2+ reflexes in upper and lower limbs, normal cerebellar exam, and normal proprioception in both feet. He had bilateral Babinski sign. He had relatively normal left upper limb and bilateral lower limb strength but had 0/5 strength in the right upper limb. He had intact light touch throughout but decreased pinprick and temperature sensation in the left upper limb from elbow to hand distally. Patient required moderate assistance for transfers and mobility but was completely dependent with all Activities of Daily Living.

After 5 weeks of inpatient rehabilitation, patient performed Activities of Daily Living with modified independence. He was modified independent with transfers and used a platform rolling walker to ambulate.

**Discussion:** This is a novel case of a patient with central cord syndrome presenting with unilateral motor and contralateral pain and temperature loss in the upper limbs.

**Conclusions:** Neck hyperextension injury may result in central cord syndrome typically with greater upper limb involvement. However, complete sparing of unilateral motor and contralateral pain/temperature domains makes this an unusual presentation.

**Submitted and Accepted for the Annual Assembly of the American Academy of Physical Medicine and Rehabilitation; Seattle Washington, November 2010**

**Ben Laplante, D.O.**

*“A retrospective database study examining correlation between satisfaction with pain control and improvement in functional status of patients with spinal stenosis.”*

**Ben Laplante, D.O.;** Clifford Everett, M.D., M.P.H.; Thomas Cesarz, M.D.

**Background:** Lumbar spinal stenosis is both an anatomic and clinical entity associated with significant pain and disability. The majority of patients with lumbar spinal stenosis report some level of disability, making functional impairment a chief concern for the clinician to evaluate and address. Multiple studies have shown improvements in both pain and functional status of patients receiving operative or conservative care, but have not focused on the relationship between pain and function over the short term in conservatively treated patients. It is currently unknown whether pain can act as a surrogate marker for function in conservatively treated patients with spinal stenosis.

**Objective:** To investigate whether pain reduction correlates with lessened disability in conservatively treated patients with spinal stenosis.

**Design:** Retrospective analysis of an outpatient clinic database with concurrent control group.

**Methods:** The study population was drawn from an orthopedic musculoskeletal practice that provided non-operative care to patients with spinal pain. The clinic database was searched to identify patients with lumbar spinal stenosis, ICD code 724.02. A total of 311 patients were identified who had complete data. Of these, 76 had a clinically significant improvement in the VAS, defined as a decrease of at least 20 on a 100mm scale. 311 patients who did not have a clinically significant improvement in the VAS were used as a control group.

**Results:** Comparison was made between the control group of 311 patients and the group of 76 patients with improved pain. For the group with improved pain, there was a decrease in the Oswestry Disability index, from 35.49 to 28.64 that was statistically significant with  $p < .000$ . Additionally, in the group with improved pain, the Modified SF-36PF decreased from 46.25 to 25.95, representing a statistically significant loss of function with  $p < .029$ .

**Conclusion:** The Oswestry Disability Index Version 1 demonstrated good correlation with pain relief and return of function. Pain relief did not correlate with the modified SF-36PF scale, in fact, it negatively correlated. This divergence of the ODI and SF36-PF requires further study.

**Presented at Association of Academic Physiatrists Annual Meeting; Bonita Springs, Florida April 2010**

## **Second Year Residents**

**Hemant Kalia, M.B.B.S., M.P.H.**

### ***Successful Rehabilitation Outcome of Functional Right Hemispherectomy in an Adult with Refractory Status Epilepticus: A Case Report:***

**Hemant Kalia M.B.B.S., M.P.H.; Douglas Fetkenhour, M.d.; Kanakadurga R. Poduri, M.D.**

A 24 year old male who underwent right hemispherectomy for refractory status epilepticus

At age 12, our patient was diagnosed with epilepsy which later progressed to intractable status epilepticus requiring high dose antiepileptics. He was persistently having 30-40 myoclonic spasms and grandmal seizures every month predilecting him to frequent falls and severe functional impairment. His seizures were aggravated by simple voluntary movements. He was using a wheelchair requiring restraints and was moderately independent with his activities of daily living.

The patient underwent acute rehabilitation for 15 days after his successful right hemispherectomy. On admission, he had left hemiplegia exhibiting flaccidity in upper arm which was managed by functional electric stimulation and spasticity in lower extremity which was managed by baclofen and range of motion exercises. His Modified Ashworth score was 2/4 in knee flexors/extensors and 3/4 in hip flexors. Interestingly, he developed isolated left deltoid and triceps spasticity requiring botulinum injection. The patient progressed exceptionally, was feeding with supervision; grooming, bathing, dressing, transferring and ambulating with minimal assistance upon discharge. Modified constraint induced movement therapy was tried but was unsuccessful.

**Setting:** (Required for Abstracts and Case Reports): Tertiary care hospital.

**Results:** (Required for Abstracts and Case Reports - Include Assessments for Case Reports.): At 3 months follow up patient is ambulating independently with a straight cane, is working as data entry specialist and is independent with all his activities of daily living. No seizure episode has been reported post surgery; plan is to slowly wean off antiepileptics in a years timeframe.

**Discussion:** (Case Reports Only): This is an exceptional case of functional recovery post right hemispherectomy in an adult thereby evincing the concept of brain plasticity . Functional Hemispherectomies are commonly performed in pediatric population but this case report calls for further analysis of this procedure in carefully selected adults.

**Conclusion:** (Required for Abstracts and Case Reports): Functional Hemispherectomies should be considered in adults who have large unilateral hemispheric lesions causing intractable seizures.

**Abstract Submitted for the 2010 AAPM&R Annual Assembly in Seattle, WA**

### ***“The efficacy of Anal Fistula Plug in Fistula-in-ano: A systematic review.”***

Garg P, Song J, Bhatia A, **Kalia H**, Menon GR.

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To assess the efficacy of Anal Fistula Plug (AFP) procedure for the treatment of fistula-in-ano especially the complex fistulas. Methods- The data base of PUBMED, MEDLINE, SCOPUS, EMBASE and COCHRANE LIBRARY for the period 1995 to 2009 was searched. A systematic analysis was carried to evaluate the success

rate of AFP procedure in fistula-in-ano. Results- A total of 25 studies were extracted and 12 (n=317) were finally included in the systematic review. The follow-up period ranged from 3.5-12 months. The AFP procedure had a success rate (patient cure rate) ranging from 24-92%. In complex fistula-in-ano in prospective studies (8/12 studies), the success rate was 35-87%. The success rate in patients with Crohn's disease was 29-86%. The success rate in the patients with single tracts was 44-93% and in patients with multiple tracts, success ranged from was 20-71%. The abscess formation/sepsis rate was 4-29% (11/108) and the plug extrusion rate was 4-41% (42/232 - 19%). Conclusions- Anal Fistula Plug procedure has a success rate ranging from 24-92% in different studies. In prospective studies of complex fistula-in-ano, there was a moderate success rate of 35-87%. As AFP is associated with low morbidity and sepsis, it appears to be a safe procedure. Further randomized controlled trials studying objective parameters of fistula healing are needed to substantiate these findings.

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**Sonya Kuhar, M.D.**

***Relationship between participation in a wheelchair sports team and the level of independence with activities of daily living achieved by the participating athletes with physical disabilities.***

Fried, Ruth P, MA, OTR/L; Kanakadurga Rao Poduri, MD; **Sonya Kuhar, M D.; Matthew Perkowski, D.O.;** Douglas Fetkenhour, MD; Kathleen Stoklosa, MS, OTR/L

The purpose of this study is to investigate the relationship between participation in a wheelchair sports team and the level of independence with activities of daily living achieved by the participating athletes who have physical disabilities. We hypothesize that children and youth who participate in a sports team with wheelchair-using peers are more likely to achieve independence in activities of daily living than those wheelchair-using peers who are not participants in team sports activities.

**Study Design:** The proposed research is prospective in nature. We will identify prospective study participants by contacting the team coaches. Matched Control participants will be identified by contacting students in inclusive and specialized schools who are patients at the Kirsch Center for Children with Physical Disabilities, and their parents.

Two groups will be studied: Athletes: Children ages 7-21 with physical disabilities who participate in team sports. They will be identified through the Rochester Rookies track and field sports team, (a program of the Center for Disability Rights) and in the Sports-Net Rochester Rockets junior competitive sports team (a division of Rochester Rehabilitation Center in Rochester NY) Control: Children ages 7-21 with physical disabilities who do not participate in team sports. These children will be recruited from the investigators' contacts at the Kirsch Center for Children with Physical Disabilities

A total of 40 participants (20 athletes and 20 controls) will be recruited. Both genders will be included. This will reflect the distribution within the population of children and youth with disabilities, which represents diverse racial and ethnic backgrounds. Children ages 7-21 with physical disabilities who are willing to complete the Vineland questionnaire will be included in this study. Participants must be willing to provide assent and their parents must be willing and able to provide permission. Participants who do not meet the above criteria for inclusion will be excluded from the study.

**Methods:** Study personnel will identify prospective study participants by contacting the team coaches of the Rochester Rookies and Rochester Rockets. The investigator will send a letter to parents of potential participants describing the study and inviting their child to participate. Follow-up phone calls will be made to parents (if child <18 years old) to provide opportunities to learn more information and have questions answered. The investigator will meet the athlete group and their parents at a team practice and obtain informed consent (assent for children and permission from parents). Investigator will identify GMFCS level and will distribute the Vineland Adaptive Behavior Scales, Interview Edition to the participants and their parents during Team practice. Questionnaires that have been completed prior to the end of practice will be collected at that time. Self-addressed, stamped envelopes will be included with questionnaires that are distributed by mail and for mailing incomplete questionnaires that were delivered in person. The investigator will use the GMFCS level and identify an appropriate match to serve as controls from patients followed at the Kirsch Center for Children with Physical Disabilities who attend inclusive and specialized schools that do not participate in team sports. The investigator will contact parents of these potential participants by mail describing the study and inviting them to participate. Follow-up phone calls will be made to parents (if child <18 years old) to provide opportunities to learn more information and have questions answered. The investigator will meet during the clinic time to obtain informed consent (assent for children and permission from parents). Participants will be asked to complete the Vineland Adaptive Behavior Scales, Interview Edition. Questionnaires that have been completed prior to the end of Clinic will be collected at that time. Self-addressed, stamped envelopes will be included with questionnaires that are distributed by mail and for mailing incomplete questionnaires that were delivered in person.

**Study in progress.**

**Matthew Perkowski, D.O.**

***“An unusual case of Neurogenic Cramp Disorder: A case report .***

**Matthew Perkowski, D.O;** Kanakadurga Rao Poduri,M.D.

61-yr-old female with diagnosis of fibromyalgia presented to clinic with chronic history of back pain and muscle cramps. Patient describes both muscle spasms and muscle stiffness that developed over many years. Muscle spasms are diffuse and all over the body. This cramp causes her severe pain (7 out of 10) and associated with diaphoresis. The spasms occur both during the day and night intermittently. She also complains of frequent falls due to her legs giving out, cannot walk 50 feet without profusely sweating, tires easily, paresthesia of bilateral feet, and has sleep difficulties. She started herself on high dose magnesium, 3200mg daily. She had been advised to stop taking high dose magnesium for concern of cardiac complications so she decreased her dose to 2400mg daily. She was diagnosed as having fibromyalgia and was treated with Lyrica. She developed side effects, the Lyrica was stopped and she was started on Cymbalta which improved her symptoms. She later stopped Cymbalta because she was gaining weight. After stopping Cymbalta she lost approximately 25 pounds and her pain remained under control with acetaminophen as needed. She had trialed physical therapy with no improvement. A neurology consult was obtained and the findings were muscles strength 4/5, intact normal gait but difficulty toe and heel-walking, intact sensation, absent lower extremity reflexes, and bilateral and symmetric tenderness to palpation of interscapular region, shoulders, elbows, wrists, hips, knees, and ankles. Overall exam findings were not consistent with her diagnosis of fibromyalgia. EMG studies revealed peripheral neuropathy. Lab tests were obtained and she was diagnosed with a neurogenic cramp disorder exacerbated by neuropathy. It was recommended that she continue treatment with magnesium.

**Discussion:** Fibromyalgia is a diagnosis by exclusion and muscle pain, spasms, fatigue and insomnia are presenting symptoms. However, this symptom complex needs thorough investigation to rule out other organic diseases.

**Conclusions:** Proper diagnosis is the key for pain management.

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***“Vitamin D Levels, Awareness, and Practices Among Resident Physicians at the University of Rochester Medical Center”***

Dr. Glenn Rehtine, M.D.; Dr. Sarah Offley, M.D.; Dr. Jeffrey Bair, M.D.; **Matthew Perkowski, D.O.**

**Objective:** To evaluate the prevalence of hypovitaminosis D, awareness of hypovitaminosis and possible affects, and impact of vitamin D supplementation among resident house staff at University of Rochester Medical Center.

**Methods:** All participants will complete a survey at the time of enrollment that will include demographic information, awareness of biologic role of Vitamin D, and validated outcome measure of personal functioning Health Related Quality of Life Index. After completion of enrollment survey, all participants will attend a short conference with the objective to educate the participants about the importance of Vitamin D supplementation and outline a universal Vitamin D3 supplementation regimen. Study participants will be given a lab requisition for serum 25-OH Vitamin D, Calcium, and Intact Parathyroid Hormone levels. Participant lab draw timing and venue is still being determined. Participants will be given a handout about Vitamin D supplementation and all participants will be recommended to take 2000 IU of cholecalciferol OTC daily. Repeat blood draw, Vitamin D survey, personal functioning Health Related Quality of Life Index will be repeated 12 months after enrollment.

**Data Analysis:** Labs, Vitamin D Knowledge and Practices Survey, and HRQoL Index will be collated at initial and 12-month follow-up. Standard statistical techniques will be used to evaluate the laboratory and HRQoL Index results independently and to identify relationships between the two measures. Survey results will be interpreted to determine participant compliance with Vitamin D supplementation and assess resident awareness of affects of Vitamin D.

**Study in progress.**