

University of Kentucky Physical Medicine & Rehabilitation



22ND
ANNUAL PM&R
RESEARCH DAY
May 27, 2010

Cardinal Hill
Rehabilitation Hospital
Center of Learning
2050 Versailles Road
Lexington, Kentucky

PROGRAM AND ABSTRACTS

22nd Annual

Physical Medicine and Rehabilitation Research Day

May 27, 2010

Cardinal Hill Rehabilitation Hospital

Lexington, KY

UKHealthCare



22nd Annual

**Physical Medicine and Rehabilitation
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**UNIVERSITY OF KENTUCKY
DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION
22nd ANNUAL RESEARCH DAY AGENDA**

CARDINAL HILL REHABILITATION HOSPITAL
CENTER OF LEARNING
May 27, 2010

8:30 a.m. – 9:00 a.m. Buffet Breakfast (CL4)

9:00 a.m. – 9:10 a.m. Opening Remarks (CL3) ~ Robert Nickerson, M.D.

PM&R RESIDENT RESEARCH PRESENTATIONS – CL3

9:10 a.m. – 9:25 a.m. Pravardhan Birthi, M.D., Physical Medicine & Rehabilitation
“Incomplete Paraplegia in an Adult with SCIWORA with
Voluntary Anal Contraction with Absence of Sacral Sensation”

9:30 a.m. – 9:45 a.m. Jay Hammock, M.D., Physical Medicine & Rehabilitation
“Sinus Bradycardia Progressing to Acute Left Heart Failure
Likely Secondary to Tizanidine (Zanaflex) Administration:
A Case Report”

9:50 a.m. – 10:05 a.m. David Brough, M.D., Physical Medicine & Rehabilitation
“TBI and PTSD in Veterans of OIF/OEF with Blast Exposure”

10:10 a.m. – 10:25 a.m. Hena Sattar, M.D., Physical Medicine & Rehabilitation
“Influence of the Kentucky Resident Training Program in
Rehabilitation Technology on the Equipment and Assistive
Technology Portion of the ABPMR Part 1 Scores”

10:30 a.m. – 10:45 a.m. **BREAK**

10:50 a.m. – 11:05 a.m. Curtis Gale-Dyer, D.O., Physical Medicine & Rehabilitation
“Swing Phase Adduction in Cerebral Palsy Diplegia:
Correlation with Physical Exam”

11:10 a.m. – 11:25 a.m. Lindsay Shroyer, M.D., Physical Medicine & Rehabilitation
“Effects of Peripheral Nerve Stimulation and Robotic Training
on Motor Recovery in Severe Hemiparesis: Case Study”

11:30 a.m. – 11:45 a.m. Oscar Ortiz Vargas, M.D., Physical Medicine & Rehabilitation
“Factors Affecting Self Study and Reading Habits in PM&R
Residents at the University of Kentucky”.

11:50 a.m. – 12:05 p.m. Silke Bernert, M.D., Physical Medicine & Rehabilitation
“Iliac Wing Fracture in a Marathon Runner: A Case Study”

12:10 p.m. Closing Remarks ~ Joe Springer, Ph.D.

PM&R Resident Presentations

ORAL PRESENTATIONS

Presenter:

Abstract Presentation:

Pravardhan Birthi, M.D.

Incomplete Paraplegia in an Adult with SCIWORA with Voluntary Anal Contraction with Absence of Sacral Sensation

Jay Hammock, M.D.

Sinus Bradycardia Progressing to Acute Left Heart Failure Likely Secondary to Tizanidine (Zanaflex) Administration: A Case Report

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Influence of the Kentucky Resident Training Program in Rehabilitation Technology on the Equipment and Assistive Technology Portion of the ABPMR Part 1 Scores

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Swing Phase Adduction in Cerebral Palsy Diplegia: Correlation with Physical Exam

Lindsay Shroyer, M.D.

Effects of Peripheral Nerve Stimulation and Robotic Training on Motor Recovery in Severe Hemiparesis: A Case Study

Oscar Ortiz Vargas, M.D.

Factors Affecting Self Study and Reading Habits in PM&R Residents at the University of Kentucky

Silke Bernert, M.D.

Iliac Wing Fracture in a Marathon Runner: A Case Study

PM&R RESIDENT PRESENTATION

Incomplete Paraplegia in an Adult with SCIWORA with Voluntary Anal Contraction with Absence of Sacral Sensation

Presenter:

Pravardhan Birthi, M.D.

Faculty Mentors/Collaborators:

Ninad Karandikar, M.D., Sara Salles, D.O.

Departmental Affiliations:

Cardinal Hill Rehab Hospital, Physical Medicine & Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Case Description: A 32-year-old morbidly obese white male presented to our acute inpatient rehabilitation hospital, status post work related bulldozer rollover accident with incomplete paraplegia. Documents from the history and physical exam in the ED revealed incomplete paraplegia, sensory loss below T12, absent rectal sensation and rectal tone, areflexic lower extremities with preservation of bowel and bladder function. Work up included a CT head, C-spine chest / abdomen all of which were negative. CT of the C/T/L spines without contrast did not reveal any changes suggestive of acute trauma to the spinal cord. There were findings of a chronic L1 compression fracture and mild degenerative joint disease. MRI 5 days later was unrevealing. The patient was given the working diagnosis of "Incomplete Spinal cord injury". The patient did receive methylprednisolone after admission to acute care. Once felt to be medically stable, the patient was transferred to our acute rehabilitation facility. The presentation of incomplete paraplegia in an adult with voluntary anal contraction despite absence of sacral sensation and negative radiographic findings as discussed.

Discussion: The clinical picture is consistent with a T 9 ASIA C spinal cord injury with paraplegia and intact voluntary anal contraction with absence of sacral sensation. We could not explain the anatomical basis for absent sacral sensations given the other neurological findings. In addition, Initial CT and MRI five days post injury, was negative for any pathology which could account for the clinical picture. A vascular etiology was considered unlikely since the sensory loss was diffuse across multiple arterial territories and MRI imaging was negative for any "hyperintensity" zones. An EMG/NCV study was consistent with "upper motor neuron syndrome" and ruled out the possibility of a psychogenic cause. A rectal needle EMG was used to differentiate Valsalva with passive pelvic floor descent and voluntary anal contraction. We then considered the possibility of "SCIWORA" (Spinal Cord Injury without Radiologic Abnormality). Literature review of SCIWORA reveals that it is more prevalent in the pediatric population and usually most commonly seen in the cervical spine. SCIWORA however does reveal MRI imaging abnormalities that correlate clinically with the neurologic deficit, unlike in our patient.

Conclusion: We present an unusual clinical scenario with paraplegia, with voluntary anal contraction and absence of sacral sensation strongly suggestive of a thoracic spinal cord injury but negative MRI imaging to determine the etiology of the injury. A rectal needle EMG was used to differentiate Valsalva with passive pelvic floor descent and voluntary anal contraction. Recovery with functional improvement in this specific scenario was similar to that expected in any patient with incomplete paraplegia.

Key Words: Cord Injury, Paraplegia, ASIA Exam, MRI, SCIWORA

PM&R RESIDENT PRESENTATION

Sinus Bradycardia Progressing to Acute Left Heart Failure Likely Secondary to Tizanidine (Zanaflex) Administration: A Case Report

Presenter:

Jay Hammock, M.D.

Collaborators:

Chadwick Walters, D.O.

Departmental Affiliations:

Cardinal Hill Rehab Hospital, Physical Medicine & Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Setting: Inpatient Rehabilitation Hospital

Patient: A 79-year-old female who was undergoing inpatient rehabilitation for mild traumatic brain injury status-post motor vehicle collision.

Case Description: The patient developed severe sinus bradycardia progressing to acute left heart failure less than thirty-six hours after initiating oral tizanidine therapy. This medication was chosen due the patient's persistent complaint of myofascial pain and spasms. Initial dose was 6mg/day in divided doses. The patient had no known coronary artery disease or congestive heart failure. Subjective complaints included new onset dyspnea and easy fatigueability. Physical exam findings included jugular venous distention and bibasilar crackles. 12-lead ECG revealed severe sinus bradycardia (35 bpm), new onset first degree AV block and QT interval prolongation. β -natriuretic peptide (BNP) was elevated at 1200 pg/ml, increased from a baseline value of 178 pg/ml.

Assessment/Results: Tizanidine was suspected as the cause of her symptoms and was discontinued. Within twenty-four hours of the last dose, the patient's vital signs returned to preadmission levels and symptoms completely resolved. Due to the rapid resolution of symptoms after discontinuing tizanidine, it was thought likely to be the offending agent.

Discussion: A similar prior case study reported development of extreme sinus bradycardia with acute right heart failure. To our knowledge, this is the first reported case of extreme bradycardia with acute left heart failure after administration of a standard initial dose of oral tizanidine.

Conclusion: The serious potential cardiovascular side effects of tizanidine must be taken into consideration when treating spasticity and myofascial pain.

Key Words: Sinus Bradycardia; Left Heart Failure; Tizanidine Hydrochloride; Zanaflex

References:

- Bes A, Eyssete M, Pierrot-Deseilligny E et al. A multi-centre, double-blind trial of tizanidine, a new antispastic agent, in spasticity associated with hemiplegia. *Curr Med Res Opin* 1988;10:7-9-18
- Kick A, Bertoli R, Moschovitis G et al. Extreme sinus bradycardia with acute right heart failure under tizanidine. *Med Klin* 2005;100:213-6
- Kitabata Y, Orita H, Kamimura M et al. Symptomatic bradycardia probably due to tizanidine hydrochloride in a chronic hemodialysis patient. *Therapeutic Apheresis and Dialysis* 2005; 9(1):74-77

PM&R RESIDENT PRESENTATION

TBI and PTSD in Veterans of OIF/OEF with Blast Exposure

Presenter:

David Brough, M.D.

Collaborators:

Randal Schleenbaker, M.D.

Departmental Affiliations:

University of Kentucky, Department of Physical Medicine & Rehabilitation, Veterans Administration, Lexington, KY

Abstract Text:

Question:

Is there a statistically significant symptom profile for TBI in the context of symptom overlap between PTSD and TBI?

The conflicts in Iraq (OIF) and Afghanistan (OEF) have resulted in combat veterans with complex physical injury and emotional trauma. Rates of traumatic brain injury (TBI) are higher than in previous wars. Mild traumatic brain injury as a result of blast exposure is more prevalent. Symptoms of TBI and PTSD have clinical similarities, making diagnosis difficult. The Department of Veterans Affairs uses the Neurobehavioral Symptom Inventory to evaluate veterans exposed to blast in the polytrauma clinic.

My work, in collaboration with Randal Schleenbaker, M.D. and others will involve using statistical data from patients exposed to blasts, and seen in the Polytrauma Clinic in the Lexington Veterans Affairs facilities. Patients' data will be divided into four groups based on their diagnosis of PTSD, TBI, both, or neither. Statistical analysis can then be used to evaluate if there is a statistically significant symptom profile for TBI.

Key Words:

Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), Traumatic Brain Injury (TBI), Post Traumatic Stress Disorder (PTSD), Neurobehavioral Symptom Inventory (NSI), Department of Veterans Affairs (VA)

PM&R RESIDENT PRESENTATION

Influence of the Kentucky Resident Training Program in Rehabilitation Technology on the Equipment and Assistive Technology Portion of the ABPMR Part 1 Scores

Presenter:

Hena Sattar, M.D.

Collaborators:

Robert Nickerson, M.D., Lumy Sawaki, M.D., Ph.D., Oscar Ortiz, M.D.

Departmental Affiliations:

Cardinal Hill Rehab Hospital, Physical Medicine & Rehabilitation, University of Kentucky, Lexington, KY
University of Louisville/Frazier Rehabilitation Center, Department of Physical Medicine & Rehabilitation

Abstract Text:

Objective:

The Kentucky Resident Training Program in Rehabilitation Technology was developed in order to provide PM&R residents with training, knowledge and skills in Assistive Technology. The program provides web-based training modules on a variety of topics in rehabilitation technology and a one month field rotation in the delivery and planning of rehabilitation technology services in vocational, rural/agricultural and other community settings.

Objective of this study is comparison of ABPMR part 1 average scores on the Equipment and Assistive Technology portion of PM&R residents from University of Kentucky, Lexington and University of Louisville/Frazier Rehab Institute to that of the national average.

Design:

Analytic cohort study comparing first time test takers ABPMR part 1 scores on the Equipment and Assistive Technology portion of PM&R residents from University of Kentucky, Lexington and University of Louisville/Frazier Rehab Institute to that of first time test takers national average. We predict that with the use of rehabilitation technology training modules the scores on the Equipment and Assistive Technology portion on ABPMR part 1 is expected to increase in these two programs.

Results:

At this time, due to the limited results (2007-2009) which we have from the University of Kentucky, Lexington PM&R department, data has shown no significant difference when compared to the national average.

Conclusion:

Once we have obtained additional results from our program as well as from University of Louisville, we plan on performing formal statistical analysis on those results, and expect average scores from the 2 programs to be significantly different from that of the national average

Key Words:

Rehabilitation Technology, Assistive Technology, Physiatrist

PM&R RESIDENT PRESENTATION

Swing Phase Adduction in Cerebral Palsy Diplegia: Correlation with Physical Exam

Presenter:

Curtis Gale-Dyer, D.O.

Collaborators:

Hank White, PT, Ph.D.² and Henry Iwinski, M.D..²

Departmental Affiliations:

¹Shriners Hospital for Children, Lexington, KY

²Department of Orthopedics, University of KY, Shriners Hospital for Children, Lexington, Kentucky

Abstract Text:

Objective: To determine 1) the amount of hip adduction at the beginning of swing phase in cerebral palsy diplegia using kinematic data and 2) if there is a correlation with dynamic hip motions while walking and passive range of motion (PROM) of hip adductors and knee flexors.

Design: Prospective Study

Setting: Gait analysis laboratory.

Participants: 494 patients who were diagnosed with cerebral palsy diplegia and gross motor functional classification system (GMFCS) level of 1-3 from gait lab database. Participants had no previous history of surgery to their lower extremities.

Main Outcome Measures: Hip adduction at 60% of the gait cycle, PROM hip abduction with the hip & knee flexed, PROM hip abduction with the hip & knee extended, PROM popliteal angle, GMFCS, and age.

Results: 157 subjects (31.8%) had hip adduction > 1 standard deviation more than age matched normative data (18% GMFCS Level 1, 24% Level 2, 48% Level 3). The correlation between the 494 participants for dynamic hip adduction versus PROM abduction with the knee flexed was $-0.239(P < .0001)$, versus PROM abduction with the knee extended was $n -0.233(P < .0001)$, and lastly versus PROM popliteal angle was $0.204(P < .0001)$. Participants with excessive hip adduction while walking and GMFCS level 2 demonstrated low ($r = .412$) but statistically significant ($p=.011$) correlation between the popliteal angle (hamstring length) and dynamic hip adduction. No significant correlations were found between the PROM of hip adductors and dynamic hip motions while walking for all GMFCS levels.

Conclusions: Less than a third of the subjects demonstrated excessive hip adduction during swing phase. However for those who used an assistive device (GMFCS level 3), excessive hip adduction was 48% out of that group. Lastly, little if any correlations were found between the dynamic hip adduction during gait motions and PROM measures.

Key Words: Cerebral Palsy, Clinical Exam, Gait Analysis

PM&R RESIDENT PRESENTATION

Effects of Peripheral Nerve Stimulation and Robotic Training on Motor Recovery in Severe Hemiparesis: Case Study

Presenter:

Lindsay N. Shroyer, M.D.

Collaborators:

Cameron Henzman, B.S., Kenneth Chelette, M.S., Laurie Nichols, B.S., O.T., Lumy Sawaki, M.D., Ph.D.

Departmental Affiliations:

Cardinal Hill Rehab Hospital, Physical Medicine & Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Stroke is the third leading cause of death in the United States and leading cause of disability among American adults. Efforts to limit the amount of tissue damaged in the acute phase of stroke have been disappointing, highlighting the need for effective therapeutic interventions after neurologic damage has occurred. The viability of such interventions is rooted in the capacity of the adult brain to undergo a degree of reorganization formerly thought to occur only during early post-natal periods.

Several lines of evidence indicate that sensory training and experience can increase the capacity for this reorganization, providing great benefit in the recovery of function after brain injury. Data from animal and human models have suggested that sensory input plays an important role in motor output, possibly by influencing cortical plasticity. Our investigation of these approaches to rehabilitation has yielded further insight into the mechanisms of functional recovery. More specifically, preliminary data from ongoing studies in chronic and subacute stroke demonstrate that motor function can be substantially enhanced when peripheral nerve stimulation (PNS) is delivered **before** intensive task-oriented therapy. In these ongoing studies, the intensity of PNS has been adjusted to elicit small compound muscle action potentials of 50 to 100 μ V without inducing muscle contractions (below motor threshold). Improvement of motor function measured by behavioral testing appears to be associated with corticomotor reorganization measured by transcranial magnetic stimulation (TMS). While afferent inputs seem to play a major role in inducing behavioral motor improvement and plastic changes in stroke patients, there have been no studies directly comparing how **timing and stimulus intensity of PNS** correlate with functional motor gains.

Specific aims of this study include:

1. Test the effect of PNS paired with robotic training on upper extremity motor function measured by the Fugl-Meyer Assessment Scale (FMA). Our hypothesis is: Above-motor threshold PNS delivered **during** robotic training will lead to a higher score on the FMA when compared to a group receiving above-motor threshold PNS delivered **prior** to robotic training. **Above-motor threshold** PNS delivered during robotic training will lead to a higher score on the FMA when compared to groups receiving **below-motor threshold** PNS delivered either during or prior to robotic training. Finally, active PNS groups will have improved FMA compared to the groups receiving sham stimulation.
2. Test the effect of PNS paired with robotic training on motor map of a specific muscle (biceps) measured by TMS. Our hypothesis is that the above-motor threshold PNS during training of the paretic upper extremity will lead to greater increase in TMS motor map on the relevant motor cortex as compared to the other five groups. One year ago we presented the proposal for this study. Over the past year this study has undergone a preparatory phase including IRB approval, study recruitment and enrolment of subjects. We will present a single case study of a subject who has completed the study. This is a double blind study and therefore intensity of the PNS stimulation is unknown to preserve the blindness until the completion of the data collection.

Key Words: Neuroplasticity, Stroke, Motor Recovery, Upper Extremity, Nerve Stimulation, Transcranial Magnetic Stimulation

PM&R RESIDENT PRESENTATION

Factors affecting self study and reading habits in PM&R residents at the University of Kentucky

Presenter:

Oscar Ortiz Vargas, M.D.

Departmental Affiliations:

University of Kentucky Medical Center, Department of Physical Medicine and Rehabilitation

Abstract Text:

Objective:

To investigate reading habits and perceived obstacles and opportunities in self-study in PM&R resident physicians at UK.

Design, participants:

Descriptive cross-sectional study involving PM&R resident physicians at University of Kentucky (UK), Lexington, Kentucky. Residents were asked to voluntarily answer an anonymous web-based survey with 7 questions, inquiring about time spend reading medical literature, preference for textbooks or scientific journals, reading time goals, and perceived barriers and opportunities to achieve those goals. Descriptive statistics and qualitative analysis using coding techniques was performed.

Results:

The survey was sent to all PGY 2, 3, and 4 PM&R residents at UK. 6/9 residents completed the survey. In average, residents read 6.17 hours a week. 61.7% of the time they read PM&R related books, followed by scientific journals (26.7%) and other sources (11.6%). All residents that answered the survey think that they are not reading enough, and 4/6 residents think they are spending just half of the time they should according with their goals. There were identified 6 perceived factors associated with reading habits. The most important factor found was the quality of the interaction with attendings 6/18. Other important factors identified are time management (4/18), and personal motivation (3/18).

Conclusions:

PM&R residents at UK have high expectations regarding their reading habits, however the average time they actually spend reading medical literature is above average when compared with other programs. Most resident rely on books for self studying. Attending-resident interaction seems to be an important factor associated with reading habits in PM&R residents at UK. Further studies to confirm and understand how attending-resident interactions facilitate reading habits in PM&R residents are needed.

Key Words:

Reading Habits, Resident Education, Graduate Medical Education, Residency, Curriculum, Programmed Instruction

PM&R RESIDENT PRESENTATION

Iliac Wing Fracture in a Marathon Runner: A Case Report

Presenter:

Silke Bernert, M.D.

Departmental Affiliations:

University of Kentucky, Department of Physical Medicine and Rehabilitation

Abstract Text:

Stress Fractures occur as result of the bone's inability to withstand repetitive, submaximal mechanical loading. The spine, pelvis and lower extremities are commonly affected with predilection for the tibia and metatarsals. This report describes the unusual case of a non-traumatic fracture of the iliac wing in an otherwise healthy female marathon runner. Although insufficiency fractures of the iliac wing have been identified in menopausal women, iliac wing fractures are not commonly reported in the context of marathon running. This case adds an important differential diagnosis in the evaluation of a high level athlete with hip pain.

Key Words:

Stress Fracture, Avulsion Fracture, Athlete

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