

University of Kentucky
Department of
Physical Medicine and
Rehabilitation

27th Annual PM&R
Research Day
May 28, 2015

HealthSouth/Cardinal Hill
Rehabilitation Hospital
Center of Learning
Lexington, Kentucky

**CARDINAL
HILL**® REHABILITATION
HOSPITAL

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College of Medicine

PROGRAM AND ABSTRACTS

27th Annual

Physical Medicine and Rehabilitation Research Day

May 28, 2015

Cardinal Hill Rehabilitation Hospital

Lexington, KY

UKHealthCare



27th Annual

**Physical Medicine and Rehabilitation
Research Day**

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**UNIVERSITY OF KENTUCKY
DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION
27th ANNUAL RESEARCH DAY AGENDA**

CARDINAL HILL REHABILITATION HOSPITAL
CENTER OF LEARNING
May 28, 2015

7:00 a.m. – 7:50 a.m. Dr. Frontera Breakfast Lecture and Roundtable with Residents
(Cardinal Hill Boardroom)

7:50 a.m. – 8:00 a.m. Opening Remarks (CL3): Susan McDowell, MD

PM&R RESIDENT RESEARCH PRESENTATIONS – CL3

8:00 a.m. – 8:20 a.m. Todd Hollen, DO, Physical Medicine & Rehabilitation
“Role of Manual Medicine in the Treatment of COPD in an
Inpatient Rehabilitation Setting”

8:20 a.m. – 8:40 a.m. Raechel Percy, DO, Physical Medicine & Rehabilitation
“Friction Blisters in Active Individuals: A Literature Review”

8:40 a.m. – 9:00 a.m. Walter Wofford, MD, Physical Medicine & Rehabilitation
“Testing the Reliability and Validity of the Anterolateral Portal
for IA Injection in the Flexed Knee with Mini-air Arthrography”

9:00 a.m. – 9:20 a.m. Namrata Raut, MD, Physical Medicine & Rehabilitation
“Functional Improvement in Spinal Abscess Patients With and
Without a History of Intravenous Substance Abuse”

9:20 a.m. – 9:40 a.m. Jamie Holt Key, DO, Physical Medicine & Rehabilitation
“A Retrospective Review of Rehabilitation Patients with Stroke
who Required Return to Acute Care Hospital”

9:40 a.m. – 9:50 a.m. ***BREAK***

9:50 a.m. – 10:10 a.m. Justin Hare, DO, Physical Medicine & Rehabilitation
“Systematic Review of Cooled Radiofrequency Ablation in the
Management of Sacroiliac Joint Pain”

10:10 a.m. – 10:30 a.m. Vinod Muniswamy, MD, Physical Medicine & Rehabilitation
“Modulating Neuropathic Pain with Transcranial Direct Current
Stimulation: Preliminary Findings from an Ongoing Study”

10:30 a.m. – 10:50 a.m. Vittal R. Nagar, MD, PhDc, Physical Medicine & Rehabilitation
“Increased Incidence of Spinal Abscess and Substance Abuse
after Implementation of State Mandated Prescription Drug
Legislation”

10:50 a.m. – 11:10 a.m. Sarah Zalone, DO, Physical Medicine & Rehabilitation
“Effect of Serial Derotational Casting Prior to Growing Rod
Instrumentation in Patients with Early Onset Scoliosis”

UNIVERSITY OF KENTUCKY
DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION
27th ANNUAL RESEARCH DAY AGENDA
(Continued)

11:10 a.m. – 11:30 a.m. Zhangliang John Ma, MD, PhD, Physical Medicine & Rehabilitation
“A Retrospective Study on Adjusting Anti-Hypertension Medications in Post-CVA Patients during Rehabilitation”

LUNCH & POSTER PRESENTATIONS

11:30 a.m. – 12:30 p.m. **Buffet Lunch (CL2)**
Poster Presentations (CL1)

POSTER PRESENTATIONS – CL1

- 1 Rachel L. Hill, Spinal Cord and Brain Injury Research Center
“Temporal Evaluation of Post-Traumatic Oxidative Damage and Mitochondrial Dysfunction Following a Severe Controlled Cortical Impact TBI in Male Rats: Implications for Pharmacological Neuroprotective Interventions”
- 2 Jamie Holt Key, DO, Physical Medicine & Rehabilitation
“Moyamoya Syndrome and Cerebral Vascular Accident as a Presenting Manifestation of Neurosyphilis: A Case Report”
- 3 Zhangliang John Ma, MD, PhD, Physical Medicine & Rehabilitation
“Suddenly Elevated International Normalized Ratio Associated with Infections: A Case Report”
- 4 Kavita Manchikanti, MD, Physical Medicine & Rehabilitation
“A Retrospective Examination of Gait Changes Post Selective Dorsal Rhizotomy in Different Age Groups”
- 5 Vinod Muniswamy, MD, Physical Medicine & Rehabilitation
“Systematic Review of Intraarticular Radiofrequency Ablation in the Management of Chronic Knee Pain Due to Osteoarthritis”
- 6 Vittal R. Nagar, MD, PhDc, Physical Medicine & Rehabilitation
“Functional Improvement for Heart Failure Patients after Left Ventricular Assistive Device Placement in a Free Standing Rehabilitation Hospital”
- 7 Elizabeth Powell, MS, Physical Medicine & Rehabilitation
“Modulation of Spinal Excitability through Transvertebral Direct Current Stimulation in Subjects with Motor Incomplete Spinal Cord Injury”
- 8 Chris Schildt, UK Biomedical Engineering
“A System for Delivering Peripheral Nerve Stimulation to Improve Hand Function in Subjects with Motor Incomplete Spinal Cord Injury in Response to Intent to Move”

UNIVERSITY OF KENTUCKY
DEPARTMENT OF PHYSICAL MEDICINE & REHABILITATION
27th ANNUAL RESEARCH DAY AGENDA
(Continued)

POSTER PRESENTATIONS – CL1 (Continued)

- 9 Camille Skubik-Peplaski, PhD, OTR
Eastern Kentucky University, Department of Occupational
Science and Occupational Therapy
“Comparing Occupation-Based and Modified Constraint-Induced
Interventions for Optimal Stroke Recovery”

- 10 Joe Springer, PhD
“Mitochondria Associated microRNA Expression Following
Traumatic Brain Injury”

- 11 Vittal R. Nagar, MD, PhD, Physical Medicine & Rehabilitation
“A Systematic Review of Hypogonadism Associated with Chronic
Opioid Therapy”

FEATURE SPEAKER – CL3 & CL4

12:30 p.m. – 1:30 p.m. Walter Frontera, MD, PhD
Professor and Chair, Physical Medicine and Rehabilitation
Vanderbilt University, School of Medicine
Medical Director of Rehabilitation Services
Vanderbilt University Medical Center

“Effectiveness of Exercise in the Rehabilitation of Sarcopenia”

AWARDS AND CLOSING REMARKS – CL3

1:30 p.m. – 1:45 p.m. Awards & Closing Remarks
Joe Springer, PhD, Physical Medicine & Rehabilitation
Robert Nickerson, MD, Physical Medicine & Rehabilitation

PM&R Resident Presentations

ORAL PRESENTATIONS

Presenter:

Abstract Presentation:

Todd Hollen, DO

“Role of Manual Medicine in the Treatment of COPD in an Inpatient Rehabilitation Setting”

Raechel Percy, DO

“Friction Blisters in Active Individuals: A Literature Review”

Walter Wofford, MD

“Testing the Reliability and Validity of the Anterolateral Portal for IA Injection in the Flexed Knee with Mini-air Arthrography”

Namrata Raut, MD

“Functional Improvement in Spinal Abscess Patients With and Without a History of Intravenous Substance Abuse”

Jamie Holt Key, DO

“A Retrospective Review of Rehabilitation Patients with Stroke who Required Return to Acute Care Hospital”

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Vittal R. Nagar, MD, PhD

“Increased Incidence of Spinal Abscess and Substance Abuse after Implementation of State Mandated Prescription Drug Legislation”

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“Effect of Serial Derotational Casting Prior to Growing Rod Instrumentation in Patients with Early Onset Scoliosis”

Zhangliang John Ma, MD, PhD

“A Retrospective Study on Adjusting Anti-Hypertension Medications in Post-CVA Patients during Rehabilitation”

PM&R RESIDENT PRESENTATION

Role of Manual Medicine in the Treatment of COPD in an Inpatient Rehabilitation Setting

Presenter:

Todd Hollen, DO¹

Faculty Mentors/Collaborators:

Joe Springer, PhD¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Background: To date, there have been no studies that have clinically evaluated the use of osteopathic manipulation techniques (OMT) to reduce pain in the setting of chronic obstructive pulmonary disease (COPD) during inpatient rehabilitation following a COPD exacerbation.

Hypothesis: Patients that are post COPD exacerbations will have pain reduction with application of OMT resulting in better functional outcomes when combined with inpatient rehabilitation.

Objective: The aims of this study are to 1) evaluate the efficacy of OMT directed at the diaphragm, rib cage, thoracic and cervical spine mechanics and the impact of these techniques in reduction of musculoskeletal pain in the setting of COPD; 2) evaluate pulmonary function pre-and post-treatment; 3) evaluate exercise tolerance and performance using 6 minute walk test; and 4) assess patient's perceived exertion utilizing the Borg scale.

Design: Prospective pilot study of 15 patients participating in inpatient rehabilitation with a diagnosis of COPD exacerbation.

Study Population:

Inclusion criteria: Patients who are 40 years or older, have a diagnosis of COPD exacerbation from most recent acute care hospital stay.

Exclusion criteria: Patients that are <40 years old or >70 years old, recent chest wall fractures or barotrauma, severe osteoporosis, lung cancer, cardiothoracic surgery within the last 6 months.

Procedure: Patients will be treated with OMT twice weekly for 3 weeks during their inpatient rehabilitation hospitalization. OMT sessions will be limited to 30 minutes. Target areas will include the cervical spine, thoracic spine, rib cage, and diaphragm. Balance ligamentous tension technique will be used for the diaphragm, and cervical spine, rib raising for thoracic spine, and a combination of balance ligamentous tension and rib raising for the rib cage mechanics.

Outcomes Measured:

Pain will be assessed before and after OMT treatments using the Brief Pain Inventory (Short Form).

PFTs will be completed on admission, and prior to and following completion of OMT (prior to discharge).

The 6 minute walk test will be performed pre-and post OMT treatments.

The Borg scale will be used for measurement of perceived exertion and conducted pre-and post OMT treatments.

Expected Outcome:

Following treatment with OMT during inpatient rehabilitation stay, we expect patients will exhibit:

A decrease in musculoskeletal pain in the rib cage, cervical and thoracic spines.

Minimal improvement in patient's PFTs.

Increased performance in the 6 minute walk test.

A decrease in patient's perceived exertion

Key Words: Osteopathic Manipulation Treatment, COPD, Pain in COPD, Musculoskeletal Pain, Manual Therapy

NOTES

PM&R RESIDENT PRESENTATION

Friction Blisters in Active Individuals: A Literature Review

Presenter:

Raechel Percy, DO¹

Collaborators:

Robert Worthing, MD², Ali Fils, MD³

Departmental Affiliations:

¹Department of Physical Medicine & Rehabilitation, University of Kentucky, Lexington, KY

²Department of Physical Medicine & Rehabilitation, VAMC, Lexington, KY

³Department of Physical Medicine & Rehabilitation, University of Utah, Salt Lake City, UT

Abstract Text:

Friction blisters of the foot are one of the most common injuries in active individuals and can have profound effects on their ability to perform. While often viewed as a minor annoyance, blisters can be debilitating in the wilderness, mid-competition, or on the battlefield, and can lead to significant medical complications such as sepsis. However, little is understood about the prevention of these injuries. The purpose of this review is to assimilate the available peer-reviewed literature on friction blisters to determine the pathophysiology and risk factors for blister development, as well as prevention techniques and technologies; with a goal of identifying areas for further investigation. A PubMed and Cochrane database search was performed with a secondary search of references for all English-language published literature from 1990-2014. Investigators have come to a consensus that shearing forces result in separation at the level of the stratum spinosum giving way to blister formation. Prevention is aimed at attempting to decrease the coefficient of friction and therefore reducing friction forces during activity, decreasing moisture, or a combination of both by using sock systems, plasters, and antiperspirants. However, to date, there has been insufficient data to correlate laboratory outcomes to in-the-field results.

Key Words: Blister, Friction, Foot, Dermatologic Injury

NOTES

PM&R RESIDENT PRESENTATION

Testing the Reliability and Validity of the Anterolateral Portal for IA Injection in the Flexed Knee with Mini-air Arthrography”

Presenter:

Walter Wofford, MD¹

Collaborators:

Oscar Ortiz-Vargas, MD², Vittal R. Nagar, MD¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²Department of Physical Medicine and Rehabilitation, VAMC, Lexington, KY

Abstract Text:

Background: IA knee injections are the most commonly performed sports medicine office procedures (39-64%). There has been great effort to improve outcomes and expand the evidence base for various approaches and modalities (palpation-guided versus US-guided, radiographic confirmation versus confirmation of placement per exam). Traditional anterolateral knee injections target the synovial membrane reflections in the intercondylar notch.

Objective: Previous studies describe an US-guided anterolateral portal for IA knee injection which targets the synovial membrane of the medial femoral condyle. The prior article notes significant outcome difference between groups which received treatment with injection delivered after palpable contact with the condyle and those who did not. Our primary aim is to demonstrate the reliability of this approach and validate its success this time with the use of ‘mini-air arthrography’. The secondary aim is to demonstrate good procedural success using a single syringe needle, without engaging the medial femoral condyle with the needle tip.

Methods: The study will be performed at Veteran Affairs Medical Center, Lexington. We will rely on US-guided placement and observed dissection of the relevant potential space with treatment agent. Lateral plain films of treated upright knees provide radiographic confirmation of the anatomical placement.

Expected Results: Avoiding engagement with the medial femoral condyle will minimize injury to articular cartilage. We expect to perform procedure time efficiently without using double syringes and ultrasound probe cover.

Key Words: Knee Pain, Intra Articular Injection, Ultrasonography, Interventional

NOTES

PM&R RESIDENT PRESENTATION

Functional Improvement in Spinal Abscess Patients With and Without a History of Intravenous Substance Abuse

Presenter:

Namrata Raut, MD¹

Collaborators:

Sara Salles, DO¹, Vittal R. Nagar, MD, PhD¹, Joe Springer, PhD¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Background: Spinal epidural abscess (SEA) is a rare but often devastating infection of the epidural space surrounding the spinal cord. Studies have shown that a large percentage of patients suffering from SEA have history of intravenous (iv) drug abuse. However, there are no studies to date comparing functional outcomes in SEA patients who have a history of iv drug abuse compared to those with no iv drug abuse.

Hypothesis: SEA patients with a history of iv drug abuse will have lower levels of functional improvement compared to those without history of iv drug abuse.

Objective: The objective of this study is to determine whether there is any difference in functional outcomes after acute inpatient rehabilitation in patients with SEA with and without history of iv drug abuse. The study will also compare pain and other neuropathic medications at discharge, their length of stay in acute rehabilitation, and discharge disposition.

Study Design: A retrospective review of existing medical records of patients admitted for acute inpatient rehabilitation after being treated for SEA at Cardinal Hill Rehabilitation Hospital (CHRH). No identifiable PHI will be collected from the proposed chart reviews.

Study Population: Inclusion Criteria: Hospital records of all patients with a diagnosis of SEA admitted to CHRH during a 5-year period between 01-2011-12-2015. Patients will have received a standard inpatient rehabilitation program defined as a total of 3 hours per day of comprehensive physical and occupational therapy, as well as speech therapy as indicated.

Exclusion criteria: Patients will be excluded if they were younger than 18 yrs. or were pregnant.

Outcomes Measured: All patient data will be reviewed and abstracted from electronic medical records at CHRH. Among the data included will be demographics and pertinent clinical characteristics. The primary outcome measure will be Functional Independence Measure (FIM) scores at admission and discharge. Secondary outcome measures will include length of stay, medications at discharge, and discharge disposition.

Expected Outcomes: We expect to see a significant improvement in FIM score gains at discharge in SEA patients with no history of iv drug abuse compared to those with a history of iv drug abuse. We also expect to see variation in the number, type and doses of pain medications, length of stay and discharge disposition between these two groups.

Key Words: Epidural Abscess, Rehabilitation, Activities of Daily Living Improvement, Pain Medication

NOTES

PM&R RESIDENT PRESENTATION

A Retrospective Review of Rehabilitation Patients with Stroke who Required Return to Acute Care Hospital

Presenter:

Jamie Holt Key, DO¹

Collaborators:

Erika Erlandson, MD¹, David Akers²

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²Department of Statistics, University of Kentucky, Lexington, KY

Abstract Text:

Objective:

- Investigate causes for return to acute care hospital (RTACH) for evaluation during a rehabilitation admission for patients with stroke.
- Identify risk factors for readmission to acute care in this population.

Design:

- Retrospective chart review.

Setting:

- Acute Inpatient Rehabilitation Hospital; Acute Care Hospital

Participants:

- Patients admitted to a stroke rehabilitation unit between July, 2012 and November, 2013 who required RTACH.

Main Outcome Measures:

- Reason for RTACH, etiology of stroke, presence of aphasia and dysphagia, weekday vs. weekend transfer, anticoagulation status, length of stay, age, and functional independence measure scores.

Level of Evidence:

- Level IV

Results:

- A total of 63 patients with stroke required RTACH during the documented time interval; 37 (59%) were readmitted to acute care. All patients with sepsis (n=7) and 75% (n=18) of patients with aphasia who required RTACH were readmitted (p=0.02). In addition, 73% (n=27) of patients identified as critical transfers (those with sepsis, neurologic changes, or cardiac symptoms) required readmission to acute care. A total of 70% (n=26) of those readmitted had a diagnosis of dysphagia. Finally, all of the patients readmitted to acute care (n=37) had a significantly shorter length of stay in rehab prior to transfer (p=0.02).

Conclusions:

- Risk factors for readmission to acute care include sepsis, neurologic changes, cardiac symptoms, aphasia, dysphagia, and shorter length of rehabilitation stay prior to transfer.
- These factors will be used to generate a risk stratification protocol for discharge planning and transition of care. This protocol will be used to identify patients with stroke who are at high risk for readmission to acute care in efforts to decrease healthcare costs, minimize setbacks and lost days in rehab, thereby improving overall outcomes.

Key Words:

- Stroke Rehabilitation, Readmission, Healthcare finance

NOTES

PM&R RESIDENT PRESENTATION

Systematic Review of Cooled Radiofrequency Ablation in the Management of Sacroiliac Joint Pain

Presenter:

Justin Hare, DO¹

Collaborators:

Vinod Muniswamy, MD¹, Oscar Ortiz Vargas, MD², Sarah Salles, DO¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²Department of Physical Medicine and Rehabilitation, VAMC, Lexington, KY

Abstract Text:

Sacroiliac region pain accounts for a large percentage of chronic axial low back pain and has been shown to negatively impact an individual's functional ability and quality of life. Conservative treatments have shown variable degrees of success.

Cooled Radiofrequency (RF) ablation or neurotomy has been recently introduced as an option to treat sacroiliac joint pain. Our goal is to assess the available literature and efficacy of this new treatment approach to a historical difficult area of pain to manage.

Objective: To investigate the efficacy of cooled Radiofrequency ablation to L5 posterior ramus and lateral sacral branches for the treatment of sacroiliac joint pain, particularly its impact on function, pain, and quality of life.

Methods: This systematic review included literature searches of PubMed, Cochrane, Clinical trials, Google Scholar and EMBASE from January 2000 to January 2015. The Cochrane review criteria, AMSTAR Checklist, and Newcastle-Ottawa Scale criteria were used for quality assessment and clinical relevance of the literature. The level of evidence was classified as good, fair and poor based on quality. The primary outcomes measured were pain control, functional improvement and quality of life.

Results: Initial search revealed 39 studies that had the potential for consideration. Of them 17 studies were identified to match the criteria. 11 studies met the inclusion criteria. Of them 1 systematic review, 3 randomized control trial (RCT), 7 nonrandomized study were analyzed. We determined that 4 of the 11 studies were of good quality, 4 were of moderate quality and the rest of poor quality. Most of the studies demonstrates >50% pain relief.

(A meta-analysis, including nonrandomized studies, reveals a significant improvement on pain and function with this intervention (p value <0.05).

Key Words: Cooled RFA, Sacroilitis, SI joint pain

NOTES

PM&R RESIDENT PRESENTATION

Modulating Neuropathic Pain with Transcranial Direct Current Stimulation: Preliminary Findings from an Ongoing Study

Presenter:

Vinod Muniswamy, MD^{1,2}

Collaborators:

Paul Sloan, MD³, Lumy Sawaki, MD, PhD^{1,2}, Elizabeth Powell, MS^{1,2}

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²HealthSouth/Cardinal Hill Rehabilitation Hospital, Lexington, KY

³Department of Anesthesiology & Pain Management, University of Kentucky, Lexington, KY

Abstract Text:

Pain impacts millions of people, affecting their physical and emotional functioning and quality of life. Neuropathic pain is considered an example of maladaptive pain. It is understood as a disruption of the normal pain signaling process and causes sensitization or spontaneous neuronal activity in the nervous system. Some of the many examples of neuropathic pain include phantom limb pain (PLP), complex regional pain syndrome (CRPS), and neuropathic pain following spinal cord injury (SCI). Recently, non-invasive brain stimulation techniques such as transcranial direct current stimulation (tDCS) have emerged as promising interventions to modulate neuropathic pain. However, most studies have applied tDCS over either dorsolateralprefrontal cortex (DLPFC) or primary motor cortex (M1). No studies have collected multiple baseline measures, including quality-of-life measures, before the tDCS intervention. Therefore, we are performing a small, randomized, sham-controlled study with 2 specific aims. Specific Aim #1 is to determine the effect of tDCS on pain and quality of life associated with neuropathic pain. Specific Aim #2 is to determine the specificity of tDCS site for modulation of pain and quality of life associated with neuropathic pain. Each subject participates in 4 evaluation sessions and 10 tDCS sessions. Subjects are randomly assigned to 1 of the following 3 groups:

- Group 1: anodal tDCS over DLPFC
- Group 2: anodal tDCS over M1
- Group 3: sham tDCS over DLPFC

Our preliminary findings indicate that on all outcome measures, tDCS applied over M1 appears to yield more benefit than tDCS applied over DLPFC.

Key Words: Transcranial Direct Current Stimulation, Phantom Limb Pain, Complex Regional Pain Syndrome, Spinal Cord Injury, Non-invasive Brain Stimulation, Humans

NOTES

PM&R RESIDENT PRESENTATION

Increased Incidence of Spinal Abscess and Substance Abuse after Implementation of State Mandated Prescription Drug Legislation

Presenter:

Vittal R. Nagar, MD, PhD^{1,2}

Collaborators:

Joe E. Springer, PhD^{1,2}, Sara Salles, DO^{1,2}

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²Cardinal Hill Rehabilitation Hospital, Lexington, KY

Abstract Text:

Objectives: To investigate the incidence of spinal abscess and substance abuse in a tertiary care hospital after state legislation titled “House Bill 1” (HB1) mandated stricter regulation of prescription drugs of abuse in Kentucky in 2012.

Design: A retrospective case series study design was used to review the incidence of spinal abscess and drug abuse diagnoses admissions from 2010-2014. Variances in the incidence of spinal abscess and substance abuse were plotted across this time frame.

Results: The incidence of intraspinal abscess increased 1.56 fold in 2011 (n=26) and 2012 (n=25) relative to 2010 (n=16). However, in 2013, the year following implementation of HB1 legislation, the incidence of intraspinal abscess increased 2.38 fold (n=38) and then 4.19 fold (n=67) in 2014. The incidence of intraspinal abscess in subjects with drug abuse diagnosis remained constant between 2010 (n=3) and 2012 (n=3). However, it increased 2 fold (n=7) in 2013 and then 9 fold (n=27) in 2014. A correlation coefficient (rSAD) of 0.775 revealed a strong association between the increase incidence of intraspinal abscess and diagnosis of drug abuse.

Conclusions: The results of this retrospective study demonstrate an increased incidence of intraspinal abscess associated with drug abuse after passage of HB1 legislation regulating prescriptions of controlled medications in Kentucky. This increased incidence may be related to individuals relying on non-prescription drugs of abuse due to more highly regulated access to controlled prescription medications. However, additional factors unrelated to HB1 legislation must be taken into account.

Key Words: Pain Management; Spinal Cord; Substance Abuse; Addiction; Narcotics; Rehabilitation Medicine

NOTES

PM&R RESIDENT PRESENTATION

Effect of Serial Derotational Casting Prior to Growing Rod Instrumentation in Patients with Early Onset Scoliosis

Presenter:

Sarah Zalone, DO¹

Collaborators:

Zack Witte, MD², Rebekah Dunnagan, MD², Ryan D. Muchow, MD², Henry J. Iwinski, MD³, Vishwas R. Talwalkar, MD²

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

²Department of Orthopaedic Surgery & Sports Medicine, University of Kentucky, Lexington, KY

³Shriners Hospitals for Children, Lexington, KY

Abstract Text:

Summary: Serial derotational casting can be used as a delay tactic prior to initiating growing rod surgery in EOS patients. In evaluating growing rod patients that had prior casting, we determined that cast treatment prior to surgery had no negative effect on outcome as determined by similar chest diameter, SAL, T1-T12 length, L1-S1 length, T1-S1 length, and T1-S1/PW compared to the primary lengthening patients.

Hypothesis: Serial casting prior to growing rod surgery does not affect surgical outcomes of growing rod surgery.

Design: Case-controlled, retrospective review.

Introduction: Serial derotational casting for EOS has been proposed as a delay tactic in patients with significant curves to avoid the complications inherent to growing rod surgery. This study seeks to determine the effect casting has on the surgical outcomes of patients who transition from casting to growing rod surgery.

Methods: An IRB-approved, retrospective review was performed to identify patients with EOS treated with growing rod surgery - one group had serial casting prior to surgery and the control was treated primarily with growing rod surgery. Demographic data (age at time of surgery, height %, weight %, etiology) and clinical data (curve type, Cobb angle, concave and convex chest width, SAL, T1-T12 length, L1-S1 length, T1-S1 length, T1-S1/PW, number of lengthening procedures, complications) were collected. Chi-square and t-test analyses were performed.

Results: 9 patients had serial casting (avg. 3.5 casts) and 10 underwent surgery primarily. The two groups had similar age, height %, and weight % upon initiation of surgical treatment ($p>0.05$). There were 6 idiopathic and 3 syndromic patients in the casting group, while the control group had 2 idiopathic patients and 8 syndromic patients. The casting group had a higher pre-op major Cobb angle (82.4 v. 72.8, $p=0.23$) and had a similar initial post-op Cobb angle (45.6; 44.7% correction v. 42.4; 41.8% correction, $p=0.54$). The casting group underwent an avg. of 6.0 lengthenings compared to 5.4 in the initial surgery group and had similar improvement in chest width, SAL, T1-T12 length, L1-S1 length, T1-S1 length, and T1-S1/PW ($p>0.05$). The final percent curve correction was 33.0% in the casting group versus 20.3% in the primary lengthening group ($p=0.31$). Operative complications occurred in 8/9 casting patients and 5/10 primary lengthening patients ($p=0.14$).

Conclusion: Serial casting prior to growing rod instrumentation does not seem to hinder the ability to obtain initial correction or improve growth parameters throughout the lengthening process.

Key Words: Serial Casting, Early Onset Scoliosis, Growing Rods

NOTES

PM&R RESIDENT PRESENTATION

A Retrospective Study on Adjusting Anti-Hypertension Medications in Post-CVA Patients during Rehabilitation

Presenter:

Zhangliang John Ma, MD, PhD¹

Collaborators:

Robert Nickerson, MD¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Objective: To characterize the relationship of hypotension and decreasing anti-HTN medication during rehabilitation in post-CVA patients with history of primary HTN.

Design: This retrospective study was conducted in patients who were admitted to Cardinal Hill Rehabilitation Hospital (CHRH) between January 2010 and December 2013 (n=308 participants). Their anti-HTN medications were reviewed from UK hospital or home, admission at CHRH and at discharge to home. The number and dosage of anti-HTN medications at time of admission and at home were compared to those at time of discharge from rehabilitation.

Participants: All UK adult patients (≥18 years) in the general rehabilitation unit and stroke rehabilitation unit at CHRH.

Results: Of the 101 patients from General Rehabilitation Unit (GRU), 22 patients had chronic kidney diseases or other secondary hypertension, and 26 patients had no anti-HTN medications, so 53 (101 - 22 - 26) patients from GRU were used as control group. Among these 53 patients, their ages were between 49 and 93 years old, gender male/female ratio was 24/29. It was found that 9 or 16.89% of them needed to decrease the dose of anti-HTN medications, and 44 or 83.03% of them did not need to decrease their anti-HTN medications. In 208 patients from Stroke Unit, 67 had CKD or other secondary HTN, 38 had chronic or recurrent stroke, so 103 (208 - 67 - 38) patients from Stroke Unit were used as the stroke group. Their ages were between 47 and 92 years old, male/female ratio was 47/57, It was found that nearly half or 49.51% of stroke patients needed to decrease their anti-HTN medications due to hypotension, compared with that of control group (16.98%, $P < 0.01$). Among the 51 stroke patients, 18 of them had right middle cerebral artery (MCA) territory stroke; 10 had left MCA stroke; 6 had right basal ganglion (BG) stroke; 3 had left BG stroke; 4 had cerebellar stroke; 6 had SAH or posterior cerebral (PCA) territory stroke, 4 had lacunar or pontine stroke. Of note, MCA stroke composed 54.9% (28/51) of those patients who needed a decrease their anti-HTN medications, followed by BG stroke 17.65%. All other lesions of stroke composed 24.45%.

Conclusions:

1. About 49.51% new stroke patients need to decrease their anti-HTN medications during rehabilitation compared to 16.98% of patients in general rehabilitation which is statistically significant ($p < 0.01$).
2. In 51 post-stroke patients who need to lower or stop their anti-HTN, 28 were MCA stroke (54.9%), followed by basal ganglion stroke (17.65%). The rest of strokes were located in cerebellum, pons, PCA, lacunar and SAH which composed about 24.45%.
3. Monitoring CVA-patients' blood pressure and adjusting anti-HTN medications during rehabilitation is essential to avoid hypotension.

Key Words: Hypotension, Hypertension, CVA, Anti-HTN

NOTES

POSTER PRESENTATIONS

<u>Presenter:</u>	<u>Poster #</u>	<u>Poster Presentation:</u>
Rachel L. Hill	1	Temporal Evaluation of Post-Traumatic Oxidative Damage and Mitochondrial Dysfunction Following A Severe Controlled Cortical Impact TBI in Male Rats: Implications for Pharmacological Neuro-protective Interventions
Jamie Holt Key, DO	2	Moyamoya Syndrome and Cerebral Vascular Accident as a Presenting Manifestation of Neurosyphilis: A Case Report
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POSTER PRESENTATION - 1

Temporal Evaluation of Post-traumatic Oxidative Damage and Mitochondrial Dysfunction Following a Severe Controlled Cortical Impact TBI in Male Rats: Implications for Pharmacological Neuroprotective Interventions

Presenter:

Rachel L. Hill^{1,2}

Collaborators:

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Abstract Text:

Traumatic brain injury (TBI) results in the rapid production of free radical damage in essential cellular and mitochondrial components leading to neuronal dysfunction and cell death. Free radicals generated in brain mitochondria initiate lipid peroxidation (LP) that degrades cell membranes and leading to the production of reactive aldehydes such as 4-hydroxynonenal (4-HNE) that impair mitochondrial oxidative phosphorylation and Ca⁺⁺ buffering functions. The resulting Ca⁺⁺ overload activates calpain-mediated proteolytic degradation of neuronal cytoskeletal proteins such as α -spectrin. However, the temporal profile (i.e. onset, peak and duration) of LP-mediated oxidative damage has not been well established, nor has the profile of mitochondrial damage and dysfunction following TBI in the rat. The aim of this study was to investigate the hypothesis that cortical oxidative damage, mitochondrial dysfunction and cytoskeletal degradation in the brain occur in a temporally progressive synchronous manner resulting in neuronal degeneration following a severe controlled cortical impact (CCI) TBI in young male adult rats between 3 hrs. out to 7 days post injury. We observed an initial decrease in mitochondrial bioenergetics within 3 hrs. with the poorest respiratory function observed at 72 hrs. Consistent with this finding, peroxidation of mitochondrial and cellular lipids as well as α -spectrin degradation also progressively increased to maximal levels by 72 hrs. after injury. These findings of a surprisingly delayed peak in secondary injury, suggest that the therapeutic window and needed treatment duration for certain antioxidant treatment strategies following CCI-TBI in rodents may be longer than previously believed.

Key Words: Traumatic Brain Injury (TBI), Therapeutic Window, Free-radicals, Lipid Peroxidation (LP), Spectrin Degradation

POSTER PRESENTATION - 2

Moyamoya Syndrome and Cerebral Vascular Accident as a Presenting Manifestation of Neurosyphilis: A Case Report

Presenter:

Jamie Holt Key, DO^{1,2}

Collaborators:

Erika Erlandson, MD^{1,2}

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²Cardinal Hill Rehabilitation Hospital, Lexington, KY

Abstract Text:

Case Description: A 27 year old Caucasian male with history of psoriasis, xanthomas, and allergic rhinitis developed acute onset left hemiparesis and slurred speech. The patient was found to have right middle and posterior cerebral arteries watershed infarcts and cerebral angiogram findings consistent with Moyamoya Disease. Additional acute care workup manifested dyslipidemia, a positive Rapid Plasma Regain titer, elevated Anticardiolipin IgG and IgM, as well as a positive Venereal Disease Research Laboratory titer suggestive of neurosyphilis.

Setting: Acute Inpatient Rehabilitation Hospital

Results: The patient underwent a full 14-day course of Penicillin G treatment for neurosyphilis while participating in acute rehabilitation. His Functional Independence Measures increased rapidly in comparison to other Moyamoya cases without discernable inflammatory etiology.

Discussion: Historically, Moyamoya Syndrome is one of unknown etiology but has been associated with a number of diseases and illnesses including meningitis, Down syndrome, Systemic Lupus, Neurofibromatosis Type I, tuberculosis, head trauma, head irradiation, von Reckinhausen's disease, hyperthyroidism, Tuberous Sclerosis, Marfan Syndrome, Sickle Cell Anemia, atherosclerosis, and even contraceptive use. To our knowledge, this is the first reported case of Moyamoya disease associated with neurosyphilis without concomitant immunodeficiency. In this case, a mechanism of cerebral vasculitis or inflammation is favored. On-going insidious disease may allow for further Moyamoya collaterals and impending clinical deficits and debility unless invasive measures are taken to restore cerebral circulation.

Conclusions: Given an increasing number of Moyamoya cases presenting to neurorehabilitation facilities, and the likelihood of an inflammatory role in Moyamoya Syndrome, treatment of underlying illness (if available) could potentially delay or negate need for invasive revascularization procedures and promote better (and possibly quicker) outcomes in an acute rehabilitation setting. Furthermore, it might be prudent to investigate associated diseases in efforts to improve standards of care.

Key Words: Stroke, Syphilis, Moyamoya

POSTER PRESENTATION - 3

Suddenly Elevated International Normalized Ratio Associated with Infections: A Case Report

Presenter:

Zhangliang John Ma, MD, PhD¹

Collaborators:

Joe Springer, PhD¹, Robert Nickerson, MD¹, Oscar Ortiz Vargas, MD²

Departmental Affiliations:

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Abstract Text:

Here we described three scenarios in a rehabilitation hospital setting of suddenly elevated international normalized ratio (INR) in patients who were placed on anti-coagulation therapy with Coumadin prior to rehabilitation. Two stroke patients and one poly-trauma patient (MVC) with subarachnoid hemorrhage, all had therapeutic INR at admission, with no changes in diet or medications prior to elevated INR. With 3-4 days following admission, all three patients exhibited elevated INR that was not responsive to reduction of Coumadin dose. One stroke patient was found to have an abdominal abscess as determined by CT scan at an acute hospital. The second stroke patient was found to have acute peritonitis. The poly-trauma patient was found to have abscess in her left thigh determined by CT scan. These cases suggested that sudden INR elevation may be related to infection in patients who are on Coumadin treatment.

Key Words: Elevated INR, Coumadin, Infection

POSTER PRESENTATION - 4

A Retrospective Examination of Gait Changes Post Selective Dorsal Rhizotomy in Different Age Groups

Presenter:

Kavita Manchikanti, MD¹

Collaborators:

Hank White, PhD², Sara Salles, DO¹, Henry Iwinski, MD²

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Abstract Text:

Selective dorsal rhizotomy (SDR) is widely used in the treatment of children with cerebral palsy (CP) and has been shown to reduce spasticity and improve gait parameters. The recommended age for SDR varies between centers, but some suggest that it be performed at an age prior to irreversible neuromuscular changes and the need for orthopedic interventions. However, few studies have compared outcomes between age groups. This study seeks to examine changes in gait following SDR across different age groups. An IRB approved retrospective review of 46 patients with CP with spastic diplegia (GMFCS levels 1-4) who underwent SDR was performed. Participants who had gait analysis prior to and one year post-SDR were included. Age range was 3.5 to 15.8 years. Subjects were subdivided into two age groups: less than 6 (n= 21) and 6 or older (n=25) at time of SDR. Pre- and post-operative gait parameters in the groups were compared using a paired t test. Significance was set at 0.05. After SDR, statistically significant improvements in gait kinematics of decreased anterior trunk lean, hip flexion, and knee flexion during stance were noted in the younger group. Both groups demonstrated increased dorsiflexion during stance. Walking speed remained unchanged. Limitations of this study include lack of controls for other interventions and long-term follow up. The results suggest that further research should compare long-term outcomes following SDR between age groups. Duplication of these results would support that SDR should be pursued at a young age if improved gait is the desired outcome.

Key Words: Cerebral Palsy, Selective Dorsal Rhizotomy, Spasticity, Gait

POSTER PRESENTATION - 5

Systematic Review of Intraarticular Radiofrequency Ablation in the Management of Chronic Knee Pain Due to Osteoarthritis

Presenter:

Vinod Muniswamy, MD¹

Collaborators:

Justin Hare, DO¹, Jay Grider, DO², Oscar Ortiz Vargas, MD³

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Abstract Text:

Chronic knee pain due to OA impairs function and quality of life. Conservative treatments are effective for symptom control in mild to moderate osteoarthritis. For severe OA, or refractory joint pain, knee arthroplasty is an excellent option; however, in patients with medical contraindications for surgery, treatment options are very limited. Radiofrequency (RF) ablation or neurotomy has limited literature substantiating its use.

Objective: To investigate the efficacy of RF ablation to genicular nerves for the treatment of chronic knee pain due to osteoarthritis, particularly its impact on function, pain, and quality of life.

Methods: This systematic review included literature searches of PubMed, Cochrane, Clinical trials, Google Scholar and EMBASE from January 2000 to January 2015. The Cochrane review criteria and Newcastle-Ottawa Scale criteria were used for quality assessment and clinical relevance of the literature. The level of evidence was classified as good, fair and poor based on quality. The primary outcomes measured were pain control, functional improvement and quality of life.

Results: 32 studies were identified. 8 studies met the inclusion criteria. There was one RCT, one non RCT, five prospective studies and one retrospective study. We determined that 1 of the 8 studies was of good quality, 3 of the 8 were of moderate quality and the rest of poor quality. All the studies favor the use RF ablation for the treatment of knee OA. A meta-analysis, including nonrandomized studies, reveals a significant improvement on pain and function with this intervention (p value <0.05).

Conclusions: Based on our review, RFA is an effective and safe choice for refractory knee pain due to chronic osteoarthritis. However, there is need for more good quality RCTs.

Key Words: RFA, Knee OA, Knee Osteoarthritis, RFA Knee Pain, Denervation, Genicular Neurotomy

POSTER PRESENTATION - 6

Functional Improvement for Heart Failure Patients After Left Ventricular Assistive Device Placement in a Free Standing Rehabilitation Hospital

Presenter:

Vittal R. Nagar, MD, PhD¹

Collaborators:

Robert Nickerson, MD¹

Departmental Affiliations:

¹Department of Physical Medicine and Rehabilitation, University of Kentucky, Lexington, KY

Abstract Text:

Objective: To examine effectiveness of acute inpatient rehabilitation (AIR) in improving functional outcomes in people who have left ventricular assist device (LVAD) placement.

Methods: A retrospective review of medical records of 20 LVAD patients admitted to Cardinal Hill Rehabilitation Hospital (CHRH), Lexington, KY between 01/2011 and 11/2013 was performed.

Results: LVAD patients with AIR had significantly higher FIM scores from admission to discharge on several FIM categories. Specifically, two-tailed paired t-test demonstrated that AIR resulted in a significant increase in: (1) total FIM score ($p < 0.0001$); (2) motor ($p < 0.0001$) and cognitive ($p < 0.0001$) FIM components; (3) self-care ($p < 0.0001$), transfer-mobility ($p = 0.0001$), communication ($p < 0.0001$), and social cognition ($p < 0.0001$) sub-components. The mean \pm standard deviation (SD) for (a) length of stay was 12.3 ± 6.3 days; (b) total FIM gain was 27.05 ± 13.41 compared to the national mean of 23 for patients admitted to AIR for cardiac diagnosis; (c) total FIM efficiency was 2.454 ± 1.4 , compared to the national mean for cardiac-related AIR stay of 2.28. 95% of patients were discharged directly to home.

Conclusions: Our study suggests that patients with LVADs achieved both motor and cognitive functional gains from AIR stay. Beneficial effect of AIR stay promotes safe discharge home.

Key Words: Acute Rehabilitation, Heart Failure, Left Ventricular Assist Device, Free Standing Rehabilitation Hospital

POSTER PRESENTATION - 7

Modulation of Spinal Excitability through Transvertebral Direct Current Stimulation in Subjects with Motor Incomplete Spinal Cord Injury

Presenter:

Elizabeth Powell, MS¹

Collaborators:

Emily Salyers, BS¹; Cheryl Carrico, MS, OT/L¹; Radha Korupolu MBBS, MS¹;
Lumy Sawaki, MD, PhD^{1,2}

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Abstract Text:

According to the National Spinal Cord Injury Statistical Center, as many as 300,000 people in the United States are living with spinal cord injury (SCI). Unfortunately, efforts to minimize neurologic damage in acute SCI have met with only limited success. Thus, there is an urgent need for interventions to enhance recovery of function for people with SCI. To address this evidence gap, we have recently demonstrated that a novel technique called transvertebral direct current stimulation (tvDCS) has neuromodulatory effects on the corticospinal tract in healthy volunteers. To build on these results, we are conducting a study of tvDCS in participants with SCI. Our central hypothesis is that active tvDCS will lead to a greater increase in corticospinal excitability than sham tvDCS, in a polarity-dependent manner. Four subjects (target n=10) with motor incomplete SCI have participated in a crossover comparison of anodal versus cathodal versus sham tvDCS, at thoracic level T10-T11 (total of 3 separate sessions per subject). Each subject received 20 minutes of each tvDCS condition. The order of the conditions was randomized. Primary outcome measures included Hmax/Mmax ratio recorded in triceps surae muscle bilaterally. Preliminary results indicate that cathodal and anodal polarizations may yield opposite effects when measured by Hmax/Mmax ratio and transcranial magnetic stimulation. These results will help establish a reliable, reproducible tvDCS methodology to modulate spinal excitability. Our next planned study phase will evaluate the effects of tvDCS paired with locomotor training for subjects with motor incomplete SCI.

Key Words: Spinal Cord Injury, H Reflex, Transvertebral Direct Current Stimulation

POSTER PRESENTATION - 8

A System for Delivering Peripheral Nerve Stimulation to Improve Hand Function in Subjects with Motor Incomplete Spinal Cord Injury in Response to Intent to Move

Presenter:

Chris Schildt¹

Collaborators:

Elizabeth Salmon, MS², Earl Fugate¹, Lumy Sawaki, MD, PhD², and Sridhar Sunderam, PhD¹

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Abstract Text:

Patients with incomplete spinal cord injuries (SCI) often have impaired hand function. Open-loop electrical stimulation applied to afferent nerves of the impaired hand can improve hand function. We believe that peripheral nerve stimulation (PNS) delivered in closed-loop only in response to patient's intent to move will facilitate functional motor recovery more than open-loop through a Hebbian learning process. The mu-rhythm is an idle motor pattern characterized as an 8-12Hz oscillation recorded from motor regions of the cerebral cortex in the electroencephalogram (EEG). A decrease in power of the mu-rhythm coincides with musculoskeletal movement, and often predicts movement before execution. We have developed an EEG detector of mu-band power suppression to determine when a motor SCI patient intends to move, and simultaneously apply PNS. To date, we have successfully screened 7 motor SCI subjects to test individuals' performance using our system. Excluding 2 subjects because of poor signal quality, the average detector sensitivity was about 60%. We consider a true positive to be a detection occurring between a cue to move and the peak force produced in a prompted hand gripping task. 2 of the 7 initially screened were invited for a more extensive interventional study consisting of 12 sessions of closed-loop stimulation spread over 4 consecutive weeks. The long term goal is to determine whether closed-loop PNS therapy improves hand function compared to analogous open-loop therapies, and to develop a system that readily, accurately, and consistently detects movement in patients without extensive training or calibration.

Key Words: Peripheral Nerve Stimulation, Closed-loop, EEG

POSTER PRESENTATION - 9

Comparing Occupation-Based and Modified Constraint-Induced Interventions for Optimal Stroke Recovery

Presenter:

Camille Skubik-Peplaski PhD OTR/L¹

Collaborators:

Melba Custer PhD OT/L¹, Lumy Sawaki MD PhD^{2,3}, Robin Stroud MS OTR/L³,
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Abstract Text:

Two-thirds of stroke survivors experience upper-extremity (UE) impairment (Rosamond et al., 2008) leading to difficulty with UE motor function and performing meaningful occupations (Trombly & Ma, 2002). Evidence suggests that occupation-based interventions are highly concordant with principles that drive neuroplastic change (Skubik-Peplaski et al, 2012). Modified constraint-induced therapy a technique using high repetition movement patterns is effective in improving UE function (Liepart, 2000). Yet to date no studies have compared these two types of interventions to build evidence to guide occupational therapists in their clinical reasoning skills and confusion continues to exist on which technique is more effective. Currently, 12 of 16 participants with chronic stroke have completed a mixed method study evaluating the effects of these stroke interventions. Pretesting and post testing were completed by a blinded occupational therapist. To date participants in both intervention groups demonstrated; increases in motor recovery, spontaneous use of both extremities during tasks and clinically significant positive change scores on the Canadian Occupational Performance Measure for performance and satisfaction were found post intervention. Transcranial Magnetic Stimulation results revealed larger nMV post intervention. Qualitative data analysis results suggest patients perceive increased performance ability post intervention. Since the study is not complete a conclusion of intervention effectiveness cannot be made at this time. The small sample size and variability of time since stroke onset limits the generalizability of the results. Yet, all participants demonstrated improved performance and quality of life following 8 interventions sessions that incorporated both occupation and modified constraint-induced training.

Key Words: Stroke, Occupational Therapy, Motor Recovery

POSTER PRESENTATION - 10

Mitochondria Associated microRNA Expression Following Traumatic Brain Injury

Presenter:

Joe Springer, PhD^{1,3,4}

Collaborators:

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Abstract Text:

Traumatic brain injury (TBI) is a major cause of death and disability. However, the molecular events contributing to the pathogenesis are not well understood. Mitochondria serve as the powerhouse of cells, respond to cellular demands and stressors, and play an essential role in cell signaling, differentiation, and survival. There is clear evidence of compromised mitochondrial function following TBI, however, the underlying mechanisms and consequences are not clear. MicroRNAs (miRNAs) are small non-coding RNA molecules that regulate gene expression post-transcriptionally, and function as important mediators of neuronal development, synaptic plasticity, and neurodegeneration. Several miRNAs show altered expression following TBI, however, the relevance of mitochondria in these pathways is unknown. Here, we present evidence supporting the association of miRNA with hippocampal mitochondria, as well as changes in mitochondria-associated miRNA expression following a controlled cortical impact (CCI) injury in rats. Specifically, we found that the miRNA processing proteins Argonaute (AGO) and Dicer are present in mitochondria fractions from uninjured rat hippocampus, and immunoprecipitation of AGO associated miRNA from mitochondria suggests the presence of functional RNA-induced silencing complexes. Interestingly, RT-qPCR miRNA array studies revealed that a subset of miRNA is enriched in mitochondria relative to cytoplasm. At 12 hour following CCI, several miRNAs are significantly altered in hippocampal mitochondria and cytoplasm. In addition, levels of miR-155 and miR-223, both of which play a role in inflammatory processes, are significantly elevated in both cytoplasm and mitochondria. We propose that mitochondria-associated miRNAs may play an important role in regulating the response to TBI.

Key Words: Mitochondria, microRNA, Hippocampus, Brain Injury

POSTER PRESENTATION - 11

A Systematic Review of Hypogonadism Associated with Chronic Opioid Therapy

Presenter:

Vittal R. Nagar, MD, PhD^{1,3}

Collaborators:

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⁴Pain Management, Saint Francis Medical Center, Grand Island, NE

Abstract Text:

Background: Sexual dysfunction and Opioid-Induced Sexual Hormone Deficiency (OPISHD) have been associated with patients on long-term opioid pain therapy (LTOPT). There have been few comprehensive reviews to establish a relation between hypogonadism with chronic opioid pain management. The OPISHD is often not treated and literature guiding this topic is scarce.

Objective: To investigate hypogonadism associated with LTOPT based on qualitative data analysis of the available literature.

Interventions: Systematic review included relevant literature identified through searches of PubMed, Cochrane, Clinical Trials, US National Guideline Clearinghouse, and EMBASE, for the years 1960 to September 2013. Quality assessment and clinical relevance criteria used were the Cochrane Musculoskeletal Review Group Criteria for randomized control trials and the Newcastle-Ottawa Scale Criteria for observational studies. Level of evidence was classified as good, fair, and poor, based on the quality of evidence.

Main outcome measures: Primary outcome measures were clinical symptoms and laboratory markers of hypogonadism. Secondary outcome measure was management of OPISHD.

Results: Thirty-one studies were identified, of which 14 studies met inclusion criteria. There were no randomized control trials and eight of 14 studies were of moderate quality. Remaining studies were of poor quality. Four studies report most patients on LTOPT have associated hypogonadism and three studies of patients receiving intrathecal opioid therapy suggest that hypogonadism is common.

Conclusions: There is lack of high-quality studies to associate chronic opioid pain management with hypogonadism. At present, there is fair evidence to associate hypogonadism with chronic opioid pain management, and only limited evidence for treatment of OPISHD.

Key Words: Chronic Pain, Opioids, Hypogonadism, Hypogonadism Treatment, Long-term Opioid Therapy, Chronic Nonmalignant Pain

KEYNOTE SPEAKER PRESENTATION

“Effectiveness of Exercise in the Rehabilitation of Sarcopenia”



WALTER FRONTERA, MD, PHD

Dr. Walter Frontera is Professor and Chair of Physical Medicine and Rehabilitation at Vanderbilt University School of Medicine and the Medical Director of Rehabilitation Services at Vanderbilt University Medical Center. Dr. Frontera received his medical degree from the University of Puerto Rico School of Medicine in 1979, and his PhD (with distinction) in Applied Anatomy and Physiology from Boston University in 1986. He joined Vanderbilt University in 2011 as the inaugural chair of PM&R. Prior to joining Vanderbilt University, Dr. Frontera served as Professor and Chair of PM&R at Harvard Medical School from 1996-2006, and then as Dean of the Faculty of Medicine at the University of Puerto Rico from 2006-2011.

Dr. Frontera is the author of more than 200 scientific publications, including 75 peer-reviewed manuscripts and 10 edited books. Currently, he is editor-in-chief of *The American Journal of PM&R* and served as past-president of the International Federation of Sports Medicine. Dr. Frontera's research interest is the study of the basic mechanisms that underlie skeletal muscle dysfunction in elderly men and women and in patients with chronic disease. Part of his research concerns the use of exercise to slow down and rehabilitate muscle weakness and atrophy in various patient populations. His clinical interest is in the rehabilitation of sports-related injuries to the musculoskeletal system.

Dr. Frontera has received several awards including the AAP's Distinguished Academician Award in 2005 and Outstanding Service Award in 2010, the Best Scientific Research Paper (3 times) presented by the American Academy of PM&R, and the Harvard Foundation Award for his contributions to the field of PM&R. In 2008, he was elected to the Institute of Medicine of the National Academies, and in 2009, member-at-large of the National Board of Medical Examiners. Recently he became the first recipient of Kessler's Foundation's Joel DeLisa, MD Award for Excellence in PM&R and was presented with the Sidney Licht Lecture Award by the International Society of PM&R. He is an honorary member of the Aragonese-Spanish Society of Sports Medicine, the Chilean Society of PM&R, The Dominican Society of PM&R, the Euskalerrria Society of Rehabilitation, the Italian Society of PM&R, the Japanese Association of Rehabilitation Medicine, the Malaysian Society of Sports and Exercise Medicine, and the Spanish Federation of Sports Medicine.

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