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## Paraplegia Following an Intrathecal Hydromorphone and Bupivacaine Pump Removal

Joseph Fike

*University of Nebraska Medical Center*

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## Paraplegia Following an Intrathecal Hydromorphone and Bupivacaine Pump Removal

### Abstract

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Blood and CSF cultures became positive for *Pasteurella multocida*. Parents reported a dog and cat in the home but denied direct contact with the neonate. However, the mother reported she sustained cat scratches and bites throughout her pregnancy, including the days up to delivery. Therefore, it is possible that the infection was incurred via vertical

transmission. Given the potential for suppurative complications of neonatal bacterial meningitis, a brain MRI was obtained and was normal. The patient completed 21 days of ampicillin and had a complete recovery. Consent was obtained to use this case for educational purposes.

**Conclusion:** Care should be taken with neonates exposed to household animals, as they are at risk for more serious and invasive *Pasteurella* infections. Notably, caution should also be taken with expecting mothers who are exposed to animals that are more likely to scratch or bite, as vertical transmission of *Pasteurella* is possible.

## #105. Plantar Grasp Sign as a Screening Tool for Orthostatic Tremor (OT)

**Vekash Raja**<sup>1</sup>, Rebecca Thompson<sup>1,2</sup>, Danish Bhatti<sup>1</sup>, Kalyan Malgireddy<sup>1</sup>, Venkata Sunil Bendi<sup>1</sup>, John M. Bertoni<sup>1</sup>, Diego Torres-Russotto<sup>1</sup>

<sup>1</sup>Department of Neurological Sciences, Division of Movement Disorders, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

<sup>2</sup>Dartmouth-Hitchcock Medical Center, One Medical Center Drive, Lebanon, NH, USA

**Mentor:** Erin Smith

**Program:** Neurological Sciences – Movement Disorders

**Type:** Original Research

**Background:** Orthostatic tremor (OT) is a rare neurological disorder characterized by a sensation of instability while standing. Very few clinical signs have been described for OT to date. Finding other symptoms and signs could prove valuable for this hard-to-recognize disease.

**Methods:** This protocol is part of the University of Nebraska Medical Center Orthostatic Tremor longitudinal study. It was noted that OT patients flex their toes and sometimes the foot arch while standing (Plantar Grasp). They reported doing this to “grab” the floor and improve stability. This paper analyses the diagnostic test characteristics of the patient’s self-reported Plantar

Grasp, a new sign in OT.

**Results:** There were 34 OT patients (88% females) and 20 control patients (65% females). Eighty-eight percent of patients with OT reported the plantar grasp sign and none of the controls. The Plantar Grasp Sign was found to be very sensitive (88%) and extremely specific (100%) in our cohort. Non-weighted Negative Likelihood Ratio (NLR) was 0.12. And the 3% prevalence

weighted NLR was so low that the negative post-test probability was close to zero (**Table 1**).

**Conclusion:** Due to its high sensitivity, specificity, and ideal likelihood ratio, we propose that the Plantar Grasp sign could be considered to screen patients with possible OT. Further studies are needed to determine the specificity of this sign in OT versus other balance disorders.

**Table 1.** Plantar Grasp Sign Test Characteristics

Plantar Grasp Sign	EMG Positive (OT)	EMG Negative (No OT)	Total	
Positive Plantar Grasp Sign	TP (30)	FP (0)	30	PPV (100%)
Negative Plantar Grasp Sign	FN (04)	TN (20)	24	NPV (83%)
Total	34	20	54	NLR (0.12)
	Sensitivity (88%)	Specificity (100%)	PLR: to infinity	Accuracy (92%)

EMG- Electromyography, TP- True Positive, FN- False Negative, FP- False Positive, TN- True Negative, PPV- Positive Predictive Value, NPV- Negative Predictive Value, NLR- Negative Likelihood Ratio PLR- Positive Likelihood Ratio

## #106. Application of the Karnofsky Performance Scale (KPS) in Inpatient Cancer Rehabilitation

**Justin Comer**<sup>1</sup>, Samuel Bierner<sup>1</sup>, Celeste Newstrom<sup>2</sup>

<sup>1</sup>Department of Physical Medicine & Rehabilitation, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

<sup>2</sup>Department of Physical Therapy, College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE, USA

**Mentor:** Samuel Bierner

**Program:** Physical Medicine & Rehabilitation

**Type:** Original Research

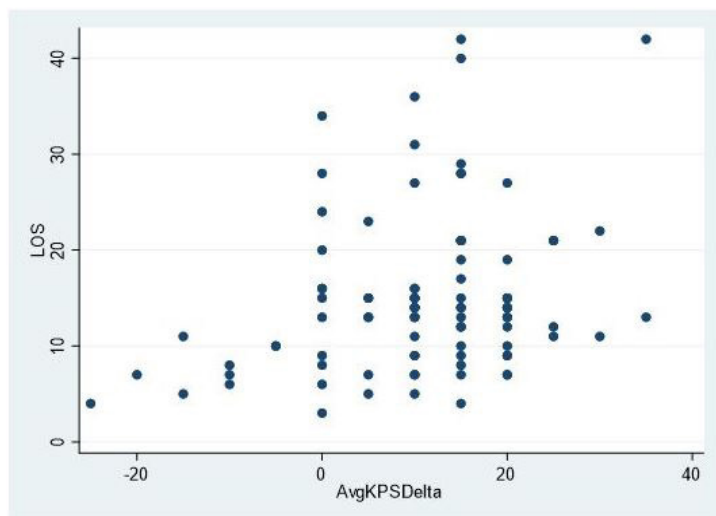
**Background:** The Karnofsky Performance Scale (KPS) is an assessment tool used in oncology to measure functional status. Functional outcome measures used in inpatient rehabilitation include functional independence measure (FIM) and GG score. Using KPS in acute inpatient rehabilitation may provide a consistent method of communication between the oncology and acute rehabilitation teams.

**Methods:** Ninety three patients were selected randomly from a database of cancer patients admitted to Madonna Rehabilitation Hospital between 7/1/2019 – 6/30/2021. Two independent observers determined the admission/discharge KPS score for each patient. Admission/discharge GG score was calculated in 63 patients and admission/discharge FIM score was calculated in 30 patients.

**Results:** Graphical analysis of length of stay (LOS) and delta KPS showed a positive correlation, but with significant scatter between 0 and 20 delta KPS score (**Figure 1**). Graphical analysis of LOS and delta GG score showed a positive correlation without significant scatter. For determination of initial KPS score, there was substantial agreement between each observer (kappa = 0.700). For

the final KPS score at discharge, there was fair agreement (kappa = 0.304). For the difference between final and initial scores (delta KPS), there was slight agreement (kappa = 0.2). Logistic regression showed that the only significant predictor of return to acute care was the average delta KPS with an odds ratio (95% confidence interval) of 0.845 (0.764 - 0.934). Initial KPS score was not a significant predictor of return to acute care.

**Conclusion:** The KPS may not be the best tool for tracking functional status during inpatient rehabilitation.



**Figure 1.** Graphical analysis of the length of stay (LOS) and the averaged delta KPS (average between the two observers).

## #107. Paraplegia Following an Intrathecal Hydromorphone and Bupivacaine Pump Removal

Joseph Fike<sup>1</sup>, Eric Jonsword<sup>1</sup>, **Blake Farrar<sup>1</sup>**

<sup>1</sup>Department of Physical Medicine & Rehabilitation, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

**Mentor:** Daniel Pierce

**Program:** Physical Medicine & Rehabilitation

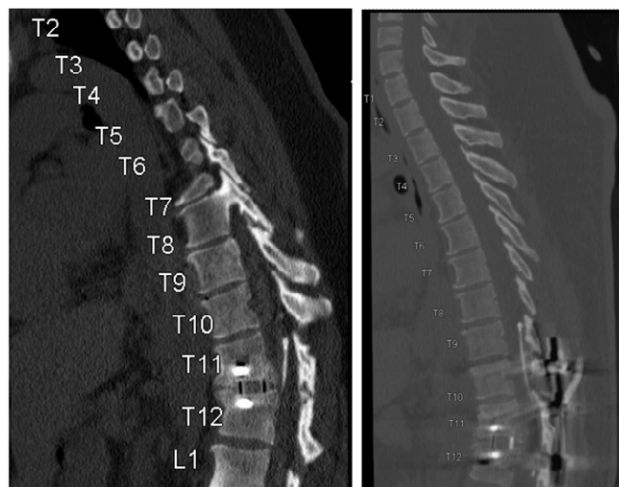
**Type:** Case Report

**Background:** In addition to pain relief, intrathecal pain management improves function and quality of life, with significant patient satisfaction. This case emphasizes the significance of recognizing and managing the potential complications associated with intrathecal therapy for pain management.

**Case:** A 36-year-old female with history of T12-S1 interbody fusion and chronic back pain managed with intrathecal hydromorphone and bupivacaine had significantly reduced efficacy following a fall onto her back. Her pump was deemed fully functional and she underwent an extension of thoracolumbar fusion and pump replacement. Intraoperatively, the pump catheter was found to be broken with an underlying collection of clear fluid and fluoroscopy revealed that the pump catheter had migrated 6 cm cephalad.

Intraoperative electromyography revealed motor and sensory changes. Post-operative images confirmed catheter migration (**Figure 1**). Twelve days post-operation, the patient was classified as T12 AIS (American Spinal Injury Association Impairment Scale) B spinal cord injury. One-month post-operation patient was classified as L1 AIS C.

**Conclusion:** During the implantation and removal of intrathecal catheters, direct damage to the nerve roots or spinal cord itself can occur. Other mechanisms of neurological injury seen in intrathecal drug delivery systems include the development of a syrinx or even a granuloma. An injury in either of these manners, however, is unlikely in our patient given the chronicity of these complications versus the acute onset of



**Figure 1.** Pre-op vs. Post-op CT scans showing catheter migration

her neurologic change. Given the growing prevalence of intrathecal pumps, physicians must understand and counsel patients on the risks associated with them regardless of the mechanism.

## #108. Focal Cerebral Arteriopathy of Childhood and Trisomy 21

Salman Assad<sup>1</sup>, Marco Gonzalez Castellon<sup>1</sup>

<sup>1</sup>Department of Neurological Sciences, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

**Mentor:** Marco Gonzalez Castellon

**Program:** Neurological Sciences - Vascular Neurology

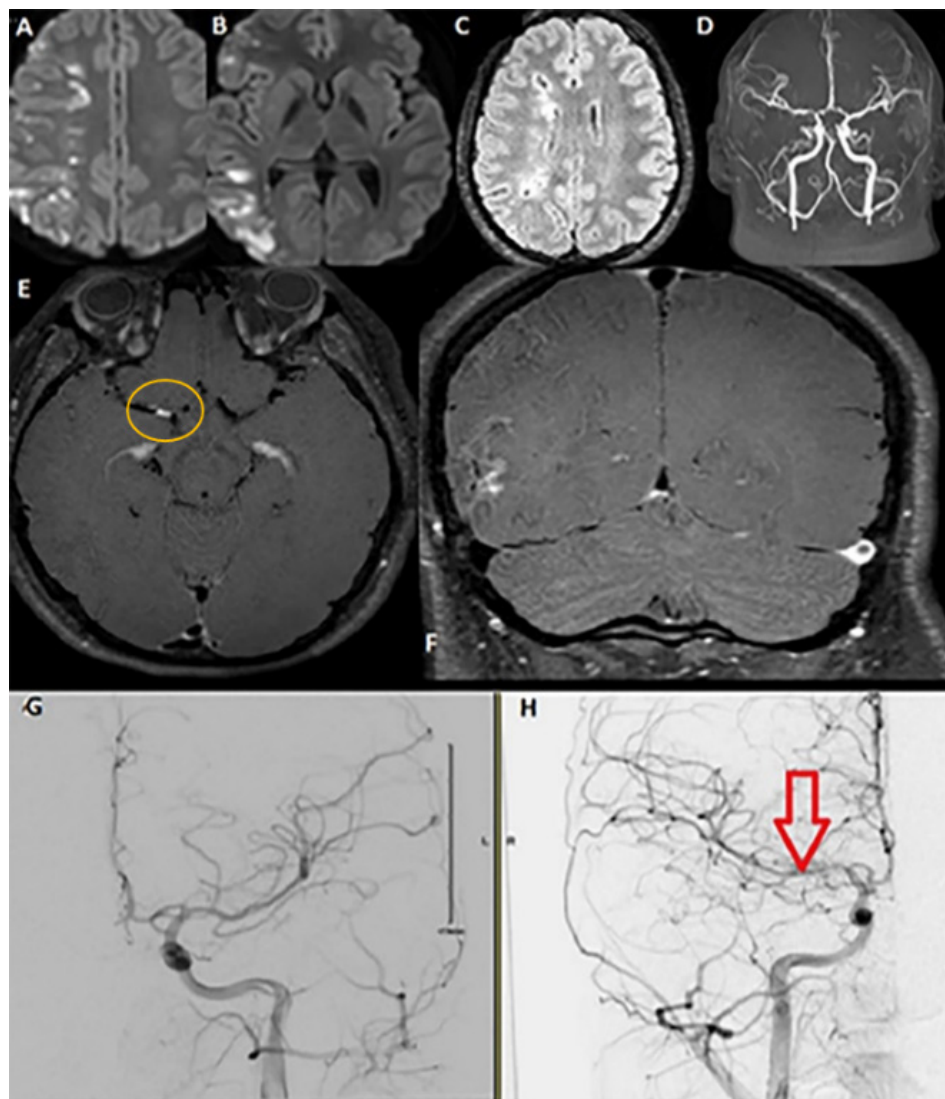
**Type:** Case Report

**Background:** Focal cerebral arteriopathy (FCA) of childhood or adolescence is a rare disorder associated with up to one quarter of pediatric arterial ischemic stroke. Stroke recurrence in patients with FCA can occur in 25% of cases.

**Case:** We present a case of a 13-year-old girl with 21 trisomy, who developed sudden left arm and leg weakness with left facial weakness and mild dysarthria. She was not treated with recombinant tissue plasminogen activator (tPA) or a mechanical thrombectomy as she presented outside the treatment

window. Neuroimaging revealed right hemispheric embolic infarcts with focal stenosis of the right middle cerebral artery (MCA), right anterior cerebral artery (ACA) and right distal internal carotid artery (ICA) with eccentric enhancement (right-MCA) on vessel wall imaging (vWI) (**Figure 1A-F**). Patient had a normal transthoracic echocardiogram and hypercoagulable panel without further consideration of cerebrospinal fluid analysis. Follow up digital subtraction angiography (DSA) showed improvement of her right ACA and right distal ICA stenoses with residual focal right MCA stenosis further ruling out the possibility of unilateral moyamoya disease (UMD) (**Figure 1G-H**). Her left side weakness had improved without any residual disability over six months without any recurrent ischemic stroke on aspirin monotherapy.

**Conclusion:** Our patient may very possibly have an FCA-dissection type of right MCA that led to the ischemic stroke in a Trisomy 21 patient. FCA-dissection is usually not progressive and has intramural eccentric enhancement on vWI compared to progressive clinical course and concentric enhancement in unilateral UMD or FCA-inflammatory type.



**Figure 1.** [A, B] Diffusion weighted imaging (DWI) and T2 FLAIR. [C] showed right hemispheric embolic watershed acute-subacute infarcts. [D] Magnetic resonance angiogram (MRA) showed focal right paraclinoid internal carotid artery (ICA), right proximal middle proximal cerebral artery (MCA) stenosis. There is moderate irregularity and stenosis in the right anterior cerebral artery (ACA) in both A1 and A2 segments. [E, F] Magnetic Resonance Angiogram (MRA) with vessel wall imaging showed a right proximal middle cerebral artery eccentric contrast enhancement (Orange Circle). [G, H] Cerebral Angiogram [red arrow] showed focal right MCA stenosis without limiting flow.

## #109. Rural Residency Rotations Effect on Future Emergency Physician Employment, Perspective From an Academic Emergency Medicine Residency 2007-2022

**Ty Anderson<sup>1</sup>**, Aaron Barksdale<sup>1</sup>, Chad Branecki<sup>1</sup>, Michael Wadman<sup>1</sup>

<sup>1</sup>Department of Emergency Medicine, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

**Mentor:** Aaron Barksdale

**Program:** Emergency Medicine

**Type:** Original Research

**Background:** American College of Emergency Medicine (ACEP) reports 52% of EM residencies offer rural rotations, yet a recent study suggests only 8% of emergency physicians (EPs) work in rural communities. The EM program at UNMC requires rural

rotations. This qualitative study investigates practice environments of UNMC EM graduates regarding rural rotations in residency.

**Methods:** UNMC is a program with 64,000 annual ED visits. Residents are required to complete two rural rotations. A 17-question survey was sent to alumni graduated between 2007-2022. Questions identified those in rural EDs, defined as populations <50,000 and/or annual ED census <10,000 visits. Questions

addressed factors prompting current work locations including number of rural rotations, family, cost of living, compensation, and lifestyle.

**Results:** Survey response was 74.5% with 100% completing a rural rotation and 89% completing multiple. Majority of respondents were male (73%) with 7.97 median years of practice, and 52% growing up rural. Thirty two percent currently work in a rural

environment with 43% at some point in their career. Notably, 33% worked in ED's with <10,000 visits. Of those working rural, rural rotations positively influenced that choice, and overall, 42% preferred rural. Eighty percent had significant others, with 57% of their partners currently working, 73% have children. Compensation affected choice for 43% whereas cost of living influenced 34%

**Conclusion:** There are discussions in EM regarding workforce, and concerns regarding declining competitiveness of the specialty. ACEP reports 8% of EPs work in rural environments, whereas we report 32% for our study group. We conclude that exposure to rural rotations impacted choice of practice location.

## #110. Intimate Partner Violence (IPV) Education for Medical Students and the Effect This Has on Comfort Caring for IPV Patients in Future Clinical Practice — A Medical Student Survey<sup>§</sup>

Morgan McKinney<sup>1</sup>, Aaron Barksdale<sup>1</sup>, Cynthia Hernandez<sup>1</sup>

<sup>1</sup>Department of Emergency Medicine, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

<sup>§</sup>Abstract submitted but not presented

**Mentors:** Aaron Barksdale, Cynthia Hernandez

**Program:** Emergency Medicine

**Type:** Original Research

**Background:** Intimate partner violence (IPV) is a public health issue with profound consequences for individuals and communities. This study aims to assess the impact of an educational course on medical students' comfort levels in addressing IPV with patient care. Specifically, it investigates changes in comfort levels before and after the course, which included objective structured clinical examinations (OSCE) and lectures on IPV care.

**Methods:** Pre- and post-surveys were administered to medical students who completed the course. These surveys assessed students' comfort levels in taking patient histories, conducting physical examinations, and providing care to IPV patients. Numerical ratings were used for quantification. The analysis included calculating average increases and percentage increases for each survey question to gauge the effectiveness of the educational intervention.

**Results:** The study revealed significant improvements in medical students' comfort levels following the educational course. The average increase in comfort ranged from 1.91 to 2.82 across five survey questions. The percentage increase ranged from 26.75% to 63.89%. These findings highlight the positive impact of the educational course on enhancing students' confidence in addressing IPV-related concerns.

**Conclusion:** The results underscore the significance of comprehensive education and training in medical curricula for addressing intimate partner violence. By equipping future healthcare providers with the necessary tools, we can improve patient care, contribute to public health efforts, and ultimately better support individuals affected by IPV. This research emphasizes the importance of integrating IPV courses into education programs to ensure that healthcare professionals are prepared to address this sensitive issue in clinical practice.

## #112. Sometimes Belly Pain Isn't as It Seems: An Unusual Presentation of SBP

Kate Dusseault<sup>1</sup>

<sup>1</sup>Department of Family Medicine, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA

**Mentor:** James Watson

**Program:** Family Medicine

**Type:** Case Report

**Background:** Spontaneous bacterial peritonitis (SBP) occurs when bacteria normally found in the gastrointestinal tract infects ascitic fluid. SBP occurs almost exclusively in patients with cirrhosis and ascites without a surgically treatable source of infection. Symptoms are severe abdominal pain, fever, and ileus. SBP has a high mortality rate if untreated. We present a case of SBP with symptoms only in the left inguinal hernia of a 66-year-old male with no prior history of cirrhosis.

**Case:** A 66-year-old male presented for direct admission from his primary care clinic

for one week history of left inguinal hernia pain, constipation, and unintentional weight loss. Past medical history was significant for heart failure, pancreatic cyst, kidney disease, and hypertension. He was hypertensive and tachycardic with WBC 12.8 x 10<sup>9</sup>/L, Cr 2.89 mg/dL, lipase 88 U/L, and all other lab normal. CT abdomen/pelvis showed acute on chronic pancreatitis, moderate ascites, and left inguinal hernia without bowel or fat. He was initially treated for pancreatitis, however symptoms worsened over the next 4 days. Diagnostic paracentesis was obtained, and ceftriaxone was started for SBP.

**Conclusion:** In this case, the diagnosis of SBP was made based on ascitic fluid, however his unusual presentation caused delay in treatment. Diffuse abdominal pain in the setting of cirrhosis should raise suspicion for SBP,

however, 13% of patients with SBP have no signs or symptoms of infection at the time of diagnosis. Due to increased mortality, patients with ascites should have diagnostic paracentesis performed as soon as possible even in the absence of typical exam findings.