

Abstracts of Scientific Papers and Posters Presented at Physiatry '23

February 21–24, 2023

BEST PAPER PRESENTATIONS

Faculty Category Award Winner

MEASURING THE EFFICACY OF PERCUTANEOUS CRYONEUROLYSIS IN THE MANAGEMENT OF PATIENTS WITH PLATEAUED OR REFRACTORY SHOULDER SPASTICITY

Paul J. Winston, MD, Mahdis Hashemi, MD, Eve Boissonnault, MD, FRCPC, Daniel D. Vincent, FRCPC, MD, ABDA, MRO, Fraser A. MacRae, BSC, Jia Song, MS, Meng-Hsuan Sung, MS, and Sandy Shi, MS

OBJECTIVES: To evaluate outcomes after cryoneurolysis in patients with spastic shoulder including range of motion (ROM), spasticity degree, and patient satisfaction with the procedure.

DESIGN: In this ongoing, intensive repeated-measures pilot study (NCT04670783), percutaneous cryoneurolysis was applied to lateral and/or medial pectoral nerves to treat shoulder spasticity. Shoulder ROM (maximal slow stretch V1) and spasticity were measured during flexion, abduction, and external rotation using the Modified Ashworth Scale (MAS [range, 0-4]). Goal Attainment Scale measured patient satisfaction (score range, -2 to +2, transformed into a T-score with a mean of 50). A Wilcoxon signed-rank test was used to analyze changes in V1 and MAS scores after cryoneurolysis. Forty-two patients underwent cryoneurolysis and 40 patients completed 90-day follow-up at the time of analysis.

RESULTS: Significant reductions in median (interquartile range) MAS scores from baseline to 90 days after treatment were observed during flexion (-1.0 [-1.5, -1.0]; $P < 0.001$), abduction (-1.0 [-2.0, -1.0]; $P < 0.001$), and external rotation (-1.0 [-2.0, -0.5]; $P < 0.001$). Significant increases in median (interquartile range) V1 ROM during flexion (20.0 [6.2, 43.8]; $P < 0.001$), abduction (20.0 [10.0, 45.0]; $P < 0.001$), and external rotation (15.0 [5.0, 35.0]; $P < 0.001$) were also observed. In a subset of patients who had completed follow-up at 9 months ($n = 22$) and 12 months ($n = 16$) at the time of analysis, significant improvements from baseline were maintained during shoulder flexion, abduction, and external rotation for both MAS ($P \leq 0.00018$ and $P \leq 0.0026$ at 9 and 12 months, respectively) and V1 ($P \leq 0.0011$ and $P \leq 0.0058$ at 9 and 12 months, respectively). There was a numerical increase of 10.5 points (28.77%) from baseline in mean Goal Attainment Scale score 90 days after treatment.

CONCLUSION: Percutaneous cryoneurolysis of the medial and/or lateral pectoral nerve was associated with improvements in shoulder ROM, spastic tone, and patient satisfaction at 90 days. Longer follow-up is ongoing to confirm sustainability of improvements.

Resident Category Award Winner

IMPACT OF INTERDISCIPLINARY PEDIATRIC PAIN MANAGEMENT PROGRAM ON FUNCTIONING IN BOTH CHILD AND PARENT: A RETROSPECTIVE STUDY OF 465 CHILDREN WITH CHRONIC PAIN

Cara E. Vernacchia, DO, Kavita Gohil, DRPH, Diane Amstutz, PhD, and Gadi Revivo, DO

OBJECTIVES: 1) Evaluate the impact of interdisciplinary rehabilitation treatment on pain and functioning of children with chronic pain, 2) explore if certain chronic pain diagnoses were associated with lower levels of baseline physical and emotional functioning, and 3) elucidate if certain features of child or parent functioning (i.e. physical, emotional, social) were more responsive to treatment.

DESIGN: A retrospective chart review was performed for children who presented for evaluation for an interdisciplinary pain management program, which included physical therapy, occupational therapy, psychological counseling, and physician visits. Children and parents completed questionnaires (Bath Adolescent Pain Questionnaire and Bath Adolescent Pain- Parental Impact Questionnaire, respectively) that assessed their emotional, social, and physical functioning before, after,

and 1-2 months after program completion. Patients were stratified into five groups: complex regional pain syndrome, headache, musculoskeletal pain, visceral pain, and widespread pain.

RESULTS: The study included 465 children (120 males, 345 females) with mean age 14.3 ± 2.4 years. Children's baseline pain and function, as assessed by questionnaires, were similar across all diagnoses and significantly improved following program completion.

These improvements were sustained at 1-2 month follow-up. Following treatment, parent's catastrophizing of their child's pain significantly improved in all diagnoses.

However, parental behavior in addressing their child's pain (i.e. negative pain behaviors such as helping child avoid pain or recommending rest), did not improve in majority of diagnoses. Additionally, the parent's relationship with their partner worsened following treatment.

CONCLUSION: Children with chronic pain showed sustained improvements in pain and functioning following an interdisciplinary pain management program. While parental catastrophizing improved, parental behavior in overprotecting their child did not, and parental relationships worsened, which may be attributed to only one parent attending sessions. These findings support the need for educating both parents and targeted interventions that improve parental behavior, decrease overprotection of their child, and improve partner relations to maximize functional outcomes.

Medical Student Category Award Winner

VALUE-ADDED MEDICAL EDUCATOR EDUCATION: ENGAGING FUTURE MEDICAL EDUCATORS TO TRANSFORM CULTURAL HUMILITY TRAINING IN MEDICAL AND RESIDENT EDUCATION TODAY

Lon Yin Chan, BA, Alexandra R. Greenberg, MS, MSPH, Fradah Gold, BS, Haris Choudry, MD, Crystal Marquez, MD, and Shirley Eisner, PhD

OBJECTIVES: Value-added medical education refers to experiential learning of medical students to become competent clinicians. While this framework has been used in clinical training, we propose applying it to train medical students and residents to become medical educators: value-added medical educator education (VAMEE). With immersive learning to cultivate skills for institutional service and forming scholarly approaches to curriculum development, assessment and evaluation, trainees can have value-added roles as student educators under faculty guidance. We present a primary-care clerkship's student-developed and facilitated cultural humility session, made to support our diverse patient population and LCME requirements (Standard 7.6), as an example of VAMEE. This session and framework can be applied to PM&R to promote cultural and disability awareness for residents and students.

DESIGN: Student educators developed a virtual version of a case-based approach in breakout rooms. Adaptations were made with faculty supervision due to time constraints, need for engaging remote methods and students'/educators' feedback. Session participants completed pre-/post-surveys, linked through anonymous identifiers, on their confidence in addressing culturally-informed patient encounters, perceived usefulness of the session, and specific feedback.

RESULTS: Removing duplicates/incompletes of surveys yielded 99 paired-pre/post-responses. Pre-session ratings were 2.7, 2.9, and 2.5 (scale:0-4) on students' confidence in defining "cultural humility," applying it to primary-care, and approaching patients in a culturally-appropriate way. Post-session averages increased to 3.2, 3.4, and 3.1 (significant Wilcoxon-SR tests). Students learned something useful (mean 4.8 on scale 0-6).

CONCLUSION: VAMEE enhanced faculty's ability to quickly transform curricula with the pandemic. RESULTS show that not only trainees benefit by learning from peers but also student educators gain skills through this student-driven iterative process. Future directions include evaluating long-term clinical impact of the session and surveying student facilitators on the effectiveness of VAMEE in

Alectinib, an ALK inhibitor. This choice would be easier for the patient to tolerate, although, we did not expect it to be fully curative. When subsequent PET scans demonstrated complete response, we opted to continue treatment for maintenance.

However, due to side effects, the patient discontinued treatment early. She received no other forms of therapy and continues to show complete remission.

DISCUSSION: A multimodal treatment approach with chemotherapy, radiation and often surgery is routinely used in treating lung cancer. Many reports also show the efficacy of using immunotherapy adjunctly with treatment. Utilizing more than one treatment has improved the prognosis of many cancers. However, while extensive cancer therapy improves objective outcomes, it brings increased side effects that challenge the quality of life patients can return to. Our case brings to light two important points. One, adding multiple treatment options to a patient's management plan may not necessarily lead to optimal benefits for the patient. Continued research that investigates how to maximize a patient's restorative function is needed. Second, with the advent of immunotherapy, individualized treatment for each patient is possible. It is worthwhile to use immunotherapy in helping patients achieve their treatment goals.

CONCLUSION: We report findings in a patient who showed complete remission following the withdrawal of Alectinib. This drug can improve survival in patients with advanced lung cancer; however, no reports of complete remission following cessation of treatment exist. Our findings exemplify how existing treatment protocols may be modified to improve patient outcomes holistically.

AN OVERLOOKED CULPRIT: A CASE SERIES OF ACUTE CHOLECYSTITIS IN BRAIN INJURY PATIENTS

Nahyun Kim, MD, Ana Ortiz, MD, and Ana-Marie Rojas, MD

CASE DIAGNOSIS: Right MCA infarct, right subdural empyema

CASE DESCRIPTION: 78-year-old female admitted after acute right middle cerebral artery (MCA) infarct with left hemiparesis and significant dysphagia status post PEG tube. 84-year-old male admitted after right MCA infarct with right ICA occlusion s/p thrombectomy 9-year-old male admitted after right subdural empyema, parenchymal hematoma and sagittal thrombosis. All three patients were managed in acute inpatient rehabilitation after brain injury and required PEG tube due to dysphagia. They were started on PO diet as dysphagia improved. Each patient developed abdominal discomfort accompanied by nausea and vomiting. And workup revealed that they have acute cholecystitis with or without gallstones.

DISCUSSION: Extant literature suggests that acute cholecystitis is frequently observed in patients with brain injury. This trend was more common among patients who had severe hemiparesis and those who fasted. The proposed mechanism to this link was compromised circulation to the gallbladder and biliary obstruction as a result of bedridden status. Another contributor to cholecystitis was fasting, which leads to hyposecretion of gastrointestinal hormones, and RESULTS in contractile dysfunction of the gallbladder. In our case series, all patients were placed on PEG tube which may have contributed to less secretion of gastrointestinal hormones compared to oral feeding. Further, the autonomic dysfunction in brain injury patients may cause contractile dysfunction of the gallbladder.

CONCLUSION: Abdominal discomfort and nausea/vomiting are very common after resuming PO diet. But acute cholecystitis/gallbladder dysfunction needs to be in the differential diagnoses in brain injury patients, no matter how old the patients are, especially if they are bedridden, fasting or placed on a PEG tube. Achieving early mobility and rehabilitation focusing on oral intake may be critical in such cases.

AN UNDER-RECOGNISED RARE PURPLE URINE BAG SYNDROME

Chau Chung Chai, MBBS, and Kok Cheow Chow, MD

CASE DIAGNOSIS: Purple urine bag syndrome (PUBS)

CASE DESCRIPTION: We report an under-recognised PUBS in a 69-year-old male nursing home resident who has underlying brainstem cavernoma and PUBS risk factors of chronic urinary catheterisation and constipation.

During his hospital follow-up, he raised concern of mental disturbance by his purplish urinary bag appearance which was suggestive of PUBS. Prior to hospital visit, he had sought treatment from a clinic whereby he was misdiagnosed as due to food dye. He had developed suprapubic pain and low-grade fever during hospital visit and treated as symptomatic PUBS. His urinary catheter and bag were changed. He was empirically prescribed on oral co-amoxiclav antibiotic for one week as per local guideline and stool softener to aid bowel evacuation. Urinalysis showed urinary tract infection (UTI) picture with

urine culture grew *Proteus mirabilis* which was sensitive to oral co-amoxiclav. His symptomatic PUBS resolved after two days of antibiotic initiation.

DISCUSSION: PUBS is a rare manifestation of UTI whereby urinary bag and catheter turn purplish which can be mentally disturbing.

PUBS is a spot diagnosis to a keen-eye clinician, but PUBS may be overlooked by unaware clinician. Often described as benign, PUBS can however cause life-threatening complications like urosepsis. PUBS has been reported to occur predominantly among chronic disabling people in nursing or rehabilitation facilities. PUBS risk factors include female gender, constipation, and chronic indwelling urinary catheterisation.

Asymptomatic PUBS management should aim at mitigating risk factors; regularly change of urinary bag and avoid constipation. Treatment of symptomatic PUBS involves appropriate antibiotic. Reassurance of PUBS natural course can ease patient's mental distress.

CONCLUSION: As the world is rapidly aging, nursing and rehabilitation facilities will proliferate with increasing population with chronic catheterisation and at risk for PUBS. Thus, this case report aims to increase awareness of PUBS for optimal prevention and management.

AN UNUSUAL CASE OF ESTHESIONEUROBLASTOMA

Yi Zhou, MD, Roger Henry, MD, and Brian Greenwald, MD

CASE DIAGNOSIS: 58-year-old male diagnosed with esthesioneuroblastoma

CASE DESCRIPTION: The patient experienced left eye proptosis, nasal congestion, and rhinorrhea of two years duration. Outpatient MRI revealed a left ethmoid sinus and nasal cavity mass with extension into the right ethmoid sinus, left orbit, and anterior cranial fossa. The mass was biopsied and pathology was consistent with esthesioneuroblastoma. He underwent endoscopic endonasal approach (EEA) for tumor resection. Postoperatively proptosis resolved however he developed left-sided weakness. Imaging revealed a right caudate ischemic stroke deemed secondary to perioperative blood loss. Subsequently on presentation to acute rehabilitation he was alert, awake, and oriented with impaired attention and delayed recall. Cranial nerves were within normal limits. Patient had 4/5 strength in both left upper and lower extremities. He required moderate assistance with ADLs and ambulation as well as minimal assistance with memory. He improved functionally and after 15 days was discharged home at an independent level.

DISCUSSION: Esthesioneuroblastoma (ENB), or olfactory neuroblastoma, represents approximately 3-6% of sinonasal malignancies with low incidence of 0.4 per-million people. ENB should be characterized by MRI to elucidate soft-tissue extension and perineural involvement. The Kadish Staging Classification and TNM staging systems are widely-used guides for ENB prognostication and management, which may include a multimodal combination of chemoradiotherapy and surgery. Depending on the treatment, reported 5-year overall survival ranges from 30-80%. EEA has grown in popularity for resection of sinonasal and anterior skull base tumors. Neurological complications may result as Hardesty and colleagues reported a 2.2% rate of neurological complications in 1002 EEA cases, including cranial nerve deficits, pontine infarcts, and hemiparesis.

CONCLUSION: This case presents an exceedingly rare malignant olfactory tumor and the importance of imaging in both timely diagnosis and initial management of esthesioneuroblastoma.

AN UNUSUAL CAUSE OF ACUTE SPINAL CORD COMPRESSION DUE TO SPINDLE CELL SARCOMA: A CASE REPORT

Philip M. Stephens, DO, MBA, Michael Glicksman, MD, Michael Heslin, DO, and Jessica Berry, MD

CASE DIAGNOSIS: Spindle Cell Sarcoma of the Spine

CASE DESCRIPTION: Patient is a 41-year-old male who presented to OSH with numbness from T4 down and difficulty walking with electric jolts down his spine following a golf swing. He presented to his PCP three weeks earlier with a two month history of chest & back numbness after wrestling his son. He was diagnosed with a thoracic muscle strain and treated with Naproxen, Cyclobenzaprine, & physical therapy. On arrival to the ED, CT chest revealed a mediastinal mass 7.5 × 6.6 × 8 cm encasing the aorta, narrowing left lower lobe bronchus, invading the T4-T5 vertebra, paraspinous soft tissues, and epidural space with pathologic compression fracture of the T5 vertebral body. He was treated with T3-T7 PSF, T4-T6 posterior spinal decompression, and T5 corpectomy with 18 mm expandable cage. Patient successfully tolerated 2.5 weeks of inpatient rehab with fully recovered neurogenic bowel/bladder, improvement in all ADLs, back pain, and leg strength.

DISCUSSION: This report demonstrates the importance of interdisciplinary spine care a patient with back pain from an atypically etiology receives including PCP, PT, ED, neurosurgery, and PM&R. Each of these providers could be the primary contact with a patient with back pain from spinal sarcoma and should be able to identify red flag symptoms necessitating advanced imaging for early detection and management. This patient had a successful outcome despite advanced progression into critical areas such as the lungs, aorta, and spinal column because of his timely transfer to a quaternary medical center followed by an intensive rehabilitation regimen. A functional rehabilitation program must complement this treatment to improve likelihood of reaching desired level of pain and mobility

CONCLUSION: Musculoskeletal and spinal specialists should be aware of this atypical back pain etiology, as with most tumors, early detection provides the best opportunity to decrease mortality and maximize functional capacity.

AN UNUSUAL RESPIRATORY COMPLICATION ON INPATIENT REHABILITATION AFTER COVID INFECTION

Jessica Sher, MD, and Cherry Junn, MD

CASE DIAGNOSIS: This case report describes severe tracheal stenosis in a patient admitted to inpatient rehabilitation (IPR) for critical illness polyneuropathy after prolonged hospitalization for COVID-19 infection.

CASE DESCRIPTION: A 37-year-old female was initially admitted with COVID-19 infection and severe hypoxemia requiring intubation and subsequent tracheostomy. During acute hospitalization, she experienced tracheal site bleeding which raised concern for tracheoinnominate fistula, and ultimately required tracheostomy revision. She was eventually decannulated and admitted to IPR for rehabilitation of profound limb weakness likely from critical illness polyneuropathy.

Within the first few days of admission to IPR, she developed tachycardia, tachypnea, and a new oxygen requirement that severely limited participation with therapies and triggered two rapid response events. No evidence of infection or pulmonary embolism was noted on laboratory or imaging studies. However, bronchoscopy and laryngoscopy showed circumferential tracheal stenosis to 3mm, carinal scarring, and tracheoesophageal fistulas. She underwent balloon dilation, repeat tracheostomy, and recovered enough function to resume IPR. After her repeat tracheostomy, she demonstrated significantly improved respiratory status and was able to fully engage with therapies with decreasing oxygen requirement.

DISCUSSION: Benign tracheal stenosis is a common iatrogenic complication following mechanical ventilation. It is important to identify early, as patients can deteriorate quickly. While surgical resection of the narrowed part of the trachea remains the treatment of choice, balloon dilation is also effective, as demonstrated in this patient. Reversal of tracheal stenosis significantly improved this patient's oxygen requirement and increased participation with therapies.

CONCLUSION: This case brings attention to an insidious otolaryngologic post-COVID complication that can also impact functional exercise and aerobic capacities. While shortness of breath and new oxygen requirement are often associated with infection or pulmonary embolism in the inpatient rehabilitation population, tracheal stenosis is a less obvious differential to consider in a post-COVID patient with a previous tracheostomy.

ANAPHYLAXIS TO WHAT? A RARE CASE OF tPA INDUCED ANGIOEDEMA

Jonathan Wolbert, DO, and Krishna Urs, MD

CASE DIAGNOSIS: Anaphylaxis after treatment with tissue plasminogen activator (tPA).

CASE DESCRIPTION: 55 year old male with past medical history of transient ischemic attack, Fallot tetralogy, AICD implantation, hypertension presented for evaluation of his left sided facial droop and left hemiparesis. Code stroke was called and the patient qualified for tPA administration. He was bolused tPA and after the continuous infusion he suddenly became unresponsive and developed notable oropharyngeal angioedema. He regained consciousness and reported dysphagia. He was immediately treated with diphenhydramine, methylprednisolone, and epinephrine.

Thankfully he responded to the medication cocktail and did not require intubation however otolaryngology did evaluate.

Subsequent CT imaging with and without contrast were negative for hemorrhage and large vessel occlusion. He saw an improvement in weakness over his stay in acute care, and was able to be discharged home safely.

DISCUSSION: Anaphylaxis to tPA is a rare but documented event with an incidence of 1.3- 5.1%. The risk of angioedema after tPA administration appears to increase 0.1-0.2% with concurrent use of ACE inhibitors. This patient's reaction was caught immediately which led to prompt and adequate treatment, ultimately not requiring intubation. With a quick recovery this patient was also able to be discharged home as well. CT imaging remained negative for acute findings throughout the hospitalization and MR imaging was unobtainable due to the AICD.

CONCLUSION: tPA associated anaphylaxis is a known complication that one needs to be wary of even with proper administration and dosage. An early suspicion can lead to prompt and accurate treatment. These reactions should never be far from our minds, even with such common treatment options as tPA in the setting of stroke-like symptoms.

APHASIA DUE TO CEREBELLAR HEMORRHAGE CONTRALATERAL TO DOMINANT LANGUAGE CORTEX: A CASE REPORT

David B. Weinfeld, MD, and Stuart Yablon, MD

CASE DIAGNOSIS: Predominantly expressive, anomia aphasia caused by an intraparenchymal hemorrhage in the right medial cerebellar hemisphere.

CASE DESCRIPTION: A functionally independent, right-hand dominant, 86-year-old woman with a history of atrial fibrillation presented to the emergency room with right sided ataxia, vomiting and dizziness. Imaging revealed an acute right medial cerebellar hemorrhage with edema. Due to worsening nausea, a repeat CT was obtained, showing intraparenchymal hematoma with effacement of the fourth ventricle, obstructive hydrocephalus and tonsillar herniation. Right suboccipital craniectomy was emergently performed. She was admitted to inpatient rehabilitation five days later. On admission, physical examination demonstrated expressive aphasia. Initial speech therapy evaluation, using the Western Aphasia Battery-Revised (WAB-R), confirmed deficits in spontaneous speech fluency and content, repetition, sequential commands and object naming. There were no deficits recorded in auditory/verbal comprehension. She also had mild higher level cognitive deficits with minor deficits in executive dysfunction. Ataxia, nausea and aphasia improved until discharge to an assisted living facility.

DISCUSSION: While the cerebellum is considered a predominantly somatic motor structure, functional imaging techniques demonstrate that cerebellar lesions may cause functional depression of supratentorial regions in the contralateral language-dominant hemisphere that modulate linguistic processing. This is postulated to be exerted by loss of excitatory transmission through cerebello-ponto-thalamo-cortical pathways. Despite descriptions of right sided cerebellar aphasia in the scientific literature, it is rarely reported or specifically screened for.

CONCLUSION: The cerebellum plays a role in language production and function. While often presenting with ataxia, nausea and vomiting, cerebellar insults may produce aphasia, all of which complicate participation in functional rehabilitation. Speech therapy evaluation should include appropriate linguistic and cognitive screening for patients with cerebellar injury.

ASYMPTOMATIC COVID-19 WITH SUBSEQUENT LIFE-THREATENING SEQUELAE

JennaLynn Philipps, BS, Linda Ye, BS, Andrew Daigneau, MD, Ray Pak, MD, and Mohammed S. Islam, MD

CASE DIAGNOSIS: 34 year old man with cardiac arrest.

CASE DESCRIPTION: The patient described is a 34 year old man with no significant past medical history. He reported an uncomplicated case of Covid-19 infection one year ago. Prior to infection, he was vaccinated with one dose of Janssen Covid-19 vaccine. He was brought to the ED due to cardiac arrest secondary to Non ST-Elevation Myocardial Infarction (NSTEMI) that occurred while running. Return of spontaneous circulation (ROSC) was achieved after 20 minutes.

Patient was unable to be weaned off mechanical ventilation, which required tracheostomy with trach collar and PEG tube placement. Two months later the patient was able to be weaned off of mechanical ventilation and decannulated. Patient was extubated and decannulated 2.5 months after cardiac arrest. He was subsequently deemed medically stable to be transferred to inpatient rehabilitation where he endorsed significant retrograde amnesia and could not remember the events that led up to his hospitalization up until a month prior.

DISCUSSION: Long term acute care (LTAC) provides services to patients who stay for an average of 25 days. LTACs have been studied for their use in decreasing readmissions.

Patient characteristics such as younger age and functional independence prior to admission are favorable prognostic factors. The role of acute rehabilitation and