Vasoreactive phenotype in children with pulmonary arterial hypertension and syncope

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Abstract:

Background: Syncope in Group 1 pulmonary arterial hypertension (PAH) is an independent predictor of poor prognosis in adults, but this is not well studied in children. We hypothesise that syncope in children with PAH often occurs in association with a reactive pulmonary vascular bed with sudden vasoconstriction in response to adverse stimuli. In the current study, we sought to determine the association of syncope with acute vasoresponsiveness and outcomes in children with Group 1 PAH.

Methods: A retrospective chart review of children with PAH at a single pulmonary hypertension centre from 1 January 2005 to 31 October 2018 was performed. Data included demographics, symptoms, imaging, haemodynamics, and outcomes at baseline and follow-up.

Results: 169 children had Group 1 PAH; 47 (28%) had syncope at presentation or follow-up. Children with significant shunts were excluded from the analysis. Children with syncope were older at diagnosis (7.5 versus 5.0 years; p=0.002) and had a higher incidence of chest pain (p=0.022) and fatigue (p=0.003). They had higher pulmonary vascular resistance at baseline (14.9 versus 9.1 WU·m2; p=0.01). More children with syncope were vasoresponders to inhaled nitric oxide (33% versus 22%; p=0.08-NS). Children with syncope and acute vasoresponsiveness had the highest survival, and non-responders with syncope on medications had the worst long-term survival.

Conclusions: Children with syncope had higher rates of vasoreactivity compared to those without. This suggests that in some children with PAH, syncope may simply reflect acute pulmonary vasoconstriction to an adverse stimulus. Larger prospective studies are warranted to further assess syncope as a marker for a vasoreactive phenotype with implications for treatment and long-term outcomes.

Describing the Creation of the Resident Education in Sleep Techniques (REST) Program: A Mind-Body Integrative Health Sleep Intervention for Pediatric Trainees

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Abstract

Objectives: Sleep deficiency is pervasive among medical residents and fellows, which can lead to adverse outcomes, including medical errors, motor vehicle accidents, mental health conditions, and burnout. Evidence has shown that mind-body integrative health (MBIH) practices can be used to improve sleep. We created the 12-week Resident Education in Sleep Techniques (REST) Program in response to a request for training on integrative approaches to sleep for our institution's pediatric residents and fellows.

Methods: The REST Program's curriculum teaches pediatric trainees to use evidence-based MBIH techniques to improve their own sleep, as well as to support pediatric patients' sleep. The Program, which was approved by the Columbia IRB, consists of weekly emails, each containing sleep tips tailored specifically to trainees' sleep behaviors and environments; a video describing and demonstrating an MBIH technique; and sleep education resources that trainees can share with pediatric patients. The Program also includes the provision of a Sleep Kit containing items to support sleep based on Program content, as well as two optional one-hour, in-person workshops demonstrating specific techniques with guided practice. MBIH techniques taught include: mindful breathing, letting go techniques, body awareness, aromatherapy, acupressure, self-hypnosis, emotional freedom technique (EFT) tapping, six breathing techniques, sleep ergonomics, and self-massage.

Results: We utilized pilot-tested online evaluation tools and a tracking system for measuring engagement with Program materials. Results from ongoing evaluation will indicate trainees' experience with the Program.

Conclusions: Experiences with implementation and corresponding lessons learned, along with future opportunities for delivering and assessing the Program, will be discussed.

Healthcare burden after operative management of severe gastroesophageal reflux disease: Results from a multi-institutional research consortium

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Abstract

Objectives: The child opportunity index (COI) provides neighborhood information with resultant quintiles to indicate quality of resources and conditions. COI stratifies into very low ≤20, 20< low ≤ 40, 0< high ≤80, and 80< very high ≤100 with higher scores reflecting better surgical outcomes. Children that undergo surgical management of gastroesophageal reflux disease (GERD) may have residual symptoms that require unanticipated hospital visits, which poses a challenge in low COI patients. The purpose of this study was to analyze COI and how it may affect choice of anti-reflux surgery.

Methods: Multi-institution, IRB-approved retrospective review of patients less than 3 years old who underwent Nissen fundoplication (n=1104) and post-pyloric feeding tube procedures (n=97), including surgical jejunostomy (SJ) or gastrojejunostomy (GJ) between 2010-2020 was performed. Kruskal-Wallis Test was performed to compare COI between patients in the Nissen group and post-pyloric tube placement patients.

Results: The median COI amongst patients that underwent Nissen was 37, indicating a low COI. In comparison, the post-pyloric enteric tube group had a significantly higher COI (median= 57, p=0.0002). More patients in the Nissen group (60.6%) had public insurance than patients in the post-pyloric tube group (40.1%). (p=0.0005).

Conclusion: Children with a significantly lower COI tend to undergo Nissen fundoplication. Previous data within our group has shown increased unanticipated hospitalizations in GJ patients versus Nissen patients one year after surgery. This unanticipated healthcare burden may be even more impactful in patients with lower COI. Consideration to Nissen over post-pyloric enteric tube should be given in this vulnerable population.

Ethnoracial Identification and Language Preferences Among Pediatric Hematopoietic Stem Cell transplantation Candidates

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Abstract

Introduction: Despite being potentially curative, Hematopoietic stem cell transplantation (HSCT) can have adverse psychosocial effects on patients and their families.1 Mitigating the effects of race/ethnicity and limited English proficiency-related health inequities may serve to decrease adverse effects for minoritized populations. As the first step of an iterative quality and equity improvement process to improve patient educational materials, we sought to identify cultural and language needs of children and their families undergoing HSCT. Specifically, our aim was to explore the Ethnoracial identification of our patients and language preferences of patients and primary caregivers.

Methods: All HSCT candidates undergo a psychological evaluation as part of their pre-HSCT work-up. A retrospective chart review (of the past 22 months) was performed to understand the ethnoracial identities of candidates. Preferred language was also identified for candidates and caregivers.

Results: 43 children (M age=12.04+5.55; 51.19% female; range of hematological/oncological diagnoses) and their caregiver were identified. Candidates identified largely as “Other/multiracial” (n=17,39.5%) and “Black/African American” (n=14, 32.6%). Of those who identified as “Other” race, 70.59% reported “Hispanic/Latino” ethnicity. The majority were monolingual English-speaking (n=28, 65.12%), the second largest group being bilingual speakers (n=8, 18.6%). Most caregivers reported English as their preferred language (n=25, 58.14%). Monolingual Spanish-speakers were the second largest group (n=9, 21%).

Conclusions: Historically minoritized groups constituted the majority of a pediatric HSCT candidate population in an urban medical center. A substantial portion of patients and caregivers identified a language preference other than English. Therefore, special consideration for reducing ethnoracial and language health inequities is imperative.

Advancing Therapeutics tjrpigj Strategic Enrichment of Omega-3 Fatty Acids for Modulating Inflammatory Neurodegenerative Diseases

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Abstract

Objectives: Early-life inflammatory events like infections and injuries may predispose the brain to Alzheimer's disease (AD) by disrupting neurodevelopment and raising vulnerability. The association between early neuroinflammation and subsequent neurodegeneration leading to dementia remains unclear. We hypothesize that omega-3 (n-3) fatty acids (FA), especially EPA and DHA, positively regulate neuro-immune cells, preserving their cell membrane structure and metabolic homeostasis. Our study examined whether strategic delivery of n-3 FA via injectable n-3 triglycerides (TG) can influence microglial lipid metabolism to potentially prevent or delay AD progression.

Methods and results: Our data show that perinatal n-3 TG injections suppressed activation of gliosis-associated markers - Iba1 and GFAP in young AD-prone mice (5xFAD) and yielded sustained transcriptional regulatory effects on the expression of inflammatory molecules, such as IL-6 and TNF-a, in adult brains ($p<0.05$). A significant increase in high-frequency vocalizations (USV) was observed in P6 5xFAD mice received perinatal n-3 compared to vehicle control ($p<0.05$), implicating enhanced active communication patterns. Improvement in behavior deficits was observed in adult n-3-treated AD mice. Perinatal n-3 TG treatment modified brain lipid composition in young offspring, increasing key membrane lipid species, such as phospholipids and lysophospholipids ($p<0.05$). Pro-inflammatory sphingolipids associated with neurodegeneration, including lactosylceramide, were significantly lower in mice treated with n-3 than those in saline-treated AD mice.

Conclusions: Our study establishes a proof of principle for targeting brain immune cell metabolism with injectable n-3 TG to mitigate neuroinflammation in AD pathogenesis, paving the way for future research into early treatments for related CNS disorders.

Disparities in resource utilization by families of children with cardiac conditions

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Abstract

Objectives: There are limited data documenting sources of medical information that families use to learn about paediatric cardiac conditions. Our study aims to characterise these resources and to identify any disparities in resource utilisation. We hypothesise there are significant variations in the resources utilised by families from different educational and socio-economic backgrounds.

Methods: A survey evaluating what resources families use (websites, healthcare professionals, social media, etc.) to better understand paediatric cardiac conditions was administered to caretakers and paediatric patients at Morgan Stanley Children's Hospital. Patients with a prior diagnosis of CHD, cardiac arrhythmia, and/or heart failure were included. Caretakers' levels of education (fewer than 16 years vs. 16 years or more) and patients' medical insurance types (public vs. private) were compared with regard to the utilisation of resources.

Results: Surveys completed by 137 (91%) caretakers and 27 (90%) patients were analysed. Websites were utilised by 72% of caretakers and 56% of patients. Both private insurance and higher education were associated with greater reported utilisation of websites, healthcare professionals, and personal networks (by insurance $p = 0.009$, $p = 0.001$, $p = 0.006$; by education $p = 0.022$, $p < 0.001$, $p = 0.018$). They were also more likely to report use of electronic devices (such as a computer) compared to those with public medical insurance and fewer than 16 years of education ($p < 0.001$, $p < 0.001$, respectively).

Conclusion: Both levels of education and insurance status are associated with the utilisation of informative resources and digital devices by families seeking to learn more about cardiac conditions in children.

Regional and Institutional Variation in Managing Rh Disease in Mexico

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Abstract

Background: Hemolytic disease of the fetus and newborn due to Rhesus blood group antigen (i.e., Rh(D)) develops from an incompatibility between the mother and fetus. Despite having anti-Rh(D) immunoprophylaxis for 50+ years, a significant global burden of Rh disease remains, particularly in low/middle-income countries such as Mexico. This study examined disparities in the allocation of maternal and child health resources, as well as clinical knowledge, to gain insights into the social determinants of health governing Rh disease prevalence in Mexico.

Study Design: An 11-question survey in Spanish was sent to all members of the Federación Mexicana de Colegios de Obstetricia y Ginecología (FEMECOG) to evaluate knowledge of the availability and implementation of anti-Rh(D) immunoglobulin prophylaxis in their practices and institutions, and about managing Rh disease by monitoring fetal anemia risk and providing intrauterine treatment when necessary. FEMECOG has 7 regions and each contains professional obstetrics associations (Figure 1A). Responses were separated by region, and chi-square two-by-two contingency tests were performed to evaluate regional and institutional differences.

Results: A total of 1512 responses were received from 5083 members. Responses by region varied from 20-41% with the most received from Region 7. Significant variations were found within the Mexican healthcare system, particularly regarding providing anti-Rh(D) immunoglobulin to prevent alloimmunization. Most concerning, some providers in Regions 5, 6, and 7 reported never having access to anti-Rh(D) immunoglobulin. In addition, there were differences in access to the drug between public and private hospital settings. Most respondents reported always using anti-Rh(D) immunoglobulin post-partum (lowest compliance 91% in Region 7), while many fewer reported always using it ante-partum (highest use in Region 1 with 26%) and some regions reported never using it in this setting (Region 7 with 26%). Every region had responders report a lack of providers who perform HDFN monitoring (i.e., fetal cerebral middle artery peak systolic velocity) with a range of 4-11% reporting no personnel available in their region. Finally, every region reported a lack of providers who perform intrauterine transfusions, with a range of 18-61% reporting no personnel in their region who offer this service.

Conclusion: Rh Disease remains a significant cause of fetal and neonatal morbidity and mortality. Since its regulatory approval in 1968, anti-Rh(D) immunoprophylaxis has proven effective at preventing maternal sensitization when administered appropriately. However, global compliance varies greatly due to lack of awareness, availability, and/or affordability. We analyzed healthcare providers' access to this therapy in Mexico, where a previous study concluded 50-80% of needed doses are not given.3 It is important to raise awareness of the global burden of this disease and identify barriers contributing to this global health challenge.

Association Between Pulmonary Vein Stenosis and Necrotizing Enterocolitis or Gastrointestinal Pathology- A case control Study

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Abstract

Background: Acquired pulmonary vein stenosis (PVS) is an important cause of pulmonary hypertension in infants with bronchopulmonary dysplasia. We previously described a case series of 21 preterm infants with PVS, of whom almost 50% had necrotizing enterocolitis (NEC).

Methods: We performed a 1:3 matched case control study where infants with PVS were matched for gestational age, time of admission, birth weight and gender with infants without PVS. Babies with congenital heart disease with known association with PVS were excluded. Hospital records were reviewed for prior history of NEC, as defined by Bell's staging criteria and for other intestinal pathology. We reviewed serial echocardiograms performed during hospitalization. Outcomes of worsening or resolution of PVS and death were also assessed.

Results: 24 patients met the inclusion criteria and were matched with 68 controls. 63% (15/24) of the infants with PVS had prior intestinal pathology, as opposed to 18% (12/68) controls; 46% of cases (11/24) had NEC. The intestinal pathology group had a significantly higher incidence of growth restriction and higher maximum CRP. The mean gradient across the pulmonary veins was higher in the intestinal pathology group versus controls, as was mortality (29% vs 9%).

Conclusions: The previously described association between PVS and gut pathology was further strengthened by this case-control study. Presence of gut pathology in preterm infants should lead to early surveillance for PVS, and early intervention as indicated.

High Stakes, low frequency: Simulation based education to optimize palliative care in the pediatric emergency department

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Abstract

Background: Children facing life-limiting illnesses frequently receive care in the emergency department (ED). To provide optimal care, members of the interprofessional team must have foundational skills in navigating conversations about goals of care, managing symptoms, and collaborating with the palliative care team. However, ED teams have few opportunities to learn and practice these skills.

Objectives: To determine the familiarity with and comfort of our interprofessional pediatric ED staff in providing palliative care, identify areas necessitating further education, and develop a simulation-based training curriculum to address learning needs and increase palliative care knowledge and skills.

Methdds: A survey of pediatric ED staff assessed familiarity with caring for palliative care patients as well as desire to learn how to care for this population more effectively. Based on the eighty responses received, a simulation-based curriculum was established to help the interprofessional team learn skills of primary palliative care that they can apply to high stakes, low frequency events, including care of children who present to the ED in acute distress near end-of-life.

Results: Implementation of this program has resulted in triannual learning opportunities for the pediatric ED as well as increased ED palliative care consultation. This curriculum has been expanded into other departments, including residency end-of-life programming.

Conclusions: ED teams benefit from using simulation to practice the unique clinical and communication skills of palliative care in scenarios with dying patients. This collaborative style of education can encourage both individual learning and team resilience, while improving primary palliative care in the pediatric ED.

Safety and Tolerability of Combination therapy with Ambrisentan and Tadalafil for the Treatment of Pulmonary Arterial Hypertension in children: Real-World Experience

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Abstract

Objective: To Describe The Safety And Tolerability Of Treatment With Ambrisentan And Tadalafil In Pediatric Pulmonary Hypertension (PH).

Study Design: This Retrospective Observational Two-Center Study Included Subjects (≤18 Years Of Age) With PH Receiving Combination Therapy With Ambrisentan And Tadalafil. At Baseline, Patients Either Received No Therapy Or Monotherapy With A Phosphodiesterase 5 Inhibitor (PDE5i) Or Endothelin Receptor Antagonist (ERA) (Group A), Switched From A Different PDE5i And ERA (Group B), Or Were On Prostanoid Therapy With Or Without A PDE5i And/Or ERA (Group C,D). Demographics, Symptoms, And Adverse Effects Were Collected. Pre And Post Therapy Values For Exercise Capacity, Hemodynamics, And Biomarkers Were Compared.

Results: There Were 43 Subjects (26 F, 17 M) Ages 4-17.5 Years (Median 9.3) With World Symposium Of PH Group 1, 3, And 5. Significant Improvements Were Seen In Change Scores At Follow-Up In The Entire Sample And Group A For 6-Min Walk Distance: +37.0 (6.5-71.0) [P = 0.022], Mean Pulmonary Artery Pressure: -6.0 (-14.0 To -3.5) [P = .002], Pulmonary Vascular Resistance: -1.7 (-6.2 To -1.0) [P = .003], NT-ProBNP -32.9 (-148.9 To -6.7) [P = .025]. WHO Functional Class Improved In 39.5% And Was Unchanged In 53.5%; PH Risk Scores Improved In 16%; Were Unchanged In 56%; And Declined In 14%. Three Patients Discontinued Therapy (Two Headaches, One Peripheral Edema). Seven Patients Were Hospitalized For Worsening Disease (2/7 Had A Potts Shunt Placed, 2/7 Had An Atrial Septostomy). There Were No Deaths Or Lung Transplant

Conclusions: Combination Therapy With Ambrisentan And Tadalafil Was Well-Tolerated, With An Acceptable Safety Profile In A Select Group Of Children. This Therapy Was Associated With Improved Exercise Capacity And Hemodynamics In Children Who Were Treatment Naïve Or On Monotherapy With A PH Medication Before The Initiation Of Ambrisentan And Tadalafil. Based On These Early Data, Further Study Of Combination Therapy In Pediatric PH Is Warranted.

Predictors of Pediatric Ileal Pouchitis

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Abstract

Background: Restorative proctocolectomy with ileal pouch-anal anastomosis (RPC-IPAA) is the preferred surgery for medically-refractory ulcerative colitis (UC). The most common complication of the ileal pouch is pouchitis and pre-surgical risk factors have been demonstrated in adults. This study aimed to analyze the relationships between several pre-operative factors and the time to develop pouchitis after IPAA in children.

Methods: Retrospective cohort study of 16 patients (13 pediatric, 3 adult) with UC who underwent IPAA and seen at Columbia University Irving Medical Center between 2006 and 2023. The relationships between time to event of pouchitis after IPAA and age-related variables (e.g. age at UC diagnosis), time-related variables (e.g. time between diagnosis and colectomy), anthropometric and anatomical variables (e.g. pouch length), and IPAA-staging were analyzed using Pearson and Spearman correlation tests for continuous variables and one-way ANOVAs for categorical variables.

Results: While no significant relationships between any of the variables and the time to development of pouchitis were found, weak positive correlations between time to development of pouchitis and all three age-related variables, patient height and weight at IPAA, and constructed pouch length existed. Conversely, there were weak negative correlations between time to development of pouchitis and all three time-related variables, and ratio of height at IPAA to constructed pouch length.

Conclusion: This retrospective cohort study was a pilot study in a small population that aimed to evaluate pouchitis through a time to event analysis. Despite being underpowered and lacking statistical significance, the weak correlations warrant further investigation in larger cohorts.

Prophylactic Antimicrobial Usage Following Pediatric Liver Transplantation

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Abstract

Objectives: To characterize antimicrobial prophylaxis usage after pediatric liver transplantation amongst liver transplant (LT) centers in the United States.

Methods: This is a multi-center retrospective cohort study amongst 12 pediatric LT centers. We assessed the utilization of prophylactic antimicrobials following LT. We examined differences in post-operative infection (POI) rates in the intensive care unit with antimicrobial prophylaxis usage as well as differences in antimicrobial usage if fascia remained opened post-operatively using chi-square tests.

Results: Following transplantation, 91% (299/327) of patients received prophylactic antimicrobials. There was no significant difference in POI rates between those with and without antimicrobial prophylaxis (29% vs 23%, $\chi 2=0.54$, $p=0.46$). Significant variability existed in the utilization of various antimicrobials amongst different transplant centers. The most common antimicrobials included piperacillin-tazobactam (62%), fluconazole (42%), vancomycin (18%), and cefepime (10%). Patients with open fascia had higher rates of infection (42% vs 20%, $p<0.001$) with higher rates of cefepime (22% vs 5%, $p<0.001$), fluconazole (66% vs 32%, $p<0.001$), metronidazole (20% vs 4%, $p<0.001$), and vancomycin (54% vs 6%, $p<0.001$) usage and lower rates of ceftriaxone (0% vs 8%, $p = 0.007$) and piperacillin-tazobactam (47% vs 66%, $p = 0.002$) usage compared to those without open fascia.

Conclusions: Significant variability exists in antimicrobial utilization amongst pediatric LT centers. Open fascia patients received broader spectrum antibiotics, likely reflective of greater infection risk. These data support the need for prospective studies to optimize antimicrobial regimens to reduce the risk of POI and develop antimicrobial stewardship protocols to optimize graft and patient survival.

Increasing Engagement in Pediatric Behavioral Health Care During Primary Care Well Child Visits

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Abstract:

Objective: Assess the feasibility of an iPad-on-wheels warm-handoff intervention for referring families into HealthySteps (HS), a parent-child interaction behavioral health program, during well-child visits.

Methods: Currently, all families belonging to the NewYork-Presbyterian Ambulatory Care Network (NYP-ACN) who present with any behavioral health concern during routine pediatric care are electronically referred to HS. We recently piloted an enhanced method of referring families to HS at two ACN clinic sites, in which pediatricians integrate HS behavioral health psychologists into visits in real time via an iPad-on-wheels to discuss identified parent-child behavioral challenges and whether to formally enroll into the program. Pediatricians at these clinic sites were formally instructed on how to utilize an iPad-on-wheels to introduce HS during well-child visits. We performed a retrospective chart review of families who were linked to HS via an iPad-on-wheels. Our primary aims were establishing program feasibility in clinics and whether this referral method improved initial and follow-up HS appointments. Descriptive statistics summarized demographic and visit data.

Results: 26 families were engaged with an iPad-on-wheels. Demographics are reported in Table 1. Most families identified as Hispanic, and most spoke primarily English. HS iPad-on-wheel visits averaged about 11 minutes, often discussing nutrition or other routine toddler topics (Table 2). Nearly all families who were introduced to HS with an iPad-on-wheels attended their initial (83%) and follow-up appointments (if applicable, 78%) (Table 3).

Conclusion: This evaluation will assist further development of using tele-behavioral health at NYP-ACN pediatric primary care clinics as well as our integrated social-emotional and behavioral programs for parental/child health.

Intermediates in SARS-COV-2 spike-mediated cell entry

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Abstract:

SARS-CoV-2 infection is initiated by membrane fusion between viral and host cell membranes, mediated by viral spike (S) proteins. Stable pre-fusion and post-fusion S structures have been resolved by cryo-electron microscopy and cryo-electron tomography, but the refolding intermediates on the fusion pathway are transient and have not been examined. We used an antiviral lipopeptide entry inhibitor to arrest S protein refolding and thereby capture intermediates as viruses interact with hACE2 on cell-derived target membranes. Cryo-electron tomography imaged both extended and refolded intermediate states of S2, as well as a novel late-stage S protein conformation on the pathway to membrane fusion. The intermediates now identified in this dynamic S protein-directed fusion catalysis provide a new understanding of the S protein refolding process and suggest how antiviral entry inhibitors may target the S intermediate state.

Pediatric Central Line Dressing Skin reactions: A survey of national trends in assessment and treatment

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Abstract:

Significant skin reactions have been observed as a complication of central line dressings in pediatric patients and may lead to a spectrum of skin reactions including erosive dermatitis which might compromise line integrity.1 There are currently no standard protocols to guide the assessment and management of cutaneous central line dressing reactions. Our center has taken a multidisciplinary approach to the assessment and management of these skin reactions. This study aims to evaluate the frequency of medical consultations related to central line dressing skin reactions at children’s hospitals/peer institutions and examine the practices and protocols utilized to assess and treat these reactions. A Qualtrics survey was developed by pediatric dermatologists and will be administered to specialists at academic medical centers who routinely participate in pediatric patient care in the inpatient setting. Insights derived from this proposed study will inform and guide the development of a standardized protocol for the management of cutaneous central line dressing reactions in the pediatric population at NYP/CUIMC, which can subsequently be applied at external hospitals. We anticipate presentation of survey data at the time of the symposium.

Biologic and Genomic Analysis of Wounds of Patients with Epidermolysis Bullosa: A focus on Pseudomonas

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Abstract:

Epidermolysis Bullosa (EB) is a rare, genetic blistering skin disorder marked by chronic, non healing wounds, and colonization and infection with multidrug-resistant bacteria can occur in severe subtypes. Chronic bacterial colonization impairs wound healing, predominately through biofilm production. S. aureus (SA) and P. aeruginosa (PA) are the most commonly found microbes in wounds of patients with EB. The presence of Pseudomonas species has been linked to wound-induced tumor formation and poor outcomes in patients with EB. This prospective cohort study analyzes wound cultures utilizing molecular microbiology techniques to further understand the microbial wound environment in patients with EB, with a focus on PA. To date, sixteen patients were enrolled with wound cultures positive for SA (fourteen patients, 88%) and PA (four patients, 25%), consistent with prior studies. Of seven cultures positive for PA from four patients, four (57%) were collected from lower extremities, four (57%) were from polymicrobial wounds, and three (43%) were pan-susceptible. Patient-reported cleansing practices ranged from no antiseptic utilization to daily dilute bleach baths. No patients were on oral antibiotics at the time the cultures were obtained. We performed genomic sequencing of wound culture swabs and characterized PA behavior. Notably, Pseudomonas species were identified with metagenomic sequencing, including from cultures that were negative for Pseudomonas. Given that flagellated bacteria have been implicated in squamous cell carcinogenesis, swarming studies (a marker of flagella activity) were performed on PA specimens and demonstrated reduced swarming compared to wild-type lab strains. Continued analysis of PA behavior could better guide future treatment strategies.

Neurocognitive Improvement with Hydroxyurea Therapy in Children with Sickle Cell Anemia in Uganda: Interim analysis at month 18

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Abstract:

Introduction: Cerebrovascular injury can lead to neurocognitive impairment in children with sickle cell anemia (SCA). Prospective impact of hydroxyurea therapy on neurocognitive function has not been reported in children with SCA in sub-Saharan Africa.

Methods: A randomly recruited sample of 265 children with SCA ages 3 to 9 years were screened and enrolled from the major sickle cell clinic in Kampala into our open label hydroxyurea trial. Primary outcomes include neurocognitive assessment and stroke prevention by screening with transcranial Doppler ultrasound (TCD). Controls were siblings/relatives of SCA participants, and underwent neurocognitive testing to establish age-specific test z-scores. Baseline (month 0) SCA group z-scores were compared to controls and to SCA sample at trial month 18.

Results: At trial baseline, SCA participants had mean age was 5.1±1.7, with similar socio-economic score, caregiver age and education versus controls. At baseline, SCA participants scored lower in all three domains: attention, neurocognitive ability and executive function ($p<0.001$). At 18 months of hydroxyurea therapy (mean dose 25.4mg/kg), re-testing of all active SCA participants (n=254) demonstrated significantly improved mean z-scores in all three domains ($p<0.001$). Therapy also reduced most elevated TCD velocities, which at baseline was associated with subsequent improved neurocognitive testing.

Conclusion: After 18 months, the SCA group exhibited significant improvements in all three domains ($p<0.001$) versus baseline. These findings suggest that: 1) Hydroxyurea therapy broadly improves neurocognitive function in children with SCA in sub-Saharan Africa; and 2) Plasticity of abnormal cerebral blood flow affects neurocognitive function. Ongoing treatment will assess impact from longer-term therap

Engaging Pediatric Infectious Disease Providers in Sexual Health Training: a Strategy for Success

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Abstract:

Objective: Pediatricians care for adolescents, a population disproportionately affected by STIs. Evidence-based guidelines are available, but there are recognized gaps in knowledge and practice including low screening rates for chlamydia among pediatric providers. The project objectives were to assess faciliators, barriers and audience uptake for a novel STI case series.

Method: The NYC STD/HIV Prevention Training Center (PTC) provides STI/HIV education to clinical providers. To prioritize a pediatric provider audience, the PTC partnered with the national Pediatric Infectious Diseases Society (PIDS) providing monthly virtual trainings to its membership.

Results: 7 trainings were held between 2021-2022 discussing: sexual history and screening tests, cervicitis/dysuria, vaginal discharge, mycoplasma/ureaplasma/PID, syphilis, congenital syphilis and rectal infections. Implementation facilitators included: clinical faculty expertise, engaged pediatric ID audience, broad geographical reach of providers and diversity in provider type. Implementation barriers included: possible Zoom fatigue, varying audience experience levels due to mix of provider levels and time constraints preventing more discussion per session. An end-of-year evaluation showed: 69.6% of participants were attendings, 8% residents, 4% fellows and 13% other (N=23).The mean number of sessions attended was 3, with some attending 6 of 7 sessions. 68% found the discussion section very valuable; 32% somewhat valuable (N=22).

Conclusion: Working with a national organization is an effective strategy to engage a priority provider audience for sexual health training. Zoom was an effective format, facilitating reach to both a broad geographical and diverse provider group. The consistent audience of attendings shows a need for this type of training to all provider levels.

Congenital Heart Disease with Congenital Diaphagmatic Hernia: Surgical Decision Making and Outcomes

Author: LA Stewart MDMS

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Abstract:

Objective: To describe the types of congenital heart disease (CHD) in a congenital diaphragmatic hernia (CDH) cohort in a large volume center and evaluate surgical decision making and outcomes based on complexity of CHD and associated conditions.

Study design: A retrospective review of patients with CHD and CDH diagnosed by echocardiogram between 01/01/2005 and 07/31/2021. The cohort was divided into 2 groups based on survival at discharge.

Results: Clinically important CHD was diagnosed in 19% (62/326) of CDH patients. There was 90% (18/20) survival in children undergoing surgery for both CHD and CDH as neonates, and 87.5 (22/24) in those undergoing repair initially for CDH alone. A genetic anomaly identified on clinical testing was noted in 16% with no significant association with survival. A higher frequency of other organ system anomalies was noted in nonsurvivors compared with survivors. Nonsurvivors were more likely to have unrepaired CDH (69% vs 0%, P < .001) and unrepaired CHD (88% vs 54%, P < .05), reflecting a decision not to offer surgery.

Conclusions: Survival was excellent in patients who underwent repair of both CHD and CDH. Patients with univentricular physiology have poor survival and this finding should be incorporated into pre and postnatal counseling about eligibility for surgery. In contrast, patients with other complex lesions including transposition of the great arteries have excellent outcomes and survival at 5 years follow-up at a large pediatric and cardiothoracic surgical center.

Pauses in Chest Compressions During ECPR: Using Simulation To Determine The Cause

Author: Ariel Sugarman MD

Additional Authors: Elizabeth Fischman MD, David O. Kessler MD, Anita Sen MD, Tarif Choudhury MD

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Abstract:

Objectives: 1. To determine the frequency, duration, and circumstances surrounding CCP during conventional CPR and ECPR. 2. To describe when and by whom pauses are verbally initiated and ended by during ECPR

Methods: In a single center prospective observational study, ECMO teams were recorded performing peripheral ECMO cannulation during simulated pediatric IHCA scenarios. Audiovisual recordings were reviewed by two reviewers and data from CC pauses greater than or equal to two seconds was characterized for length and patterns of communication. We compared CC pause characteristics between both conventional CPR and cannulation phases to explore themes and modifiable factors.

Results: In preliminary data, the longest CC pause was longer in the cannulation phase when compared to the conventional CPR phase (47s vs 21s). In the conventional CPR phase, the code leader and recorder prompted 100% of CC pauses and in the cannulation phase, the recorder and surgeon prompted 68% of CC pauses. Resumption of CC in the conventional CPR phase was prompted by the code leader 50% of the time and unprompted 50% of the time. Resumption of CC in the cannulation phase was unprompted 48% of the time and prompted by the surgeon 26% of the time.

Conclusions: The longest CC pauses during the cannulation phase occur for surgical procedures related to cannula placement. Communication surrounding starting and stopping CC during the cannulation phase was frequently suggested by surgeons. After completion of the remaining simulations, we hope to identify modifiable factors leading to CC pauses during pediatric ECPR.

Overall Experience of two clinical trial for FUS-mediated blood brain barrier in children and AYA with progressive DIPG/DMG

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Abstract:

Objectives: DIPG/DMG is a fatal brain tumor commonly found in the brainstem with a median overall survival of 1 year. The blood-brain barrier (BBB) poses a major challenge to the delivery of therapeutic agents. Over the past 4-years we opened two Phase I clinical trials using Delsona focused ultrasound (FUS) device developed at Columbia to treat pediatric and AYA patients with relapsed DMG. The first study, we delivered FUS with panobinostat and second study we gave concurrent etoposide. Here we present the results of the two studies.

Methods: Pediatric and AYA patients with biopsy proven DIPG/DMG at disease relapsed were enrolled onto clinicaltrial.org identified NCT04804709 (FUS with oral panobinostat) or clinicaltrial.org identified NCT05762419 (FUS with oral etoposide). Patients were allowed to

have prior therapies, including radiation and reirradiation. FUS was delivered over the course of six or four cycles respectively. MRI was performed to validate BBB-opening and closure.

Results: For the FUS panobinostat study, we enrolled 5 patients and accrued 3. The study was closed prematurely when panobinostat was taken off the market. For the FUS etoposide study, we enrolled 3 patients and accrued 2. This study is currently open. For the two trials combined, we delivered over twenty five FUS treatments. Four of five patients accrued had achieved BBB-opening. The average time for BBB-delivery was approximately 47 minutes. Side effects from FUS was limited to one grade 1 dermatological toxicity.

Conclusion: FUS-mediated BBB-opening is feasible in children with relapsed DIPG/DMG. Further studies are needed to assess for efficacy.

A Phase I study examining the feasibility of intermittent convection-enhanced delivery (CED) of MTX110 for the treatment of children with newly diagnosed diffuse midline gliomas (DMGs)

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Abstract:

Objectives: Objectives: Histone deacetylase inhibitors have been found preclinically to be among the most active agents against DMGs, however, they are clinically ineffective with systemic delivery due to blood brain barrier limitations and systemic toxicity. Using a repurposed device (an implantable subcutaneous pump connected with a catheter directly implanted into the pons) we performed a standard 3+3 phase I, dose escalation study to investigate the safety and feasibility of repeated infusions of MTX110, a water-soluble formulation of panobinostat, via CED.

Methods: Eligible patents were between 3 and 18 years of age with newly diagnosed DMG after radiation therapy. Following tumor biopsy and device implantation, patients received two 48-hour-infusion pulses of MTX110 7 days apart. The pump was prefilled with MTX110 and gadolinium for co-infusion to serve as a surrogate for drug distribution and administered at a rate of 0.2 mL/hr.

Results: Nine patients (30mM group, n=3, 60mM group, n=4, and 90mM group, n=2) have been treated with the MTX110 infusate. All but one patient had adequate tumor coverage as measured by co-infused gadolinium on MRI. One patient suffered a severe adverse event related to the infusion and tumor anatomy. Four patients had Grade 2 transient neurological deficits related to biopsy (n=1) and the infusion (n=3). Progression free survival ranges from 8 to 20 months, and overall survival is between 12 and 35 months.

Conclusion: Using MTX110, we demonstrated the safety and feasibility of repeated drug infusion by CED in DMG patients and established the recommended phase 2 dose at 90mM concentration.

Socioeconomic Factors Affecting Healthcare Equality in Slow-Flow Vascular Malformations at an Urban Quarternary Center

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Additional Authors: Emma Iaconetti, MD; Shannon Brackett, FNP; Erica M. Fallon, MD; Sheryl Tulin-Silver, MD; Maria C. Garzon, MD; June K. Wu, MD

Abstract

Purpose: Slow-flow vascular malformations, including lymphatic (LMs) and venous (VMs) malformations often require interdisciplinary care. We previously showed that patients at our urban quarternary center who are non-white are more likely to have Medicaid insurance and live ≤10 miles from our hospital. We hypothesize that healthcare disparities exist based on insurance status and race.

Methods: A retrospective study was performed of LM/VM patients at one institution between 1/1/2019-12/31/2020. Patients' demographics, insurance, and healthcare utilizations were collected and stratified based on insurance (Medicaid vs. commercial payor) and race (white vs. non-white). LMs/VMs were further divided into "simple" vs. "complex." Involvement of the airway or more than one anatomical area was defined as "complex."

Results: 125 patients were included. Insurance status was available for 124 patients (56 LMs, 68 VMs). Race data was available for 100 patients (49 LMs, 51 VMs). Of these, 76 patients (25 LMs, 51 VMs) had "simple" diseases and 49 patients (31 LMs, 18 VMs) had "complex" diseases. Patients with simple diseases had no differences in healthcare utilization based on insurance or race. Complex patients had equivalent healthcare utilization based on race but those with Medicaid were more likely to receive more imaging studies (p=0.047).

Conclusion: Our results demonstrate that LM/VM patients, regardless of insurance or race, had equivalent access to healthcare resources from a specialized interdisciplinary healthcare team as demonstrated by similar healthcare utilization. There was one exception that complex LM/VM patients with Medicaid received more imaging studies.

Neutralizing and protective antibody targets the prefusion conformation of Measles virus F and arrests it in the refolding intermediate.

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Abstract (250 word limit)

Measles virus (MeV) is a re-emerging highly infectious respiratory virus and a globally increasing public health threat, due to a perfect storm of inadequate vaccine coverage, disruption of vaccination campaigns, declining herd immunity, and rising populations of the immunologically vulnerable who can not be vaccinated. As the quest for MeV eradication tumbles and vulnerable populations increase, effective interventions against MeV are needed. However, there are no approved therapeutics against MeV disease. Neutralizing antibodies are effective treatments against multiple viruses; but surprisingly, there are not yet any structures of any antibodies against MeV F. Here, we describe the development of a chimeric monoclonal antibody (mAb 77.1), the first shown to neutralize the measles fusion protein, as well as its cryo-EM structure in complex with MeV F in the prefusion conformation. We further provide the complementary cryo-EM structure of unbound F in its post-fusion conformation to model fusion-related rearrangements, as well as a cryo-EM structure of pre-fusion F in complex with fusion inhibitory peptides. In vitro mechanistic experiments reveal that mAb 77.1 blocks the fusion process by stabilizing the F protein in an extended intermediate state after its activation, and in vivo challenge experiments demonstrate effective prophylaxis by this mAb’s activity. Finally, we determined the mechanism of the antibody to disrupt the F refolding cascade. mAb 77.1 shows promise as potential MeV immune prophylaxis via specific targeting of the MeV F structure and preventing further activation of extended intermediate in the fusion process.