THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES MEDICAL STUDENT RESEARCH DAY

HIGHLIGHTING THE BREADTH OF RESEARCH AND SCHOLARLY ACTIVITY

APRIL 26, 2023



School of Medicine & Health Sciences

THE GEORGE WASHINGTON UNIVERSITY



Medical Student Research Day is an opportunity for all medical students to showcase their work through poster sessions and selected oral presentations. Awards will be presented for outstanding poster presentations. Awards will be presented for outstanding poster presentations.

Medical student research day is designed to highlight the breadth of research and scholarly activity that medical students have accomplished during their education at The GW School of Medicine and Health Sciences. All medical students are invited to present research regardless of the area of focus. Abstract submissions represent a broad range of research interests and disciplines, including basic and translational science, clinical research, health policy and public health research, and education-related research.



- THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY —

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ANESTHESIOLOGY AND CRITICAL CARE

Comparing Midline Versus Central Line Venous Blood Gas Oxygen Saturations: A Novel Pilot Study

Purpose: Central venous oxygen saturations (ScvO2) obtained from central venous catheters (CVCs) are often used to approximate cardiac oxygen delivery. However, CVCs are considerably invasive and there is incentive to find a less invasive measurement to substitute ScvO2 as a guide for resuscitation. Midlines (ML), which are long peripheral intravenous catheters inserted above the antecubital space via the basilic, cephalic, or brachial veins, currently provide safe and comfortable mid-term vascular access for critically ill patients. Given the proximity of MLs to the axillary vein, this study aimed to analyze and compare the midline oxygen (MO2) saturation and ScvO2. If correlated, MO2 could provide additional physiologic information, while potentially decreasing the need for invasive CVCs. Methods: This study is a prospective observational study in adult patients with a CVC in the internal jugular or subclavian veins who either had or were planned to have a ML placed for their medical care. Venous oxygen saturations were compared between both catheters using a point-of-care blood gas analysis on iSTAT (Abbott ©) machines and analyzed within a 15-minute period. Results: A total of n= 24 patients were enrolled. The relationship between ScvO2 and MO2 was evaluated by the Wilcoxon Signed Rank Test and Bland-Altman Plot Analysis. Subjects were 67% male and 62.5% Black. The mean age was 57.9 years with an average SOFA score of 8.3 and APACHE II of 19.1. Patients were most commonly admitted for acute respiratory failure (45.8%) and septic shock (25%). The overall mean ScvO2 and MO2 were $66.2\% \pm 10.6\%$ and $60\% \pm 16.6\%$, respectively (p = 0.003), with a mean bias of 6.25% ± 9.59%. A Bland-Altman analysis demonstrated that more than 50% of ScvO2 and MO2 had a discordance of at least 5%, a clinically relevant difference. In a subgroup analysis, samples comparing right-sided MLs to CVCs (n=13) revealed a mean ScvO2 of 66.2% ± 10.3% and mean MO2 of 62.1% ± 16.15% (p=0.17). Conclusion: MO2 as a potential correlate of ScvO2 is an intriguing concept and its clinical utility remains to be seen. Our preliminary findings showed an approximate aggregate 6.2% difference in mean MO2 vs ScvO2; however, there was significant divergence in >50% of subjects. A right sided ML is an interesting variable, as the anatomic location may affect the relationship to the ScvO2 in addition to concurrent vasopressor use and various shock states. Further investigation is actively ongoing.

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ANESTHESIOLOGY AND CRITICAL CARE

Early Tracheostomy in Older Trauma Patients Exhibits Comparable Benefits to Those in Younger Patients

Objectives: Early tracheostomy is associated with a lower incidence of pneumonia (PNA) and duration of mechanical ventilation (MVD) in hospitalized trauma patients. The purpose of this study is to determine if early tracheostomy also benefits older adults compared to the younger cohort. Methods: Adult hospitalized trauma patients who received a tracheostomy as registered in TQIP from 2013 - 2019 were analyzed. We excluded patients with tracheostomy prior to admission and patients with AIS of any body region equal to 6. Patients were stratified into 2 cohorts consisting of those aged =65 and those aged <65. These cohorts were analyzed separately to compare the outcomes of early (< 5 days) vs late (> 5 days) tracheostomy. The primary outcome was MVD. Secondary outcomes were in-hospital mortality, hospital LOS (HLOS), and PNA. Univariate and multivariate analyses were performed with significance defined as p-value < 0.05. Results: In patients aged <65, early tracheostomy was performed within a median of 2.3 days (IQR, 0.47-3.8) after intubation and a median of 9.9 days (IQR, 7.5-13) in the late tracheostomy group. The early tracheostomy group's ISS was significantly lower with fewer comorbidities. In patients aged =65, early tracheostomy was performed within a median of 2.7 (IQR, 0.67-4.0) days after intubation and a median of 9.8 days (IQR, 7.4-13) in the late tracheostomy group. There were no differences in injury severity or comorbidities when comparing the groups. Early tracheostomy was associated with lower MVD, PNA, and HLOS on univariate and multivariate analyses in both age cohorts, although the degree of benefit was higher in the younger cohort. Mortality did not differ based on time to tracheostomy. Conclusion: Early tracheostomy benefits hospitalized trauma patients regardless of age. Age should not factor into timing for tracheostomy placement.

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ANESTHESIOLOGY AND CRITICAL CARE

EEG Predictors of Neurologic Injury in Patients undergoing Extracorpeal Membrane Oxygenation

Objective: To assess electrographic associations of brain injury in children undergoing extracorporeal membrane oxygenation (ECMO). Methods: This is a retrospective review of all patients on ECMO admitted to the pediatric and cardiac intensive care units (PICU, CICU) at Children's National Hospital from August 2019 to December 2022. Clinical variables included age, sex, ECMO indication, presence or absence of congenital heart disease, duration on ECMO, initial type of ECMO (veno-arterial (VA)/ veno-venous (VV)), and total number of ECMO runs. EEG features collected were based on duration of the first ECMO run and included EEG background and presence or absence of electrographic seizures (ES). EEG background within the first 24 hours was defined as normal (both neonate and non-neonate), mildly abnormal (slowdisorganized in non-neonate; excess discontinuity in neonate), moderately abnormal (discontinuous in non-neonate), or severely abnormal (attenuated/featureless/burst suppression in neonate and non-neonate). Imaging features included ischemic, anoxic, hemorrhagic (extra-axial, intraparenchymal, or intraventricular hemorrhage), or combined injury. A chi-squared test was used to assess the association of EEG features, ES, and injury. Results: One hundred and twelve patients met inclusion criteria with a mean age of 3.05 years (SD 5.99). Forty-four percent (49/112) were female, 84% had congenital heart disease, 93% (104/112) had EEG, and 95% (106/112) had neuroimaging. The most common indication for ECMO was cardiopulmonary arrest (50/112). Nineteen percent (21/112) were admitted to the PICU and 81% (92/112) were admitted to the CICU with a mean duration on ECMO of 142.54 hours (SD 241.77). VA ECMO, including both central and peripheral, was the most common approach to cannulation (90%, 101/112). Seventy-nine percent (89/112) had a single ECMO run, whereas 21% (23/112) had multiple ECMO runs. A mildly abnormal EEG background was the most common finding (77%, 80/112), and 6% (6/104) had a severely abnormal background. Thirty-eight percent (40/104) had ES, the majority of which occurred on the first day of cannulation (25%; 10/40). Fifty-three percent (59/112) had brain injury and the most common injury type was anoxic (22%, 13/59). A severely abnormal EEG background (p=0.028) and presence of electrographic seizures (p<0.0001) while on ECMO was associated with the development of brain injury. Conclusion: Severity of EEG background and presence of ES was associated with the development of brain injury in patients on ECMO. We hope to further explore the ability of EEG background and ES to localize and predict degree of brain injury in this population.

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Assessing the Efficacy of a Tumor-specific Vaccine, anti-PD-1, and Decitabine in a Syngeneic Murine Model of Glioma: a Preclinical Trial

Introduction: Despite the revolution in immunotherapy over the past decade, brain malignancies remain insensitive to immune-based approaches. Traditionally thought to be due to CNS immune privilege, many reports have thought immunotherapy would never show efficacy in brain cancers. However, there have been reports of tumor-associated and tumor-specific T cells generated in cancer models, some with spontaneous immune clearance, implying a potential for immunotherapy in brain cancer. In this experiment, we targeted a tumor-specific antigen (Trp2) by vaccine in combination with immunotherapy and decitabine, an epigenetic therapy, potentially outlining a new therapeutic avenue for glioma treatment. Methods: C57B6/J7 mice were intracranially injected with 100,000 Trp2+ GL261-NCI (Luc+) cells in 1 µL. Tumors were monitored by bioluminescence. Treatments included SQ decitabine (0.3 mg/kg/ dose, daily M-F, qO week), IP anti-PD-1 (200 mg/mouse, MWF x 5 doses between second and third vaccination), IV anti-Trp2 vaccine (3x D2, D4, D10 from the start of treatment). Mice were euthanized upon tumor-related symptoms and brain tissue was collected and processed. Results/discussion: Bioluminescent data demonstrated a delayed increase in signal in all groups dosed with decitabine. Keeping with this data, Kaplan-Meier curves showed an increase in survival in the treatment groups dosed with decitabine (p=0.0006), with an increase in survival by 50% in the decitabine-only group as compared to vehicle control. However, the anti-Trp2 vaccine and anti-PD-1 groups show no survival benefit alone. Taken together, these data would imply a therapeutic effect for decitabine, of which is being explored by CyTOF, IHC and H&E. We hope to demonstrate increased immune infiltration and activation signatures through later experiments.

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Evaluating the Prognostic Utility of the Hematopoietic Cell Transplantation Comorbidity Index (HCT-CI) in Children and Young Adults with Relapsed Refractory B-cell Acute Lymphoblastic Leukemia (r/r B-ALL) Prior to CAR T-cell Therapy

Introduction: Despite the clinical efficacy of CAR T-cells, particularly in children and young adults (CAYA) with r/r B-ALL, many of whom have had extensive prior therapy, there is limited understanding of how baseline comorbidities associate with outcomes. In patients, including children, undergoing allogeneic hematopoietic stem cell transplant (HCT), the HCT-CI (Sorror et al, Blood, 2005) is a validated tool for prognostication of post-transplant non-relapse mortality and survival based on a set of pre-transplant comorbidities; increasing scores are associated with worse outcomes. To date, there is no tool which helps to predict CAR T-cell outcomes as informed by baseline comorbidities. Objectives: To evaluate the use of HCT-Cl for prognostication of outcomes following CAR T-cells. Methods: The HCT-CI score was retrospectively determined for 119 patients with r/r B-cell ALL treated on 1 of 3 Phase I CAR trials at the National Cancer Institute (NCT01593696, NCT02315612, NCT0344839) through 12/31/2020. A score for each of the comorbidities included in the HCT-CI was applied to every patient using data collected prior to the start of lymphodepleting chemotherapy. Scores were analyzed with respect to outcome measures including cytokine release syndrome (CRS), complete response (CR), median overall survival (OS) and cumulative incidence of relapse (CIR). Results: Among the 119 patients, the median age was 15.4 (range, 4.4-30.7) and median number of prior cycles of therapy (excluding HCT) was 5 (1-14). The median HCT-CI score was 2 (range, 0-7), with 49.6% of patients having a score > 3. Each patient had a median of 1 comorbidity (range, 1-3), with hepatic and pulmonary systems predominantly contributing to the HCT-CI scores. There was no association between HCT-CI and CRS incidence (p=0.28), CRS max grade (p=0.37)), CR (p=0.29), median OS (p=0.39), nor 2-year CIR (p=0.36) (Table 1, Figures 1&2) and scores did not differ between trials (p=0.21). Conclusion: Despite the important role of HCT-CI in predicting post-HCT outcomes, it lacked prognostic utility in CAYA with r/r B-ALL undergoing CAR T-cell therapy. Nonetheless, integrating comorbidities with known determinants of response and toxicities (ie. disease burden) may be important in predicting outcomes, especially considering the substantial baseline profiles of these patients. Efforts to generate and validate a CAR Comorbidity Index using such a set of pre-CAR characteristics and risk factors are underway.

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Bothersome Hot Flashes Following Neoadjuvant Androgen Deprivation Therapy and Stereotactic Body Radiotherapy for Localized Prostate Cancer

Background: Androgen deprivation therapy (ADT) may improve cancer control in unfavorable localized prostate cancer treated with stereotactic body radiotherapy (SBRT). ADT is known to cause hormonally related symptoms that resolve with testosterone recovery. Hot flashes are particularly burdensome. This study sought to evaluate the timeline of hot flashes following short-course ADT and SBRT as well as its relationship with testosterone recovery. Methods: Institutional IRB approval was obtained for this retrospective review of prospectively collected data (IRB#: 2009-510). ADT was initiated three months prior to the start of SBRT. Hot flashes were self-reported via question 13a of the Expanded Prostate Index Composite (EPIC)-26 prior to ADT initiation, the first day of robotic SBRT, and at each follow-up (1, 3, 6, 9, 12, 18, 24 and 36 months). The responses were grouped into three relevant categories (no problem, very smallsmall problem and moderate-big problem). Scores were transformed to a 0-100 scale with higher scores reflecting less bother. Testosterone levels were measured at each follow-up. Results: From 2007 to 2010, 122 localized prostate cancer patients (9 low-, 64 intermediate-, and 49 high-risk according to the D'Amico classification) at a median age of 72 years (range 54.49-88.32) were treated with short course ADT (3-6 months) and SBRT (35-36.25 Gy) at Georgetown University Hospital. Thirty-two percent were black and 27% were obese. 77% of patient received three months of ADT. At baseline, 2% of men experienced hot flashes that were a "moderate to big problem" and that proportion peaked at the start of SBRT (45%) before returning to baseline 9 months post-SBRT with a cumulative incidence of 52.4%. The median baseline EPIC-26 hot flash score of 94 declined to 50 at the start of SBRT but this returned to baseline by six months post SBRT. These changes were both statistically and clinically significant (MID = 9.5). Testosterone recovery (> 230 ng/dL) occurred in approximately 70% of patients by 12 months post SBRT. Resolution of hot flashes correlated with testosterone recovery. Conclusion: Bothersome hot flashes occur in greater than 50% of men treated with neoadjuvant ADT. Resolution of hot flashes occurs in the majority of patients within one year after treatment. Reassurance of the temporary nature of hot flashes may assist in reducing patient anxiety. Measuring testosterone levels at followup visits may allow for anticipatory counseling that may limit the associated bother.

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Mogamulizumab Retreatment for Cutaneous T-cell Lymphoma

Cutaneous T-cell lymphoma (CTCL) is a rare and heterogenous subset of diseases. Mycosis Fungoides is the most common type of CTCL. It occurs in older adults (55-60 years old), with male predominance and presents with cutaneous plaques or nodules with generalized erythroderma. Sézary Syndrome is the leukemic variant, with Sézary cells in the blood. Becuase CTCL is often managed as a chronic condition, therapies can be used sequentially and sometimes paused and resumed. Mogamulizumab (MOGA) is a monoclonal antibody against CCR4 which is approved for treatment of MF/SS. The MAVORIC study was a phase 3 clinical trial evaluating the use of mogamulizumab; in this study, 7% (13/184) developed treatment-associated rash, which can be a common AE with this drug. To distinguish between the drug induced rash and the disease, immunohistochemistry and peripheral blood flow cytometry are regularly assessed. We compiled our institution's experience with mogamulizumab retreatment as a case series. We used an institutional database to identify any patient with a diagnosis of MF/SS at Memorial Sloan Kettering with a gap of 60 days or more between MOGA infusions, from January 2010 to July 2022. This resulted in a group of 4 patients. In our series, MOGA was often the 3rd line of treatment, usually after Targretin and phototherapy. Prior treatments were discontinued due to adverse effects and/or worsening Sézary count. Only one patient had an adverse event following the initial dose of mogamulizumab (hypertension). Following dose #10, treatment was held for patient 1 for 63 days due to rash and arthritis; at retreatment, the patient developed the rash again and was discontinued. Pt 4 was held due to being hospitalized with a suspected drug reaction. The median time patients were held off MOGA was 168 days [49-493]. The median total number of treatments was 17 Doses [7-29]. The median number of days on treatment before being discontinued was 155 days [22-329]. The median number of treatments before being discontinued was 13 treatments [4-23]. There is a need for more real-world data as MOGA is continued to be a treatment of choice in 2nd /3rd line treatment in MF/SS.

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CLINICAL AND TRANSLATIONAL RESEARCH

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Implications of Epithelial Membrane Protein-2 (EMP2) in Glioblastoma Angiogenesis

Background: Angiogenesis is a prominent feature of glioblastoma. Consequently, efforts have been made to target the VEGF signaling pathway, leading to the development of bevacizumab and several other agents. Despite promising preclinical data and a modest improvement in progression-free survival, these agents have failed to demonstrate meaningful improvement in patients' overall survival. Hence, a better understanding of how tumors develop anti-angiogenic therapy resistance is warranted to develop more effective therapeutic agents. One potential mechanism centers on epithelial membrane protein-2 (EMP2), a cell surface protein that regulates cell trafficking and intracellular compartmentalization. Herein, we aimed to investigate EMP2 as a therapeutic target in in vivo murine models, and determine whether the loss of EMP2 improves sensitivity to anti-angiogenic therapy. Methods: Murine glioblastoma cell line (SB28) expression of EMP2 was confirmed via western blotting and gPCR. To determine if EMP2 expression can be upregulated following anti-angiogenic therapy (similar to our previous results in human specimens), tumors were implanted subcutaneously into four syngeneic C57BL/6 mice and treated with aflibercept given its species cross-reactivity (bevacizumab is a humanized mAb and therefore could not be used; and aflibercept has a very similar mechanism of action, despite structural differences). Tumors were treated with 25 mg/kg of aflibercept weekly for three weeks, and were analyzed via immunohistochemistry (IHC). Subsequently, SB28 cells were genetically modified via viral vectors to express increased (+EMP2) or reduced levels of EMP2 (shKD) compared to vector control (Ctrl). Tumors were implanted into eight C57BL/6 mice, treated with aflibercept (weekly, 25 mg/kg) and weighed at day 32. A p-value <0.05 was considered statistically significant. Additionally, the TCGA database was utilized to evaluate the prognostic implications of EMP2 in glioblastoma patients (EMP2 expression was dichotomized to high and low). Results: In our initial experiment, we noted a significant upregulation of EMP2 in aflibercept-treated tumors compared to control (P=0.05) (Figure 1), validating our findings reported in bevacizumab-treated human specimens. HIF1a expression was also increased with aflibercept treatment, although this did not reach statistical significance. Subsequently, genetic modification of EMP2 significantly altered tumor response to aflibercept (P=0.02) and tumor weight (P=0.03) (Figure 2). Furthermore, an analysis of The Cancer Genome Atlas (TCGA) demonstrated that high EMP2 expression correlated with poor survival following bevacizumab treatment. Conclusion: Our results demonstrate the potential for EMP2 as an angiogenic target in glioblastoma murine models, and validate its relevance in human tumors.

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CLINICAL AND TRANSLATIONAL RESEARCH

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Radiofrequency Ablation Versus Partial Nephrectomy as a Treatment Option for Renal Angiomyolipoma

Purpose Renal Angiomyolipomas (RAML) rank as the most common benign renal tumor in the United States and they present with a global incidence of 30 per 100,000. 80% of RAML cases are sporadic, while the other 20% of cases are associated with tuberous sclerosis complex. RAML is an uncommon occurrence and occurs more frequently in females than males. RAML have a high fat content which makes them easily diagnosable, however, they only require treatment when they are symptomatic as they are a benign tumor. The gold-standard treatment for RAML is surgical resection via partial nephrectomy (PN), however many of these patients are not candidates for surgery due to the size, location, or vasculature of the tumor. In these patients, ablation has emerged as a new treatment option to devascularize and decrease the size of the tumor while sparing renal tissue and function. Radiofrequency Ablation (RFA) is a popular thermal ablation which uses radio waves to heat the tumor to temperatures around 50-100oC to freeze the tumor. The purpose of this research is to compare the Technical Success Rate (TSR), and Major Adverse Event Rate (MAE) of CA and PN to determine if RFA could replace PN as the gold standard treatment of symptomatic RAML. Materials and Methods A literature review was done using the PubMed database to compare the TSR and MAE of RFA and PN. MAE was defined as complications that were life-threatening or resulted in hospitalization. TSR for PN was defined as complete removal of the tumor whereas RFA was defined by complete ablation of the tumor as verified by post-procedural imaging. A total of 6 studies were used in this review, comprising of 220 total cases, with their results compiled and reviewed. Of these cases, 30 received RFA while 190 cases received PN. Results Patients receiving RFA had a TSR of 100%, compared to 98.4% for PN. This result showed no clinical significance on a 95% CI (p=.49). CA had a MAE percentage of 0.0% compared to 12.1% of PN treated tumors. This result showed clinical significance on a 95% CI (p=.044). Conclusion This review indicates that there is no significant difference between the TSR of PN and RFA. These results suggest that there is no difference in effectiveness. However, PN had a significantly higher MAE than RFA which suggests that RFA is likely safer than PN. This research suggests that RFA is a suitable alternative gold-standard.

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CANCER

Efficacy of Influenza Vaccine on T-Cell Response in Recipients of CAR-T Therapy for Leukemia

Chimeric antigen receptor-modified T (CAR-T) cell therapies are gaining wider use in pediatric leukemia patients. Depletion of the immune system following CAR-T therapy leaves patients susceptible to infections. A recent study evaluating antibody responses to influenza vaccine following CAR-T therapy showed only a partial vaccine response.1 However, these studies did not analyze cellular responses to vaccination, which is well described after influenza vaccine and could provide additional protection. This study aimed to assess T cell responses in an established cohort of CAR-T recipients and healthy controls who received the 2019-2020 influenza vaccine. T cells were isolated following a 10-day microexpansion by stimulating thawed peripheral blood mononuclear cells with peptide libraries encompassing four proteins from the 2019-2020 influenza vaccine: Hemagglutinin-Kansas (HA-Kansas), Hemagglutinin-Brisbane (HA-Brisbane), Nucleoprotein-Kansas (NP-Kansas), and Nucleoprotein-Brisbane (NP-Brisbane). Cellular immune response was evaluated using flow cytometry identifying IFN-?+/TNF-a+ activated influenza-specific T cells. One healthy control and 3 post-CAR-T patients were evaluated. Healthy control samples were analyzed pre-vaccine, day 30, day 60, and day 90 timepoints, showing a robust CD4+ T cell pre-vaccine response to NP-Brisbane (mean 6.58%) and NP-Kansas (mean 3.86%) followed by waning responses. CD4+ T cell responses to HA-Kansas increased from pre-vaccine (mean 0.55%) through day 60 (mean 1.36%), before waning at day 90 (mean 0.80%). Patients who received vaccination post-CAR-T showed varied responses with 66% (n=2/3) demonstrating increased CD4+ T cell response to at least one vaccine peptide post-vaccination. Trend did not reach statistical significance. Percentage of IFN-?+/TNF-a+ CD8 T cells remained <1% in healthy and CAR-T patients pre and post vaccination. Preliminary data suggest a more robust CD4+ than CD8+ population response to influenza vaccination. Analysis of additional patients who received influenza vaccination pre- and post-CAR-T is ongoing. This research is an early step in determining benefit and timing of influenza vaccination in individuals receiving CAR-T therapy.

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Machine-Learning Model of Pre-Treatment MRI Accurately Predicts Progression Following Cervical Cancer Radiotherapy

MRI may be useful to identify women with cervical cancer at high risk of disease progression to test strategies of treatment intensification. The purpose of this study was to determine the value of a machine-learning model built on pre-treatment MRI for prediction of risk of progression after radiation therapy. Magnetic Resonance Imaging (MRI) data for women with cervical cancer was collected from The Cancer Genome Atlas Cervical Squamous Cell Carcinoma and Endocervical Adenocarcinoma Collection (TCGA-CESC) on the Cancer Imaging Archive (TCIA), which reported clinical, treatment, and imaging data from a single institution. 27 patients who had received radiation for cervical cancer were selected for input into a custom 3-D Residual Neural Network (ResNet) model with added custom layers specific to DICOM data in tensorflow python package. One T2 MRI per patient was used to predict recurrence free survival after radiation treatment, where patients were predicted to be "high-risk" or "low-risk" for disease recurrence as the output of the model. The model was validated using five-fold cross validation; 80% of the data was used to train each fold and 20% was used for testing. Final model statistical significance was confirmed through shuffle test at the p < 0.01 level. The clinical outcomes of patients and the model's "low-risk" and "high-risk" prediction were compared. There were 27 patients in the study with mean age of 51 years (range 29-79). 20 patients had squamous cell carcinoma and 7 patients had adenocarcinoma. 10 women were treated with radiation alone and 17 with chemo-radiation. 5 women received surgery in addition to radiation or chemoradiation. 21 patients received brachytherapy. Median follow-up of patients was 29 months (range 3-64). The model predicted 7 patients as "high risk" for recurrence; all 7 developed recurrence during follow up. None of the 20 patients predicted to be "low risk" developed disease recurrence. Among all patients in the study, the two-year progression free survival (PFS) was 82.0%. Patients identified as "low risk" and "high risk" by model had two-year PFS of 100% and 43%, respectively. Among patients with recurrence, 3 developed local recurrence and 4 developed distant metastases. The ResNet model achieved crossvalidated accuracy of 92% for prediction of progression-free survival (p<0.01). A 3-D ResNet machine-learning model using pretreatment MRI image data can accurately predict clinical outcomes for cervical cancer following radiation therapy. Future work to confirm generalizability should focus on validation with a larger clinical dataset.

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Intensified adjuvant treatment for high risk resected cutaneous angiosarcoma of the head and neck

Background: Previous studies have highlighted the poor survival of patients with cutaneous angiosarcoma of the head and neck. Therapeutic options are limited, and effective treatment strategies are yet to be discovered. The objective of this study is to evaluate overall survival following intensified adjuvant treatment for high risk resected angiosarcoma of the head and neck. Methods: Patients diagnosed with nonmetastatic cutaneous angiosarcoma of the head and neck from 2004 to 2016 were identified from the National Cancer Database (NCDB). We retrospectively compared demographics and overall survival between patients who received surgery and radiation therapy (SR) and patients who received surgery and chemoradiation (SRC). The chi square test, Kaplan-Meier method, and Cox regression model were used to analyze data. Results: A total of 249 patients were identified, of which 79.5% were treated with surgery and radiation alone and 20.5% were treated with surgery and chemoradiation. The addition of chemotherapy, regardless of sequence of administration, did not significantly improve overall survival. Factors associated with worse survival in both groups included older age, positive nodal status, and positive margins. Patients with positive nodes had improved survival with radiation doses > 50.4 Gy compared to = 50.4 Gy (HR: 2.93, CI: 1.60 - 5.36, p < 0.001). Conclusions: Adjuvant chemotherapy does not seem to impact overall survival for resected non-metastatic angiosarcoma of the head and neck. Higher radiation doses are prognostic for high-risk disease.

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X285K HOXB13 Binds Androgen Receptor Within Nucleus but Possibly to a Lesser Extent than WT HOXB13 as Assessed by PLA Assay

Introduction: Prostate cancer is known to be more prevalent among men of African descent, compared to white individuals. Recently, a new HOXB13 variant, X285K, has been identified among men of West African descent with PCa, with estimates indicating that roughly 1% of African American men found with prostate cancer have the X285K mutation. Men found to have X285K are prone to have a higher likelihood of clinically significant prostate cancer and an earlier diagnosis of PCa. The X285K variant has a single base deletion in its stop codon (c.853delT), which results in an extension by 96 amino acids at the C-terminal end. Although the relationship is multifaceted, it is well established that HOXB13 interacts with androgen receptor (AR) which plays a pivotal role in PCa pathogenesis. However, little is known about how this specific variant (X285K) may impact HOXB13's function endogenously. Objective: We hoped to address two important parameters involving X285K. (1) we hoped to assess whether or not X285K HOXB13 binds to AR in the nucleus as assessed by Proximity Ligation Assay (PLA), (2) we hoped to compare WT HOXB13 to X285K HOXB13 to assess any potential differences in terms of binding to AR. We hypothesize that the extended amino acid tail on X285K HOXB13 may disrupt AR binding, resulting in a weaker PLA signal intensity. The results of this experiment may add to the literature on X285K, which is currently limited. Methods: PLA was performed in accordance with the manufacturer's protocol. Images were captured using EVOS and ISIS fluorescence microscope following PLA. ImageJ was utilized to guantify PLA signal . Results: X285k displayed decreased PLA signal density at 24 hrs (69.38 vs. 91.43, p=.004), 48 hrs (48.97 vs. 82.27, p= .022), and 72 hrs (79.62 vs. 109.36, p=.004) compared to WT. Furthermore, the addition of synthetic androgen (R1881) increased PLA signal density for X285k HOXB13 at 24 hrs (69.33 vs. 29.15, p=.008), 48 hrs (48.97 vs. 6.75, p=.005), and 72 hrs (79.62 vs. 41.06, p=.002), suggesting that X285k HOXB13 binding is enhanced upon androgen stimulation. Conclusion: The current study indicates that X285K HOXB13 variant protein interacts with androgen receptor (AR) protein in prostate cancer cells. X285k binds AR within the cell nucleus as assessed by PLA, as is the same for WT HOXB13. The current study also suggests X285k may bind to AR to a lesser extent than WT, though this has never been demonstrated before.

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CLINICAL AND TRANSLATIONAL RESEARCH DAY CANCER

Molecular Stratification of the Pancreatic Cancer Microenvironment

Pancreatic cancer (PC) is the third leading cause of cancer-related death in both men and women in the U.S. with a 5-year survival rate of 11%. Despite the excitement surrounding immunotherapy and targeted therapies, PC remains resistant to these treatments. Investigating the PC tumor microenvironment (TME) is critical to understand how PC evades modern therapies. Using digital pathology analysis, we quantitatively characterized the TME of human PC specimens. Using open-access bioinformatics databases, we also examined how specific genetic alterations and immune features drive the landscape of the PC TME and inform prognostication of a patient's disease. With these computational tools, we confirmed squamous-like histology on a human PC specimen and identified features that are potentially prognostic of poorer survival. To first visualize the human PC TME, we performed immunohistochemistry (IHC) on de-identified human pancreatic specimens from the GWU Hospital. Digital pathology analyses were conducted with QuPath. Clinical, genetic, and immune data from the PAAD patient cohort from The Cancer Genome Atlas (TCGA) were extracted via cBioPortal and iAtlas. Statistical analyses were conducted in RStudio using the R survival package. The aggressive squamous-like subtype of PC is associated with a genetic alteration in TP63, a key tumor suppressor gene in the TP53 gene family. We conducted histologic and genetic analyses to characterize TP63 in human PC. After performing IHC with DAB-labeled p63 antibodies, we used QuPath to map the density of p63+ cells. We counted 846 of 1825, or 46.36%, p63+ cells, thus confirming squamous-like histology. Next, we used the R survival package on the TCGA cohort data to quantify clinical outcomes based on squamous-like histology. Survival analysis revealed a lower median overall survival in p63+ patients (15.32 vs 20.19 months, p = 0.0301). Cox regression of log2 copy number values of the TCGA cohort yielded a hazard ratio (HR) of 11.4659 for p63+ patients (p = 0.0000567). These statistics confirm that TP63 alterations confer survival hazard. Finally, Cox regressions were exhaustively performed on immune variables from the iAtlas database; notable findings included worse prognosis predicted with M2 macrophages (HR = 8273.054, p = 0.002679), Th2 cells (HR = 1.001, p = 0.0002), and hypoxia score (HR = 1.034, p = 0.001). Thus, patients with PC with these immune features may have worse clinical outcomes. We plan to further characterize the human PC TME and develop additional ways to prognosticate clinical outcomes, which could inform therapeutic directions for patients with PC.

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CLINICAL AND TRANSLATIONAL RESEARCH

CANCER

Definitive Local Treatment for Metastatic Prostate Cancer: An NCDB Retrospective Study

Introduction/Background: Prostate cancer (PCa) is the most common non-skin malignancy in men and the second leading cause of cancer mortality in US males. Metastatic disease (mPCa) at presentation comprises about 5% of cases, which represents an incurable and lethal disease. Thus, novel approaches are needed such as the use of definitive local treatment (LT) to the prostate via pelvic radiotherapy (RT) or radical prostatectomy (RP). This study aims to compare the use of LT with androgen deprivation therapy (ADT) vs. ADT alone in the setting of metastatic prostate cancer using a large national database. Methods: The National Cancer Database (NCDB) was queried from 2004-2017 to conduct a retrospective cohort analysis of cTanyNanyM1 PCa who received LT + ADT vs. ADT alone. Clinicopathologic variables were compared between the two groups using appropriate statistical tests of comparison for continuous or categorical variables. Cox Proportional Hazards Model was used to identify predictors of Overall Survival (OS). The Kaplan-Meier (KM) method and log rank test were used to compare overall survival for LT+ADT vs. ADT alone. Results: A total of n=36,635 patients with cM1 were identified with 3197 (8.7%) patients receiving LT + ADT. Among LT + ADT, 2884 (90.2%) patients received RT + ADT and 313 (9.8%) received RP + ADT. Median follow-up was 2.8 years. Kaplan-Meier analysis showed significant improvement in 5-year OS for patients who received LT + ADT vs. ADT alone. For ADT alone, 5-year OS was 31.3% (CI= 30.7-31.8%) vs. 54.2%. (CI= 52.4-56.1%) for LT+ADT. Furthermore, comparing the type of LT on KM analysis: RP + ADT showed better 5-yr OS, 74.0% (CI= 67.5-79.1%) vs. 52.2% (CI= 50.2-54.2%) for XRT+ADT (p<0.001). Conclusion Definitive local treatment in addition to ADT significantly improves 5-year OS for patients with metastatic prostate cancer. There is a significant improvement in patient outcomes for those who are treated with RP vs RT. These findings support multimodal treatment for metastatic prostate cancer, and further studies are needed to optimize the choice of definitive LT in this setting.

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Discovering Novel Genetic and Epigenetic Alterations in Pediatric Cortical Brain Tumors with Dual-Label Optical Genome Mapping

Brain tumors are the most common type of solid tumor and the leading cause of cancer-related mortality in the pediatric population. Structural variants play a key role in tumorigenesis. However, the full spectrum of structural variants in tumors is not fully understood due to the limitations of commonly used genetic study methods, such as short-read based genome sequencing. Additionally, it is not understood how these structural variants change methylation patterns in brain tumors. Optical genome mapping utilizes ultra-long DNA molecules to construct longer genomic fragments, making it more effective in identifying large structural variants. This study used duallabel optical genome mapping (DLOGM) to observe both structural variants and methylation patterns of pediatric cortical brain tumors. Ultra high molecular weight DNA was extracted from pediatric cortical high grade gliomas (n=10). Long DNA molecules were initially labeled with red fluorescent nucleotides at specific sequence motifs (DLE-1 enzyme). They were then labeled with green fluorescent cofactors in non-methylated TCGA sequences (mTaq enzyme), stained, and imaged. Structural variants were identified based on the alignments of red labels to the reference genome while methylation levels were estimated based on presence of green labels. Structural variants were identified in all samples with the most common events being deletions and translocations. Most samples had structural variants that overlapped with a gene known to have a role in tumor development. Unique methylation patterns for tumor types were found for all samples. DLOGM successfully identified both structural variants and methylation patterns that may potentially be involved in tumorigenesis. This study demonstrates that DLOGM effectively allows for the identification of genome-wide structural variants and methylation patterns in pediatric cortical high grade gliomas. Future studies that expand upon tumor pathologies are needed to widen the spectrum of patterns identified. This will impact our understanding of brain tumors and their development, and therefore has the potential to influence future diagnostic algorithms and treatment modalities for patients with brain tumors.

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Evaluating the cellular immune response to the pneumococcal vaccine post-chimeric antigen receptor T (CAR-T) cell therapy

Chimeric antigen receptor T cell (CAR-T) therapies are associated with prolonged hypogammaglobulinemia due to the indiscriminate B-cell directed cytotoxicity of the CAR-T cells. To evaluate T-cell mediated cellular immunity in the setting of CAR-T, we intend to examine the response to a "booster" Prevnar13 vaccine (conjugated to diphtheria CRM197 protein) prior to CAR-T infusion. We utilized healthy control adult and pediatric samples to optimize testing of T cell reactivity against the CRM197 peptide library. Peripheral blood mononuclear cells were collected from healthy control adult and pediatric patients. Thawed cells were cultured for 7 days with IL-4, IL-7 after stimulation with the CRM197 library. On day 7, CRM-197 specific T cells were harvested and restimulated with CRM197, actin (negative control) or SEB (positive control). We utilized ex-vivo interferon-? enzyme-linked immunosorbent spot (ELISpot) assays and multi-parameter flow cytometry to evaluate cellular response to CRM197. We utilized intracellular cytokine staining and surface markers of T cell phylogeny to assess the T-cell response. After staining, cells were fixed and acquired on a cytoFLEX flow cytometer. Reactivity was measured by the percentage of IFN ? +/TNFa+ cells. A total of 5 adult and 3 pediatric (ages 5, 6 and 12yo) samples were included in the initial validation of the CRM-197 library. Non-expanded PBMC samples did not demonstrate a significant response IFN ? to CRM197. We then performed 7-day microexpansions with CRM197 utilizing the three pediatric control samples and adult sample A. We did not see significant increases in the IFNg+/TNF+ populations in response to CRM197 re-stimulation (mean 0.33% CD4+, 0.10% CD8+) for any of the adult (n=1) or pediatric (n=3) patients utilizing ICS and flow cytometry. Actin stimulated samples demonstrated a mean 0.29% CD4+ and 0.15% CD8+ IFNg+/TNF+ populations respectively. There was not a significant difference in the CD4+ versus CD8+ response. Our initial studies of the CRM197 peptide library have not demonstrated strong immunogenicity in the healthy control samples tested to date. While T-cell responses to vaccines are typically subtle, our data could be limited by the fact we did not have access to clinical information from any of the adult or pediatric donors. As such, we did not know exactly how far these patients were from their CRM197 conjugated vaccines at the time of donation. The next steps are to procure control samples with known clinical histories and once the peptide library is validated, we will initiate further studies of CAR-T patients.

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Relationship Between Young Age (40-49) and Breast Cancer Prognostic Factors at Diagnosis: An Argument for Annual Screening.

Introduction: Younger women who develop breast cancer are more likely to be diagnosed with breast cancer at a more advanced stage with a larger tumor size and/ or spread to lymph nodes, as well as a more biologically aggressive profile, yielding an overall poorer prognosis compared to older women. Premature deaths due to breast cancer among women in their 40s accounts for the same years-of-life lost to breast cancer as women in their 50s. Yet, multiple conflicting published recommendations on screening mammography exist in the US for this age cohort. Purpose: The current study was designed to assess interval cancers, compare the tumor characteristics of screen detected versus symptomatic breast cancers in women aged 40-49 years old and assess differences in cancer prognostics in younger compared to older women. Methods: During the 5 year study period, 151 women aged 40-49 years of age were diagnosed with an invasive or non-invasive breast cancer and underwent histopathologic confirmation of that primary breast cancer. Mean age at the time of diagnosis in this age cohort was 44.68 years. When comparing 40-49 years to 50-74 years in our participants the average size, grade or stage of the invasive breast cancer did not differ. However, the breast tumors in younger women were less likely to be detected via screening mammography (p=0.044). Those same tumors were also more likely to present with factors predictive of an aggressive tumor such as having positive lymph nodes (p=0.041), being a triple negative tumor (0.034) or HER2 enriched (p=0.021). Invasive breast cancers in older women were more likely to present with favorable luminal-A tumors (p=0.044). While not statistically significant, younger women on average had slightly bigger tumors with a slightly higher grade. When looking at interval cancers, cancers that developed despite having screening within the last year, minority women were two times as likely to have developed breast cancer while forgoing screening compared to non-Hispanic Whites (p=0.0012). Conclusion: The results of this retrospective cohort study provided further confirmation of the value of screening mammography in detecting small, localized breast cancers among younger women in their forties. Efforts to limit screening among women aged 40-49 years old who have elevated risk would miss the benefits of early detection of breast cancers among women in this age group.

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Delaying Surgery in Favorable-Risk Prostate Cancer Patients : An NCDB Analysis of Outcomes

Introduction and Objective Concern for overtreatment in very low-, low-, and favorable intermediate-risk prostate cancer has promoted a more conservative approach through active surveillance (AS). We analyzed the National Cancer Database (NCDB) to determine if delaying radical prostatectomy greater than six months is associated with increase in the rate of secondary treatment (adjuvant or salvage) and/or adverse pathology at radical prostatectomy. Methods Within the NCDB, 40 to 75 year old men with very low-, low-, and favorable-intermediate risk prostate cancer, defined by the National Comprehensive Cancer Network, were identified from January 2010 to December 2016. These individuals received radical prostatectomy either before or after 6 months following diagnosis. Clinical, demographic, and pathologic characteristics were obtained. Adverse surgical outcomes were defined as pT3-4N0-1. Multiple logistic regression models were used to predict delay in treatment, adverse surgical outcomes, and receipt of secondary therapy. Survival analysis was performed using Cox Proportional Hazards Model and the Kaplan-Meier Method. Results Of the 95,425 patients that met inclusion criteria, only 5,776 patients received surgery 6 months after diagnosis. The median time of delay was 7.4 months compared to 2.3 months in the immediate treatment group. Delaying surgery had no statistically significant impact on adverse surgical outcomes, regardless of risk category. Patients who had delayed surgery, however, were less likely to receive additional therapy (either adjuvant or salvage) (OR 0.64, 95% CI 0.51 - 0.78, P < 0.001). Survival analysis showed that both groups fared well, with 5-year survival of 97% for both groups. Treatment group was not predictive of survival. Conclusions Delaying surgery more than 6 months following diagnosis showed no impact on adverse surgical outcomes or overall survival. These patients were also less likely to require secondary therapy. The results suggest that even patients who "fail" AS and require subsequent surgery have comparable positive outcomes to those who receive immediate treatment.

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Comparing Treatment Options for High-Risk Prostate Cancer Patients: An NCDB Analysis of Outcomes

Introduction and Objective The current standard therapy for high-risk prostatic adenocarcinoma is either radical prostatectomy (RP) or the combination of radiotherapy (XRT) with androgen deprivation therapy (ADT). We analyzed the National Cancer Database (NCDB) to compare patient characteristics and survival outcomes between treatment options to determine if there's an optimal strategy. Methods Within the NCDB, men with high-risk prostate cancer, defined by the National Comprehensive Cancer Network, were identified from January 2010 to December 2016. These individuals received either RP or XRT + ADT as their initial treatment course. XRT + ADT was defined as beam radiation to the pelvis with ADT initiated within 90 days. Clinical, demographic, and pathologic characteristics were obtained. Survival analysis was performed using Cox Proportional Hazards Model and the Kaplan-Meier Method. A multiple logistic regression model was used to predict receipt of secondary therapy (adjuvant or salvage) among RP patients. Results A total of 58,415 men were analyzed; 63% underwent RP first and 37% underwent XRT + ADT first. In a multivariable logistic regression model predicting treatment, the XRT + ADT group was more likely to have higher PSA, higher clinical stage, and higher Gleason score (all P < 0.001). Median follow-up was 3.33 years. Survival analysis showed that the RP group fared better (96.6% OS at median follow-up versus 90.1%), even while controlling for patient demographics and disease characteristics. The resulting hazard ratio for the XRT + ADT group compared to RP was 2.0 (95% Cl 1.90 - 2.17, P < 0.001). Within the RP group, 5,273 (9%) received secondary therapy (XRT ± ADT) with a median time of 3.3 months from date of surgery. Conclusions These findings suggest that while each modality has its own risks and benefits, RP provides better survival outcomes over XRT + ADT when used as the primary definitive treatment course in well-selected high-risk patients.

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CANCER

Molecular Subtyping According to HER2-regulated Gene Expression Demonstrates Distinct Carcinogenic Pathways for Invasive Breast Cancer Development

Breast cancer is the most diagnosed form of cancer in women; however, it shows high intertumoral and intratumoral heterogeneity, which generates diagnostic and therapeutic challenges, and thus, unpredictable clinical response to existing therapies. The human epidermal growth factor receptor 2 (HER2) oncogene plays an important role in breast cancer progression. This gene is overexpressed in 20-25% of breast cancers worldwide and is correlated with aggressive malignant behavior and short overall survival. However, HER2-overexpressing breast cancers become sensitive to HER2-targeted therapies, which improve overall survival in patients with both localized and metastatic tumors. Thus, HER2 assessment by immunohistochemistry (IHC) with and without additional in situ hybridization (FISH) allows for sorting of patients into various therapeutic response categories: Non-responders (IHC 0/1+); Responders (IHC 3+ expression); and patients with undefined HER2-overexpression (IHC 2+). In some cases, HER2 expression is not functional (lacking signaling capacity), and other times, there is an interconversion from HER2 positive to HER2 negative phenotypes within a patient, which contributes to breast cancer progression and acquisition of drug resistance. Consequently, while anti-HER2 therapies have improved the prognosis of breast cancer, up to 60% of treated patients experience disease progression during treatment. In this study, we used a multi-analytic transcriptional assay focused on HER2, HER3 and HER2regulated gene expression. This assay allowed for the assessment of HER2 signaling and the identification of potential responders in those breast cancers not qualifying for HER2-targeted therapies (IHC 0/1+ and IHC 2+) and non-responders in those breast cancers gualifying for HER2-targeted therapies (IHC 3+). The multi-analytical assay was supported by a gene expression panel including: Erbb2 and Erbb3 genes, cancer stem cell genes, proangiogenic and immune-inflammatory genes with prometastatic effects, Erbb2-regulated tumor microenvironment (TME) stromal genes, and immune checkpoint genes whose expression level has been associated to cancer immunosuppression. Our results demonstrate a remarkable subtyping of molecular intrinsic breast cancer phenotypes (luminal A, luminal B, basal-like, HER2-enriched, normal-like) according to HER2-regulated genes. In addition, prometastatic, proangiogenic, immune-inflammatory, and immune checkpoint gene expression varied according to expression level of HER2regulated genes, suggesting that HER2-dependent and independent pathways may contribute to breast cancer progression and require different therapeutic approaches.

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- THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY

CLINICAL AND TRANSLATIONAL RESEARCH

CARDIOLOGY

Review of Surgical Outcomes associated with Robotic Assisted Mitral Valve Repair (RMVR)

Objective: The purpose is to examine how robotic assisted mitral valve repair (RMVR) affects surgical outcomes for patients with degenerative mitral valve disease. Methods: A comprehensive literature review was conducted by examining literature from the MEDLINE database. Research articles, literature reviews, and statistical reports were accessed using PubMed through the Himmelfarb Library. Literature which examined the surgical outcomes of RMVR and its comparison with conventional mitral valve repair (CMVR) were analyzed. Results: The literature shows consistent surgical outcomes for improved mortality, morbidity, and mitral valve durability for patients who underwent RMVR. However, cardiopulmonary bypass (CB) and cross clamp (XC) times are significantly longer, hospital stay times are significantly shorter, and the quality of life for patients is significantly higher. Conclusions: RMVR is a safe and effective operation which provides consistent and even superior surgical outcomes for patients with degenerative mitral valve disease. Further research into long term mitral valve durability (>5 years) for patients who underwent RMVR is recommended.

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CARDIOLOGY

Bodyweight Changes and the Incidence of Atrial Fibrillation in Individuals With Obstructive Sleep Apnea

Introduction: Previous studies have demonstrated that obstructive sleep apnea (OSA) and obesity independently increase the risk for development of atrial fibrillation (AF). However, it is unknown whether weight changes in an OSA cohort also increase the risk of AF. Methods: This was a case control study from a single tertiary institution analyzing patients with a confirmed OSA diagnosis from 2013-2020. Patients with missing data on any of the key variables were excluded from these analyses. The covariates included smoking history, hypertension, congestive heart failure, chronic obstructive pulmonary disease, heart failure, and coronary artery disease. Patients' weight at the time of AF diagnosis by electrocardiogram (ECG) was compared to the weight documented one year earlier. Weight at the time of the ECG closest to the sleep study date was compared to the weight one year prior for the control group. Multivariate logistic regression analysis to examine the association between AF cases (versus controls) and weight percent change greater than 5%. Results: Among the 182 patients included in the analysis, the incidence of AF was 32.4% and the median weight change was -1.32± 11.69 lb. About 36% of those diagnosed with AF had weight changes (gain or loss) above 5% compared to 23% in the control group (p = 0.07). The average weight change for those with diagnosed AF compared to individuals without AF was -2.5 \pm 11.8 lb vs. -0.76 \pm 11.6 lb (p=0.19). The change in the adjusted odds of AF diagnosis among those with more than 5% weight gain or loss was 2.27 (95% CI = 1.01, 5.09) compared to those with less or no weight change. Conclusions: Among individuals with OSA, those who exhibited weight changes greater than 5% over a one year period have increased odds for developing AF. Further large-scale studies need to be undertaken to understand the link between intentional versus unintentional weight loss.

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Predictors of arrhythmia in adults with repaired Tetralogy of Fallot

Background Tetralogy of Fallot (TOF) is the most common cyanotic congenital heart disease (CHD) in adults, accounting for up to 3.5-10% CHD cases. Compared to other cyanotic CHD entities, survival for TOF patients is excellent with 30- to 40-year survival at 85%-90% after surgical repair. These advances have afforded patients a longer lifespan, but impose additional morbidity in arrhythmia burden, which portends complications such as sudden cardiac death (SCD), congestive heart failure (CHF), and stroke. Studies have identified patients at risk of arrhythmias, but clarification is needed with regards to when these individuals will actualize these endpoints. This study was conducted to investigate a predictive model for arrhythmias from clinical, electrocardiographic (ECG), and echocardiographic data in this population. Methods This was a retrospective study conducted from a population of patients from CNMC. Inclusion criteria were age >18 years, diagnosis of TOF with history of repair, ECG and/or echocardiogram in their chart between 3-24 months prior to arrhythmia onset (for cases sub-group) or within 24 months prior to their most recent follow-up date if in the control sub-group. Exclusion criteria were those with unrepaired TOF or insufficient data for use in the chart. Results 188 patients were included for analysis (38 arrhythmia, 150 controls). There was no significant difference in the percentage of patients with history of pulmonary valve replacement (PVR) between groups (p=0.471). QRS duration was not different between the two sub-groups (p=0.371), although a higher percentage of cases had a QRS duration >180 ms compared with the controls (p=0.001). Only 2.7% of controls exhibited QRS fragmentation compared to 89.5% of patients in the arrhythmia subgroup (p 0, (odds ratios in table): moderate tricuspid regurgitation, QRS fragmentation, severe pulmonary regurgitation, RV systolic dysfunction, 1st degree AV block, LV systolic dimension. Conclusion This study investigated multivariate models of risk factors for incident arrhythmias and found that patients who developed arrhythmias were older at the time of corrective surgical repair, had a QRS duration >180 ms on ECG as well as fragmented QRS and 1st degree AV block, consistent with previous studies. Our study is unique in that our model predicts the endpoint of incident arrhythmia within two years of data collection. This model is predicated on data derived from a single cohort, and thus needs to be validated independently in a separate population.

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CARDIOLOGY

The Future of Myocardial Infarction Prevention: New Approaches to Quantifying Atherosclerotic Plaque Burden Beyond Coronary Artery Stenosis

Background: Quantitative assessment of plaque burden may enable risk prognostication beyond the paradigm of percent stenosis in current guidelines, but is uncommonly utilized in clinical practice. Atherosclerosis Imaging-Quantitative Computed Tomography (AI-QCT) through artificial intelligence may enable rapid, accurate assessment, but has not yet been compared to standard clinical methods of plague assessment. Methods: Consecutive patients from the CLARIFY (CT Evaluation by Artificial Intelligence for Atherosclerosis, Stenosis and Vascular Morphology) study of patients undergoing cardiac computed tomography angiography (CCTA) for chest pain were evaluated. Studies were analyzed by a blinded core laboratory through FDA-cleared software that performs Al-QCT through artificial intelligence including percent stenosis, plaque volume, and plaque composition. Al-QCT plaque volume was staged (0-10 mm^3, 11-250 mm^3, >250-750mm^3 and >750mm^3) by prognostic thresholds. This staging was compared to clinical methods of plaque evaluation that include segment involvement score, also known as SIS, (0, 1-4, 5-7, =8), visual plaque estimate (None, Mild, Moderate, Severe), CAD-RADS percent stenosis category (0, 1-2, 3, 4-5) and coronary artery calcium score (0, 1-100,101-300, >300) as identified by a consensus of visual assessment by consensus of an Independent Practitioner (IP) and Advanced Practitioner (AP) blinded to the AI-QCT core lab reads using categorical methods of interobserver agreement and the kappa statistic. Results: There were n=102 patients (Average age 59 ± 11 years; 44% women). AI- QCT median plaque volume was 95 mm^3 ± 238 mm^3. AI-QCT plaque burden stage had high agreement 93% (k=0.874 95% CI: 0.79-0.959) with segment involvement score categories. However, the agreement between AI-QCT and categories of visual assessment (64%; k=0.51 [0.395-0.631]), coronary artery calcium score (66%; k=0.49 [0.363-0.614]) and CAD-RADS (59%; k=0.448 [0.32-0.576]) was modest. Conclusion: In this assessment of plague burden, AI-QCT and SIS demonstrated high agreement, while agreement was modest between AI-QCT and other methods. With ongoing validation, Al-QCT may enable a rapid, reproducible, quantitative approach to coronary artery disease burden categorical assessment beyond time-consuming visual approaches.

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CARDIOLOGY

Molecular Endotyping of Patients with Atrial Fibrillation through Inflammatory, Angiogenic and Fibrogenic Blood Biomarkers Predictive of Atrial Remodeling

Atrial fibrillation (AF) is an increasingly prevalent arrhythmia with significant health and socioeconomic impacts. While it is the most common arrhythmia in clinical practice, its underlying mechanism is still not well understood and already affects up to 10% of the population over 60 years of age. Its onset increases with age and leads to heart failure, peripheral embolism, and stroke, and its mortality remains high despite effective anticoagulation. However, approximately 20% of all AF cases remain undiagnosed, and their recurrence ranges from 40% to 50%, despite attempts at electrical cardioversion, ablation, and the administration of anti-arrhythmic drugs. Among pathogenic factors of AF, the pro-inflammatory imbalance plays a fundamental role because inflammatory cells and their molecular mediators can lead to structural remodelling of the atria thereby altering cardiomyocyte electric conduction and risk of AF. In this study we measured the concentration of plasmatic proteins associated with the regulation of cardiomyocyte reactivity to systemic inflammation in patients with and without atrial fibrillation. Multianalyte immunoassays were performed with Milliplex kits and Luminex technology. The following biomarker types, affecting cardiomyocyte electrical conduction, were included: cardiomyocyte injury and oxidative stress biomarkers (troponin T, N-terminal-B type natriuretic peptide, creatine Kinase-myocardial band); inflammatory and angiogenic biomarkers (fetuin-A, CXCL16, MCAM/CD146, progranulin, angiopoietin-2); procoagulant biomarkers (PF4/CXCL4, a2-macroglobulin); biomarkers of atrial fibrosis and remodeling (osteopontin, DPP4/sCD26, LRG1, endostatin, thrombospondin-2, PDGF-AB/BB, serum amyloid protein). The results of the multi-analytical test clearly segregated patients with and without AF and helped to create a prediction model of machine learning for individuals at risk of AF. They also helped to identify patients without AF but whose disease or treatment may lead to an AF-inducing inflammatory imbalance requiring a specific treatment to prevent or reverse the onset of AF in its earliest stage. Finally, an unsupervised clustering analysis also helped to stratify patients with AF according to their level of inflammatory imbalance and to identify a subset of patients whose AF may be caused by an occult cancer that should be investigated.

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CLINICAL AND TRANSLATIONAL RESEARCH

CARDIOLOGY

Assessing the Effectiveness of Transitional Care for Congenital Heart Disease Patients

Background: Patients with congenital heart disease (CHD), developmental birth defects of heart structure, are at greater risk of incurring medical complications and neuro-cognitive deficits. While healthcare transition is a critical aspect of pediatric and adolescent-based medicine in the cardiology field, transitional care has not yet been standardized. Our program hopes to combine standardization with accessibility through already standardized assessments in a tele-medicine format. This model of health care delivery is intended to provide patients ease of accessing care without the requirement of transportation to a facility and will help expedite care as patients can monitor and follow their own goals at their discretion. Objective: To provide an established pathway with personalized goals for patients and their families to foster successful transition from pediatric to adult care. Methods: Recruited participants took baseline surveys and subsequently had meetings with the CHD social worker. They both then reviewed the surveys and assigned two learning goals for the year in the categories of medical knowledge, care coordination, and mental health. Teaching sessions were administered throughout the year via Telemedicine calls on the Zoom tele-health platform. Participants took surveys post-intervention. Both baseline and post-intervention surveys evaluated the demographics, health knowledge, transition readiness, anxiety, depression and number of participants. Data for participants under age 18 and over age 18 were reported separately. Results: 48 participants < 18 years old and 23 participants >18 years old as of July 28th, 2022 completed baseline surveys. A small majority of participants < 18 years old (51.1%) and the minority of participants > 18 years old (40.0%) could name or describe their congenital heart condition. A small majority for both groups of participants (51.1%) felt that they could take part in making choices in their healthcare. The minority for both participants < 18 years old (31.9%) and participants > 18 years old (45.0%) knew which cardiac symptoms may require urgent medical attention. Conclusion: Transition readiness has not yet been achieved for a large majority of patients. With our intervention we expect to see improvements in medical knowledge, care coordination topics, or mental health awareness. Longterm, our goal is to increase rates of transition of pediatric patients with CHD to adult centered care.

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CLINICAL AND TRANSLATIONAL RESEARCH

DERMATOLOGY

Survey of Providers' Opinions and Prescribing Habits of Oral Minoxidil for the Treatment of Androgenetic Alopecia

Background: Utilization of low-dose oral minoxidil has increased in recent years in association with several clinical studies that have shown its efficacy in treating androgenetic alopecia (AGA). Objective: To assess dermatology providers' attitudes and recommendation behaviors of oral minoxidil for the treatment of AGA. Methods: An online survey gauging the professional opinions, prescribing behaviors, and use of oral minoxidil was sent using the Orlando Dermatology Aesthetic and Clinical Conference email listserv which included multiple levels of dermatology practitioners including MD/DOs, NPs, and PAs across the United States. Results: Overall, the survey was sent to 2200 providers, and 201 (9.1%) responses were collected. 81% (n=139) of respondents supported the use of oral minoxidil for AGA. Support varied significantly (P=.03) by providers' number of years in practice with those in practice for greater than 30 years with the least amount of support. 92% of respondents (130, n=141) reported feeling comfortable prescribing oral minoxidil, and 83% (116, n=140) found oral minoxidil to be better than its topical formulation. 78% (108, n=139) felt their patients were satisfied with their results, and 89% (124, n=140) felt oral minoxidil was well tolerated by their patients. Conclusions: This study found that most prescribers use oral minoxidil as treatment for AGA and find it to be an effective and tolerable option for patients. Support for oral minoxidil was affected by providers' years in practice.

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Assessment of racial and ethnic differences of atopic dermatitis characteristics in a diverse outpatient cohort in the United States

Atopic dermatitis (AD) can present differently across racial groups. Yet, little is known about difference in how commonly different feature of AD occur by race. We assessed racial and ethnic differences in the proportions of select key features of AD. The healthcare claims database from a large metropolitan tertiary care medical center was queried for patients with physician-diagnosed AD. Medical records were reviewed for demographics, comorbidities, and documentation of Hanifin-Rajka criteria. Frequency of each criterion was evaluated by race (White/Black/Asian/Multiracial-Other) and ethnicity (Hispanic/non-Hispanic). Overall, 766 patients with AD were included in the study; 374 (48.8%) were White, 284 (37.1%) Black, 89 (11.6%) Asian, and 19 (2.5%) multiracial/other; 48 (6.3%) were Hispanic and 719 (93.7%) were non-Hispanic. Compared to White patients, Black patients had significantly higher proportions of personal (81.4% vs. 57.3%) and family (63.3% vs. 42.2%) history of atopic disease, perifollicular accentuation (60.6% vs. 36.9%), and xerosis on physical exam (84.2% vs. 73.9%)(P=0.03 for all). Multiracial/other patients had elevated proportions of history of dry skin (81.3%), xerosis on physical exam (86.7%), and elevated Immunoglobulin E levels (75.0%). Black and multiracial/other patients had food hypersensitivity (positive skin-prick or serum specific immunoglobulin E tests) compared to White patients (50.0% and 71.4% vs. 35.1%, P=0.04). There were marginally significant differences in the proportion of childhood onset of AD (<18 years; 56.9% vs. 41.8%, P=0.07) and anterior neck fold involvement (42.6% vs. 25.3%, P=0.06) in Asian compared to White patients. There were no significant racial differences in the likelihood of other Hanifin-Rajka criteria, including pruritus, flexural dermatitis, chronic dermatitis, ichthyosis, nipple eczema, hand/foot dermatitis, immediate skin reactivity, subcapsular cataracts, cutaneous infections, pruritus when sweating, intolerance to wool/lipid solvents, environmental/ emotional factors worsening AD, or white dermatographism. When comparing Hispanic and non-Hispanic patients, there was a marginally significant difference in a personal history of atopic disease (52.5% vs. 66.8%, P=0.06). Otherwise, there were no significant ethnic differences among other Hanifin-Rajka major or minor criteria. A recent systematic review found differences of AD characteristics by study region. Our results further indicate there are racial differences of AD characteristics within the same region. These differences may be attributable to population-differences of genetics, environmental exposures, skincare practices, etc. Future research is needed to understand the mechanisms and treatment responses of these heterogeneous AD presentations.

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CLINICAL AND TRANSLATIONAL RESEARCH

DERMATOLOGY

Comparative Drug-survival of Advanced Therapies in Patients with Atopic Dermatitis

Multiple advanced therapies are used to treat atopic dermatitis (AD), each with a different efficacy, safety, and tolerability profile that can affect overall drug-survival. However, little is known about how drug-survival rates compare between different therapies. We compared drug-survival for subcutaneous dupilumab, oral cyclosporine, mycophenolate, upadacitinib, and narrowband ultraviolet B (NB-UVB) in the treatment of AD. The healthcare claims database from a large metropolitan tertiary care medical center was queried for patients with physician-diagnosed AD using International Classification of Disease, Tenth Revision, Clinical Modification codes L20.x. Medical records were reviewed for use and duration of advanced therapies and reasons for their discontinuation (lack of efficacy, adverse-events, disease improvement, not specified) from 10/01/2015-10/1/2021. Drug survival was analyzed using proportion of patients with and median time to discontinuation. Overall, 766 patients with AD were identified, of which 139 (18.1%) were prescribed dupilumab, 10 (1.3%) cyclosporine, 21 (2.7%) mycophenolate, 5 (0.7%) upadacitinib, and 64 (8.4%) NB-UVB. Drug-survival was highest for upadacitinib (100%), followed by dupilumab (86.3%), mycophenolate (38.1%), cyclosporine (30.0%) and NB-UVB (12.5%)(Chi-square, P<0.0001)(Table 1). Highest median (minimum-maximum) time to discontinuation was observed with dupilumab (638 [0-1732] days), followed by cyclosporine (539 [30-7944] days), mycophenolate (274 [29-1928] days), upadactinib (421 [153-579] days), and NB-UVB (167 [4-3774]). The most common reason for discontinuation of dupilumab, cyclosporine, mycophenolate, and NB-UVB was lack of efficacy. Discontinuation due to adverse-events was highest for cyclosporine (42.9%), followed by dupilumab (31.6%), mycophenolate (30.8%) and NB-UVB (16.1%). Dupilumab had the highest percentage of patients who discontinued use due to improvement in disease (21.1%). Our data suggest that dupilumab is more effective and/or better tolerated than older systemic therapies. Other studies appear to support this finding as well. Further research is needed to investigate the comparative effectiveness and tolerability of different AD treatment modalities.

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THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY

CLINICAL AND TRANSLATIONAL RESEARCH

DERMATOLOGY

Prurigo Nodularis in a 12-year-old Patient with Minimal Change Disease

Herein we report a case of prurigo nodularis (PN) in a 12-year-old male with a flare of relapsing minimal change disease (MCD). Although the precise etiologies of these diseases are unknown, elevated Interleukin-13 (IL-13) levels have been implicated in the pathogenesis of both PN and MCD. PN can be associated with progressive renal decline in patients with chronic kidney disease (CKD), while MCD typically follows a relapsing-remitting course. Interestingly, the development of PN preceded the onset of the nephrotic flare in our patient, raising the question of the roles of PN and IL-13 in triggering a MCD relapse.

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Retrospective Review Differentiating Pediatric Lichen Sclerosus and Vitiligo

Background: Lichen sclerosus (LS) and vitiligo present similarly with white discoloration in the anogenital region and are often misdiagnosed as one another. LS must be treated aggressively to prevent sequelae like scarring making accurate diagnoses crucial. Objective: To differentiate LS and vitiligo based on history, physical exam, and demographic findings at the initial visit. Methods: Data were extracted from 98 patients with an LS (80) or vitiligo (18) diagnosis seen at a vulvar dermatology clinic over 6.8 years. Descriptive statistics were used for data analysis. Results: Pruritus, constipation, and dysuria were the most common symptoms experienced by both LS and vitiligo patients, more frequently by LS patients, but only pruritus reached statistical significance (p=0.040). LS patients had exam findings including petechiae, erosions, fissures, erythema, hyperkeratosis, adhesions, clitoral hood involvement, and symmetry more frequently, but only epidermal atrophy (p=0.047) and figureof-8 hypopigmentation (p=0.036) reached statistical significance. LS and vitiligo were misdiagnosed as one another 15 times. 46.7% of these misdiagnoses were made in African Americans, who comprise 38.8% of all patients. Conclusions: There were fewer symptom and exam finding differences between vitiligo and LS than expected. The small number of vitiligo patients and the commonality of vulvovaginitis and constipation in prepubertal females leading to symptoms may partially explain this. Additionally, prior treatments can alter the presentation of these conditions. More studies are needed to differentiate LS and vitiligo, particularly in darker skin tones; these may require analyzing history and exam findings across time to account for evolution as they are treated.

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Is Beta-Alanine a Potential Therapy for Idiopathic Aquagenic Pruritus?

Aquagenic pruritus (AP) is a skin condition that manifests as an acute itching sensation following water exposure. Many patients report that their AP symptoms are so severe that they actively avoid water-based activities, including showering, and their quality of life has significantly depreciated. Common anti-pruritic treatments, such as antihistamines, have only had limited success for AP. Patients are calling for additional research on AP in search of more effective treatments. Online patient support groups have shared anecdotal success of AP with beta-alanine (bAla), a non-essential amino acid marketed as an over-the-counter athletic performance enhancement. There is no clinical research on the use of bAla for AP, which limits the ability of medical professionals to recommend it as an evidence-based treatment. This study aimed to review the existing literature and identify the possible mechanisms for why bAla may be a potential treatment for AP. Investigators searched PubMed using the keywords aquagenic pruritus, beta-alanine, itch, and water. A literature review revealed several possible mechanisms of bAla and its role in alleviating aquagenic pruritus. bAla's exact antipruritic mechanisms are unclear, but the difference in acute and chronic itch pathways and therapeutic targets may explain why AP patients have varying success with anti-itch treatments. Based on the current understanding of the itch-anxiety cycle, bAla's therapeutic effects for AP may be through its anxiolytic-like effects or by increasing carnosine, a free-radical scavenger and organic pH buffer with anti-inflammatory and antioxidative properties. This is thought to be because of bAla signaling through MrgprD receptors in a histamineindependent itch neural circuit. Glutamate release by MrgprD-expressing neurons may help suppress mast cell hyperresponsiveness and skin inflammation, which could be a neuroimmune connection in cutaneous immune homeostasis. This pathway may connect the roles of mast cells in AP pathophysiology and the paradoxical pro- and anti-pruritic effects of bAla. bAla is suspected of suppressing the AP itch through desensitization of pruritic pathways, like topical capsaicin, eliciting similar initial paresthesia followed by longer-term pain and pruritus alleviation. Although bAla appears promising, its reported efficacy is still limited to patient testimonies. With increased controlled studies and peer-reviewed publications, bAla could be a pivotal success in AP relief.

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DERMATOLOGY

Use of Dynamic Optical Coherence Tomography in a Corticosteroid Vasoconstrictor Assay: a Pilot Study

The vasoconstrictor assay (VCA) is a widespread technique quantifying topical steroidinduced skin blanching for comparison of corticosteroids' bioavailability/potency, as blanching intensity correlates with their clinical efficacy. Blanching represents an indirect measure of cutaneous vascular alterations and can be absent after application of even potent agents, and VCA trials largely exclude individuals with skin of color due to absence of observable blanching in darker skin. Optical coherence tomography (OCT), a noninvasive imaging modality based on light reflectance, may represent a new method for directly assessing relative corticosteroid-induced changes in cutaneous microvasculature. Twenty healthy volunteers (10 male, 10 female) ages 23-58?years were enrolled, with Fitzpatrick skin types ranging from I-VI (I: n = 1; II: n = 4; III: n = 6; IV: n = 4; V: n = 3; VI: n = 2). Two corticosteroid ointments (class I: 0.05% clobetasol propionate [CP], class V: 0.2% hydrocortisone valerate [HV]), a nonsteroid anti-inflammatory ointment (2% crisaborole), and vehicle control (white petrolatum) were all applied on eachsubject using a modification of traditional VCAs. Overall, CP, HV, and crisaborole sites showed significant changes in vessel diameter over time. From 0 to 6?hours, CP caused a significant decrease in vessel diameter (P = 0.001), and HV had a significant decrease from 6 to 8? hours (P = 0.015). The transient increase in vessel diameters seen at crisaborole-treated sites is likely due to vasodilatory phosphodiesterase 4 (PDE4) inhibition. CP- and HV-treated vessel diameters increased significantly from 8 to 24?hours (P = 0.002 and P = 0.001, respectively) back to baseline. White petrolatum did not impact vessel diameter. Between formulations, CP-treated diameters were significantly lower than all others at 6?hours (HV: P = 0.043; crisaborale: P <?0.001; petrolatum: P = 0.005), while HV was significantly lower than crisaborole (P = 0.01) but not petrolatum. At 8?hours, the HV vessel diameter further decreased, becoming significantly lower than petrolatum (P = 0.004). Objective measures of topical steroid-induced vasoconstriction may prove useful adjuncts to, or replacements of, the traditional blanching assay. The earlier vessel diameter trough of CP versus HV corroborates findings that increasing steroid potency is associated with earlier maximal skin blanching. Among 20 subjects, 15 were skin types III-VI, demonstrating D-OCT's potential value for the assessment of topical steroids in skin of color. Overall, our findings suggest that D-OCT can detect and differentiate degrees of vasoconstrictive changes after topical corticosteroid application.

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DERMATOLOGY

Association of Atopic Dermatitis Clinical Severity and Morphology with Asthma Onset and Control

Background & Aims: Atopic dermatitis is a chronic inflammatory skin disease with multiple comorbidities, asthma being one of the most prevalent and most burdensome among them. While an association between atopic dermatitis severity and asthma has been well established, our study sought to determine which aspects of atopic dermatitis severity have the strongest relationship with asthma prevalence, asthma age at diagnosis, and asthma control. Methods: Data analyzed were collected from a cross-sectional dermatology practice-based study of adults with atopic dermatitis. Patients were recruited from the eczema clinic at an academic medical center and atopic dermatitis was diagnosed by Hanifin-Rajka criteria. Atopic dermatitis severity and lesional morphology were assessed by a board-certified dermatologist using a variety of severity scales, including Atopic Dermatitis Severity Index, DESCRIBE-AD, Eczema Area and Severity Index, Patient Global Assessment, Patient-Oriented Eczema Measure, Rajka-Langeland, and SCORing Atopic Dermatitis. Asthma Control Test scores were used to determine asthma control. Results: Diagnosed-asthma prevalence was not associated with moderate-severe vs. clear-mild atopic dermatitis severity. Adultage of asthma diagnosis was significantly or marginally significantly associated with moderate-severe vs. clear-mild atopic dermatitis in the following measures (adjusted odds ratio [95% CI] for Atopic Dermatitis Severity Index: 4.164 [0.945-18.344]; Eczema Area and Severity Index: 8.034 [1.586-40.683]; Patient-Oriented Eczema Measure: 0.542 [0.285-1.030]; Rajka-Langeland: 4.962 [1.983-12.415]; SCORing Atopic Dermatitis: 4.103 [0.763-22.057]). Similarly, severe Patient Global Assessment (0.349 [0.143-0.852]) and a DESCRIBE-AD comorbid health conditions score of 3 (0.349 [0.143-0.852]) were significantly associated with adult-age of asthma diagnosis. Poor asthma control was significantly or marginally significantly associated with moderate-severe vs. clear-mild atopic dermatitis in the following measures (adjusted odds ratio [95% CI] for Atopic Dermatitis Severity Index: 1.837 [0.974-3.465]; Rajka-Langeland (1.667 [0.924-3.008]; SCORing Atopic Dermatitis: 1.905 [1.013-3.581]). Similarly, moderate Patient Global Assessment (1.732 [1.041-2.882]), severe Patient Global Assessment (3.426 [2.073-5.662]) and DESCRIBE-AD comorbid health conditions scores of 2 (1.732 [1.041-2.882]) and 3 (3.426 [2.073-5.662]) were significantly associated with poor asthma control. Lichenification as a feature of lesional morphology was significantly (0.402 [0.168-0.963]) associated with poor asthma control. Conclusions: While more severe atopic dermatitis is associated with older age of asthma diagnosis and poorer asthma control, the presence of more comorbid health conditions is associated with younger age of asthma diagnosis and poorer asthma control. Additionally, lichenification is associated with decreased asthma control. Understanding the risks of asthma as a comorbid condition of atopic dermatitis allows for a comprehensive approach to patient care.

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CLINICAL AND TRANSLATIONAL RESEARCH

DERMATOLOGY

Encapsulated Anandamide: A Promising Therapy for Cutaneous Lupus Erythematosus

Cutaneous lupus erythematosus (CLE) is a heterogeneous autoimmune skin disease which can occur independently or in conjunction with systemic lupus erythematosus (SLE). Drug development for CLE is severely lacking. Anandamide (AEA) is a primary endocannabinoid which modulates sensory input processing and attenuates the innate and adaptive immune response through mixed cannabinoid receptor agonism. Our study evaluated AEA as a topical treatment for CLE and assessed the benefits of nanoparticle encapsulation (AEA-np) on cutaneous drug penetration, delivery, and biological activity. Compared to untreated controls, AEA-np decreased IL-6 and monocyte chemoattract protein-1 in UVB-stimulated keratinocytes (p<0.05) in vitro. In BALB/c mice, AEA-np application resulted in improved cutaneous penetration, extended AEA release, and persistence of AEA at the follicle base after 24 hours compared to AEA alone. Utilizing the MRL-lpr lupus murine model, topical treatment with AEA-np for 10 weeks led to decreased clinical lesion scores and improved lesion appearance on histology compared to unencapsulated AEA and untreated controls (p<0.05). Further, twice weekly prophylactic application of AEA-np in MRL-Lpr mice resulted in decreased histologic scoring and CLASI-based visual scoring of lesions as compared to controls over time (p<0.05), and reduced complement C3 and macrophage indicator IBA-1 in lesion tissue (p<0.05). The demonstrated clinical and immunomodulatory effects of treatment with AEA in this study support its potential as therapy for CLE. This work also suggests that encapsulation of AEA improves penetration and treatment efficacy compared to unencapsulated topical AEA. Future clinical studies will be conducted to assess full therapeutic potential.

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DERMATOLOGY

Sensitive Skin in Persons of Color: A Pilot Survey of Prevalence, Perception, Behaviors of Individuals who Self Identify with Sensitive Skin

Sensitive skin (SS) is a subjective syndrome characterized by cutaneous hyperreactivity to otherwise innocuous stimuli. While a common complaint, SS has yet to be fully defined or have pathophysiology characterized. Further gaps exist in research on SS in persons of color (POC); therefore we aimed to assess prevalence, symptom burden, and behaviors of self-identified POC individuals with SS at a community health fair. 58 attendees (78% female/22% male, 86% POC) completed our survey after brief education on SS. 57% self-reported SS (60% of women, 46.2% of men), with 15% experiencing symptoms daily. 27% had SS with no primary skin disease. Hyperreactivity to consumer products was reported in 56% of individuals with SS, manifesting as cutaneous symptoms of burning (56%), itch (50%), redness (40%), dryness (40%), and pain (17%). Respondents with SS were 8 times more likely to use products marketed for SS (p=0.0028), but 72% reacted to SS products. 94% of respondents with SS reported 1 or more triggers causing skin reactions. The average number of triggers per individual with SS was 4.2 (SD=3.54), significantly more than respondents without SS (p=0.0128). The most commonly reported SS triggers included extreme temperatures (48%), skincare products (42%), stress (39%), sweat (39%), sun exposure (36%), and diet (36%); 91% of individuals with SS react to at least one of these. This was the largest survey of its kind in the past 10 years and the first survey in a predominant POC population. These data provide insight into the SS experience and identify both pitfalls, such as high rates of reactivity to products marketed to SS, and potential therapeutic/ management targets, such as cholinergic stimuli, to offer better approaches to SS.

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DERMATOLOGY

Insight into Dermatology Provider's Perspectives on/and Approaches to Sensitive Skin: A Pilot Survey

Sensitive skin (SS) is a common patient complaint, however, there are no consistent guidelines to guide dermatologists' approaches to diagnosis and management of SS. Attendees of an international dermatology conference were surveyed to gauge dermatology providers' experiences and perspectives on SS; attendees were predominantly dermatologists. Fifty-one percent of surveyed dermatology providers estimated prevalence of SS to be between 25 to 49% (n=45). An additional 34% estimated SS prevalence to be 50 to 74%, while a minority of respondents estimated less than 25% or greater than 75% (13% and 2%, respectively). When asked to approximate the number of clinic patients per week with a complaint of SS (n=41), selections ranged from less than 10 patients per week to greater than 50, with respondents most commonly reporting 10 to 20 patients weekly (44%). Surveyed providers (n=36) considered the primary symptom of SS to be redness (41%), burning (14%), stinging (25%), pruritus (17%), or tingling (3%). When prompted to choose the most likely etiology for SS (n=32), 72% indicated that altered skin barrier is the main cause of sensitive skin. Other selected options included external or environmental factors (16%), primary neuropathy (6%) and immune dysregulation (6%). No respondents classified SS as a result or symptom of another dermatosis. Fifty-five percent of surveyed dermatology providers consider SS to be a unique skin condition (n=42). Of the remaining, 33% disagreed with this statement and 12% were unsure. The biggest challenges in sensitive skin management (n=45) were identified as difficulty giving product recommendations (31%), assessing improvement over time (29%), prescribing medical management (18%), establishing diagnosis (13%), and discussing sensitive skin with patients (9%). Although the definition and diagnosis of SS are ambiguous, SS is increasingly being considered as a unique condition. Patients are commonly seeking dermatologic care for SS, however, dermatologists identified challenges with various aspects of patient care. This data highlights both a significant demand and a current need for improved provider resources about SS.

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EMERGENCY MEDICINE

Exposure to a Virtual Reality Mass Casualty Simulation Elicits a Differential Sympathetic Response in Medical Trainees and Attending Physicians

Background: Previous studies have demonstrated the use of virtual reality (VR) in mass casualty incident (MCI) simulation; however, it is uncertain if VR simulations can be a substitute for in-person disaster training. Demonstrating that VR MCI scenarios can elicit the same desired stress response achieved in live-action exercises is a first step in demonstrating non-inferiority. The primary objective of this study was to measure changes in sympathetic nervous system (SNS) response via a decrease in heart rate variability (HRV) in subjects participating in a VR MCI scenario. Methods: An MCI simulation was filmed with a 360° camera and shown to participants on a VR headset while simultaneously recording EKG and HRV activity. Baseline HRV was measured during a calm VR scenario immediately prior to exposure to the MCI scenarios. SNS activation was captured as a decrease in HRV compared to baseline. Cognitive stress was measured using a validated questionnaire. Wilcoxon matched pairs signed rank analysis, Welch's t-test, and multivariate logistic regression were performed with statistical significance established at p<0.05. Results: Thirty-five subjects were enrolled: 8 attending physicians (2 surgeons, 6 emergency medicine (EM) specialists), 13 residents (5 surgery, 8 EM) and 14 medical students (6 pre-clinical and 8 clinical-year students). SNS activation was observed in all groups during the MCI compared to baseline (p<0.0001) and occurred independent of age, sex, years of experience, or prior MCI response experience. Overall, 23/35 subjects (65.7%) reported increased cognitive stress in the MCI (11/14 medical students, 9/13 residents, and 3/8 attendings). Resident and attending physicians had a higher odds of discordance between SNS activation and cognitive stress compared to medical students (OR 8.297, 95% CI [1.408-64.60], p=0.030). Conclusions: Live-actor VR MCI simulation elicited a strong sympathetic response across all groups. VR MCI training has the potential to guide acquisition of confidence in disaster response.

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EMERGENCY MEDICINE

Investigating Clinicians' Perspectives on Racial Disparities within a Pediatric Emergency Department

Background: Quality of care differs by patient race and ethnicity in pediatric emergency departments (PED). Understanding clinicians' perspectives on the factors contributing to health inequities could provide further insight into how to mitigate these issues. Objective: To understand clinicians' perspectives on the contributors to racial and ethnic inequities in a PED. Design/Methods: One-on-one semi-structured interviews with PED clinicians were conducted as part of a pilot study assessing racial and ethnic inequities in pain management from July 2022 to September 2022. Eligible clinicians included pediatric emergency medicine (PEM) attendings, general pediatricians, PEM fellows, physician assistants, and nurse practitioners who had treated =1 patient with a chief complaint of acute abdominal pain or extremity injury in the PED within 1 month prior to the interview. Clinicians were invited to share their perspectives on trust, communication, and disparities in health care. Interviews were conducted and recorded via Zoom. Open-coding and Nvivo software were used to conduct thematic analyses of participants' responses. Results: A total of 10 interviews were conducted among 5 female and 5 male clinicians. Half identified as White, 30% Asian, 10% Black, and 10% Hispanic. Major themes included: race/ethnicity, culture, education, and resources (patient factors); knowledge, attitudes, and bias (provider factors); provider communication and cultural competence (clinical encounter); and health care organizational culture and quality improvement (health care system factors). All clinicians identified that patients are treated differently based on race and ethnicity both within the general healthcare system and within the PED. All clinicians identified both time and systemic issues as barriers to quality care. Other barriers included power dynamics between the provider and team, as well as between the patient and provider. When asked about possible personal practices to mitigate, prominent themes included (5+ clinicians mentioned) being intentional about verbal and nonverbal communication with families, empathy, and collaborative care amongst clinical teams. The majority (80%) were able to identify feasible and immediate solutions to mitigate bias within the PED. These clinician interviews provide valuable insight into possible solutions to improve patient trust and communication within the healthcare system, as well as subsequent resources necessary to ultimately eliminate health inequities. Future studies are needed to identify and implement effective interventions.

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EMERGENCY MEDICINE

A Machine Learning Approach to Predicting Overcrowding in the Emergency Department using Greet Note Information

Background & Objectives Large numbers of patients boarding in the emergency department (ED) while awaiting hospitalization have led to a crisis of overcrowding and reduced access to care. Accurate prediction of boarding may alleviate crises by allowing additional inpatient nursing staff to be flexed in, increasing ED throughput. No validated tools exist to predict future boarding. The objective of our study was to leverage an admission prediction model to predict future boarding load through two retrospective months of emergency department operations. Methods An XGBoost model was trained to predict an admission target using features collected during the very early ED evaluation: vital signs, arrival modality, subjective pain score, emergency severity index, and a free text chief complaint. The model was trained on 75% of the encounters presenting to a single academic center Jan-Oct 2019 and validated on the remaining 25%. The model was then used to predict the probability of admission for all patients in the ED at 30-minute intervals in Nov-Dec 2019, which were summed to calculate expected boarders 2, 4, 6, and 8 hours in the future. Predictions were compared to the actual number of ED boarders using linear regression and percentage of predictions within 1 standard deviation (SD). Results A total of 75207 ED visits were analyzed, 7529 (10%) of which resulted in hospital admission. 12229 were dropped due to null features, 40064 were used for training, 13295 for testing, and 9619 to simulate real ED conditions for boarding prediction. The XGBoost model achieved a ROC AUC of 0.94. When used to predict the total number of future boarders, the model achieved R2 scores of 0.91 at 2h, 0.86 at 4h, 0.82 at 6h, and 0.78 at 8h. It correctly predicted the expected number of boarders (within 1 SD, or 4.76 patients) in 97%, 93%, 89% and 86% of cases at 2, 4, 6, and 8h respectively. Conclusions Machine learning models may be used to effectively predict patient hospitalization and ED boarding volume up to 8 hours in advance. This improved situational awareness of the future state may help drive more creative and efficient solutions to mitigate the negative impacts of overcrowding that we are currently experiencing. More work is needed to improve model performance on live ED data and validate generalizability to other ED settings.

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EMERGENCY MEDICINE

Causative Factors of Orthopedic Injury Severity Resulting from Targeted Automobile Ramming Mass Casualty (TARMAC) Attacks and Recommendations for Improved Hospital Preparedness

Over the last ten years, the number of attacks in which an automobile becomes an improvised weapon intentionally driven into a crowd to cause mass fatalities and injuries has steadily increased. These attacks represent a shift in terrorism tactics from elaborate schemes requiring multiple conspirators and difficult-to-obtain materials (e.g. explosives, firearms, aircraft) to easily-accessible weapons and a single perpetrator. The primary purpose of this study is to review the literature to analyze the musculoskeletal injuries sustained from TARMAC attacks compared to unintentional auto-pedestrian events. Secondarily, following analysis of the available data, we aim to provide recommendations that are likely to improve preparedness in hospitals so orthopedic surgeons have improved ability to manage a surge of patients from such incidents. This study focuses on the injuries treated by orthopedic specialists given the evidence that most injuries sustained by survivors are musculoskeletal. Literature published by treating teams following major TARMAC attacks in Nice, France; Berlin, Germany; and Charlottesville, Virginia, identified four major mechanisms of injury: Direct vehicle impact, secondary impact with the ground or other hard object, crush injury caused by the vehicle tires, and injury related to rapid movements of the crowd. These injuries are of greater severity compared to an accidental pedestrian-struck incident, associated with the greater momentum of the vehicle. Attacks using vehicles with large mass and high velocities impart the highest impact, as seen in the victim data from Nice, where a 19-ton cargo truck was used at high speed to kill 86 and injure 434 others. During the George Floyd Protests throughout the US in 2020, at least 35 significant intentional ramming attacks occurred. With increasing prevalence, we recommend hospitals include TARMAC attacks when revising their disaster response plans. From an orthopedic standpoint, we recommend establishing an emergency operations plan where damage control surgery becomes the primary procedure during the patient surge with plans for definitive care later. Equipment for this plan, including Ex-Fix devices, pelvic binders, skeletal traction, and wound vac devices, may not normally be stored in sufficient quantities during normal hospital operations. During patient surges, additional protocols for service utilization, including sterile processing and radiology, are needed to minimize delays. Sufficient planning for large-scale, complex, blunt trauma is warranted given the increase in TARMAC attacks. Orthopedic surgeons should be familiar with the topic to assist hospital emergency management committees in revising disaster plans to better prepare for the possibility of a TARMAC attack.

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EMERGENCY MEDICINE

Customer Discovery for a Pressure Injury Prevention Device

Pressure injuries, also called bed sores, develop when prolonged pressure is applied to the same area of skin. Such injuries are common among patients with limited mobility, who may remain in the same position for extended periods. Despite the implementation of protocols that call for at-risk patients to be turned or rotated every 2 to 4 hours, pressure ulcers remain prevalent, mostly due to a lack of complete adherence to these protocols. The resulting impact is both financially and physically taxing, with the US healthcare system spending up to \$26.8 billion annually treating approximately 3 million patients with pressure injuries. Given the financial burden of pressure injuries on healthcare facilities, there is a growing need for effective prevention devices, particularly in nursing homes. To address this need, we conducted interviews with 34 healthcare professionals, including nurses, CNAs, physicians, and administrators, who work in hospitals, nursing homes, and skilled nursing facilities. We also shadowed care providers in each of these settings to better understand current practices for preventing pressure ulcers. Based on our findings, we identified several key design and product implementation considerations for a pressure injury prevention device. Our interviews revealed that healthcare providers face several challenges in preventing pressure injuries, including a lack of time to turn patients (78%), issues related to new hires and education (74%), and errors in assessing mobility (57%). In addition to these considerations, we developed a list of 10 design considerations based on our interviews and shadowing experiences, which we applied to prototyping and eventual inclusion in our provisional patent. By addressing these issues, we hope to develop an effective pressure injury prevention device that can reduce costs and improve patient outcomes in nursing homes and other care settings.

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Smoking and Type 2 Diabetes Mellitus Risk in NAFLD Patients: A Longitudinal Cohort Study

Background: Non-alcoholic fatty liver disease (NAFLD) remains one of the most prevalent chronic liver diseases in the United States and globally. Type 2 diabetes mellitus (T2DM), also with a rising burden, is closely linked to NAFLD. Tobacco use may also be associated with T2DM; however, the synergistic impact of NAFLD and tobacco use on the incidence of T2DM is unknown. Objective: This study explores the temporal relationship between cigarette smoking and T2DM in a cohort of NAFLD patients. Design: A longitudinal cohort study was conducted to explore the effects of smoking on incident T2DM in adults with NAFLD. A total of 279 adults with biopsy-proven NAFLD without baseline T2DM were included. The primary exposure status was categorized as either never-smoker or ever-smoker, while secondary exposure status was further stratified into never-smoker, former-smoker, or current-smoker. The primary outcome was the development of T2DM. Furthermore, a cox-proportional hazard analysis was performed to demonstrate associations between tobacco consumption and incident T2DM. Results: Compared with never-smokers, ever-smokers had an increased risk of T2DM with an adjusted hazard ratio (aHR) of 1.48 (95% CI: 0.74 - 2.97). Secondary analysis using the stratified exposure status showed elevated hazard ratios for current smokers [aHR 2.79 (95% CI: 1.09, 2.79)] and former smokers [aHR 1.10 (95% CI: 0.49, 2.51)], respectively, compared to never smokers. In addition, the non-parametric Kaplan Meier survival curve also demonstrated a significantly shorter time to the development of T2DM (log-rank test p=0.03) among current smokers, while the time to develop T2DM in former smokers was not significantly different from that of non-smokers. Conclusion: The risk of T2DM among adults with NAFLD increased in a stepwise manner from never-smokers to former smokers, with the highest incidence in current cigarette smokers. Further studies are needed to determine if smoking cessation programs can decrease the risk of T2DM in adults with NAFLD.

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Evaluation of Fecal Continence in Children with Anorectal Malformations and Hirschsprung Disease on Bowel Management at Children's National Hospital: A Pilot Study

Introduction: An anorectal malformation (ARM) and Hirschsprung disease (HD) are congenital colorectal conditions which may lead to fecal incontinence or constipation. A key aspect of post-surgical treatment for these patients is a bowel management program (BMP), with the goal of helping them achieve fecal continence. We hypothesize that the rate of continence will be overall high (>75% in patients with ARM or HD) 1 year after initiation of a BMP. Methods: A single institution retrospective review was conducted of toilet-trained children = 4 with ARM or HD on a BMP seen for initial and one-year follow-up visits between 2019 and 2022. The primary outcome was fecal continence on the BMP, defined as: 1-3 bowel movements per day and remains clean between bowel movements (= 1 stool accident per week) at one-year follow-up. Covariables included age, sex, BMP component(s) (laxatives, enemas, or combinations), and primary diagnosis of ARM or HD. Basic descriptive statistics were performed in addition to a Fisher's exact test to compare continence outcomes at one-year follow-up between ARM and HD patients. Results: Out of 92 patients with a primary diagnosis of ARM or HD, 34 patients were eligible, 17 ARM and 17 HD. Of the 34 patients, 76% (n=24) achieved continence at a one-year follow-up compared to 32% (n=11) at initial visit. 83% (n=15) of ARM patients achieved continence at one year compared to 29% (n=5) at baseline. 71% (n=12) of HD patients achieved continence at one year compared to 35% (n=6) at baseline. There was no significant association between primary diagnosis of ARM or HD and continence outcomes at one year-follow up (p = 0.668). A sub-characterization of BMP components showcased 41% (n=7) of BMPs in patients with HD included a combination of therapies, compared to 0% (n=0) in ARM patients. Discussion: Our initial pilot study results indicate that initiation of the BMP was associated with a higher number of patients with ARM and HD becoming continent after one year compared to baseline. The HD cohort did not reach the hypothesized 75% threshold, but the ARM cohort did. Limitations of the study include the small sample size of the population, the duration of follow-up, its retrospective nature, and our inability to capture care received at outside facilities. A longer study duration and larger cohort would be next steps in making a more definitive association between BMP and continence.

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Effectiveness of Stimulant vs. Osmotic Laxatives in Treating Constipated Children with Hirschsprung Disease: A Pilot Study

Introduction Hirschsprung Disease (HD) patients who experience gastrointestinal symptoms after primary pull-through are commonly prescribed osmotic and stimulant laxatives for bowel management. This pilot study investigated the relationship between laxative type and bowel outcomes in a cohort of pediatric patients with HD after primary pull-through at a single institution between 2019-2022. Our hypothesis is that patients using stimulant laxatives are equally likely to experience constipation, diarrhea, and stool accidents compared to those who use osmotic laxatives. Methods A single institution retrospective review from 2019 to summer of 2022 of children with HD was conducted. Children aged = 4 years old who had a primary pull-through and were on laxatives for bowel management were included. Patients taking both types of laxatives were excluded. The primary bowel outcomes were constipation (10 bowel movements/week) and stool accidents (>1 stool accident/week). Bowel outcomes were assessed at initial visit post-primary pull-through. Covariables included age, sex, and laxative use and type. Frequencies and summary measures were used to describe the characteristics of the study population and the prevalence of bowel outcomes. Unadjusted descriptive statistics were performed using Chi-square tests for categorical variables in R Studio 2022.07.0+548. Results Out of 66 HD patients reviewed, 14 patients who had a primary pull-through and were on laxatives at initial visit were included. The 14 patients in the cohort had a median age at initial visit of 10 (range 4-15) and were 64% male. 8 patients were treated only with stimulant laxatives, and 6 patients were treated only with osmotic laxatives. 38% (n=3) of patients treated with stimulant laxatives experienced constipation, whereas 83% (n=3) of patients treated with osmotic laxatives experienced constipation (p=0.1375). 1 (13%) patient on stimulant laxatives had diarrhea, in comparison to 5 (83%) patients on osmotic laxatives with diarrhea (p=0.0256). Finally, 63% (n=5) of patients treated with stimulant laxatives reported having stool accidents. 67% (n=4) of patients treated with osmotic laxatives reported having stool accidents (p=1). Conclusion Patients in our cohort using stimulant laxatives experienced diarrhea less than those who use osmotic laxatives. Due to limitations in sample size, we cannot conclude the impact of laxative type on bowel outcomes in HD patients generally, therefore this guestion requires further investigation in a larger cohort.

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Evaluation of Fecal Continence in Children with Anorectal Malformations and Hirschsprung Disease on Bowel Management at Children's National Hospital: A Pilot Study

Introduction: An anorectal malformation (ARM) and Hirschsprung disease (HD) are congenital colorectal conditions which may lead to fecal incontinence or constipation. A key aspect of post-surgical treatment for these patients is a bowel management program (BMP), with the goal of helping them achieve fecal continence. We hypothesize that the rate of continence will be overall high (>75% in patients with ARM or HD) 1 year after initiation of a BMP. Methods: A single institution retrospective review was conducted of toilet-trained children = 4 with ARM or HD on a BMP seen for initial and one-year follow-up visits between 2019 and 2022. The primary outcome was fecal continence on the BMP, defined as: 1-3 bowel movements per day and remains clean between bowel movements (= 1 stool accident per week) at one-year follow-up, compared to initial visit. Covariables included age, sex, BMP component(s) (laxatives, enemas, or combinations), and primary diagnosis of ARM or HD. Basic descriptive statistics were performed to characterize the overall population and a Fisher's exact test to compare continence outcomes at one-year follow-up. Results: Out of 92 patients with a primary diagnosis of ARM or HD,34 patients were eligible, 17 ARM and 17 HD. Of the 34 patients, 76% (n=24) achieved continence at a one-year follow-up compared to 32% (n=11) at initial visit. 83% (n=15) of ARM patients achieved continence at one year compared to 29% (n=5) at baseline. 71% (n=12) of HD patients achieved continence at one year compared to 35% (n=6) at baseline. There was no significant association between primary diagnosis of ARM or HD and continence outcomes at one year-follow up (p = 0.668). A sub-characterization of BMP components showcased 41% (n=7) of BMPs in patients with HD included a combination of therapies, compared to 0% (n=0) in ARM patients. Discussion: Our initial pilot study results indicate that initiation of the BMP was associated with a higher number of patients with ARM and HD becoming continent or clean for stool after one year compared to baseline. The HD cohort did not reach the hypothesized 75% threshold, but the ARM cohort did. The difference in BMP components between the two populations could indicate a more specialized treatment regimen being required for HD patients to achieve continence. Limitations of the study include the small sample size of the population, the duration of follow-up, its retrospective nature, and our inability to capture care received at outside facilities.

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GENETICS

Analysis of Electronic Health Record Data Identifies Features Associated with Future Genetic Evaluation

Neurodevelopmental syndromes represent a large percentage of rare diseases which present clinically during developmental screenings but may not fully be recognized as having a genetic etiology. Pediatricians are the first care providers to screen for possible developmental delays, and early identification of developmental delays allows for timely interventions to maximize developmental outcomes. Automated evaluation of the data generated by primary care providers in conjunction with observation and parent/caregiver histories can suggest earlier referral for children with initial signs of neurodevelopmental disorders. Our analysis of primary care electronic medical record data identified features that are strongly correlated with eventual genetic evaluations. Retrospective patient-level data was obtained from electronic health records, extracting International Classification of Diseases (ICD) codes, number of encounters, Ages & Stages Questionnaire (ASQ) scores, newborn screening results, biometrics (height, weight, and head circumference) and medications. These records reflect five years of data from the Goldberg Center's primary care records cross-referenced with genetics and neurogenetics records over the same period. Point biserial correlation coefficients were calculated for each feature and the outcome of genetic evaluation for 7- to 11-month, 16- to 20-month, and 28- to 32-month-olds. 25,281 records were accessed, with 11,045 meeting the inclusion criteria for analysis. For infants between 7 and 11 months old at the time of visit, referrals (0.259, p=0.00), number of medications (0.192, p=0.00), number of abnormal ASQ domains (0.181, p=0.00), and number of associated ICD codes (0.176, p=0.00) were the highest correlated features with future genetic evaluation. Among 16- to 20-month-olds, abnormal ASQ gross motor score (0.303, p=0.00), number of departments seen (0.285, p=0.00), and number of abnormal ASQ domains (0.260, p=0.00) were the highest correlated features. The strongest correlations seen in the 28- to 32-month-old group included number of departments seen (0.376, p=0.00), abnormal ASQ gross motor score (0.325, p=0.00), number of encounters (0.320, p=0.00), and number of abnormal ASQ domains (0.304, p=0.00). No significant differences were seen between genders. The features identified through this analysis indicate that abnormal ASQ screening results and frequent encounters with medical services are associated with future genetic evaluation. The relationship between these variables will be used to develop and train a machine-assisted algorithm that can identify patients in need of genetic testing and evaluation. Further investigation is needed to elucidate associations with other outcome variables related to neurodevelopmental delays and underlying genetic conditions.

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- THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY

CLINICAL AND TRANSLATIONAL RESEARCH

GENETICS

Neuropsychological Assessment of Patients in the Turner Syndrome Multidisciplinary Clinic

Background: Turner syndrome (TS) is caused by a missing part or whole second sex chromosome in a phenotypic female, often manifesting dysmorphic features, short stature, primary ovarian insufficiency, and cardiac abnormalities. Recent consensus guidelines recommend formal neuropsychological (NP) assessments in TS due to a high prevalence of neurocognitive impairment. Objective: Our goal was to review the spectrum of NP impairment in patients with TS referred from a multidisciplinary clinic. Methods/Design: A retrospective chart review was completed to include NP assessments between 01/01/2019 and 11/01/2022. The prevalence of NP impairment was determined based on the neuropsychologist's impression as stated in the NP summary report. Parent-reported T-scores (mean 50, SD 10) on BRIEF (Behavior Rating Inventory of Executive Function) and CBCL (Child Behavior Checklist) instruments were abstracted. A descriptive analysis is presented (Excel v2102). Results/Discussion: Only 38/118 unique patients with TS seen in the specialty clinic had completed NP assessment with a median age of 11.3 years (range 2.3-20.2); 37% had 45, X karyotype, and 34% were diagnosed in the pre/neonatal period. A high prevalence of attention problems (24%), difficulties in domains of mathematics (47%), visual-spatial ability (58%), executive functioning (68%), and anxiety disorder (53%) were noted. Although median parent-reported T-scores were normal in these domains, clinically elevated scores were seen in 9% for BRIEF Global Executive Composite score, 21% for CBCL total problems score, and 18% for CBCL DSM5 anxiety problems score. Our data confirm the high prevalence of neurocognitive impairment among patients with TS, despite relatively normal parent-reported scores on standardized BRIEF and CBCL instruments. Anxiety, and difficulties with the visual-spatial ability and executive functioning seen in more than half of the individuals justify routine screening. Future studies will need to explore barriers to the completion of NP tests as well as optimal assessment tools, and strategies to improve NP outcomes in this population.

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INFECTIOUS DISEASE

TLF-Mediated Lysis and Resistance Mechanisms in T. brucei

Humans have evolved along with African trypanosomes for millions of years. The Trypanolytic Factor (TLF) evolved to be the first line of defense in a complex coevolutionary arms race between parasites and primates. Specifically, great apes (including humans) have serum apolipoprotein-L1 (APOL1) in their TLF complexes that can lyse the cells of Trypanosoma brucei brucei, preventing human infection. In contrast, human infectious forms of T. brucei (rhodesiense and gambiense) have evolved TLF-based resistance factors that enable them to infect and kill their human hosts. TLF is a robust lytic factor against T. brucei brucei; however, the precise mechanism of parasite killing remains unclear with a number of proposed models under investigation. To elucidate the mechanism of TLF lysis and resistance, this study employed a novel forward-genetics-based screening strategy. The Hovel-Miner Lab has developed a Gainof-Function (GoF) parasite library tool that enables the identification of genes whose induced expression can promote survival in otherwise toxic conditions. They applied this library to the question of TLF and isolated populations of surviving parasites that are TLF resistant. This study seeks to identify the genes whose induction promoted parasite survival in the otherwise lethal TLF treatment conditions. To achieve this goal, genomic DNA was extracted from GoF library survivors treated in 10nM TLF concentrations and then PCR amplified to identify enriched genes. PCR are analyzed by agarose gel electrophoresis and bands of interest isolated for DNA extraction and molecular cloning. Plasmid DNA harboring overrepresented genes in TLF survivor populations are isolated and analyzed by traditional Sanger Sequencing. DNA sequences are identified using NCBI Blast and Tritrypdb.org, which is a genome information database for trypanosomatid parasites. Preliminary results implicate the involvement of gene Tb927.8.2230, which is associated with checkpoint protein HUS1. Further investigations will include the evaluation of additional TLF screening conditions and analysis of the HUS1 homolog identified to further determine its role in TLF killing and resistance.

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INFECTIOUS DISEASE

Risk Factors for Community-Acquired ESBL UTI in Pediatric Patients: A Case- Control Study

Background Urinary tract infections (UTI) are among the most common bacterial infections among infants and young children. Enterobacterales are isolated in more than 80% of pediatric UTI cases, and the rates of resistance are rising. Most pediatric studies focus on hospital-acquired resistant infections, but there has been an increase in community-acquired UTI cases caused by extended-spectrum beta-lactamase (ESBL) producing bacteria, for which risk factors are not clearly defined. Objective To identify and quantify the risk factors associated with community-acquired ESBL urinary tract infections (UTIs) in pediatric patients. Methods We conducted a singlecenter retrospective case-control study at a tertiary teaching hospital. We reviewed urine culture information from January 2019 to December 2021 of patients evaluated in the emergency department. We identified those who met our study definition for community-acquired ESBL UTI: positive urine culture (>10^5 CFU if clean catch or urine bag collection, >50^4 if a catheterized sample, and any CFU if suprapubic aspiration), abnormal urinalysis (positive leukocyte esterase or >10 WBC), symptoms consistent with UTI, and no hospitalization or long-term facility stay in the previous 3 months. We randomly selected matched cases (ESBL UTI) to controls (non-ESBL UTI) by age and gender (confounders) in a 1:3 ratio. We conducted a univariate analysis using Fisher's exact test and developed a multivariate conditional logistic regression model to determine the association between each variable of interest and ESBL UTI. Results The study included 78 cases and 234 controls, with a median age of 3.8 years (IQR:1.2-6.5). The females were 184 (59%), and the Hispanic/Latinos were 190 (62%). In the univariate analysis, state of residence, functional urinary disorder, genitourinary anatomical abnormalities, immunosuppression, antibiotic use 3 months before UTI, UTI in the previous 3 months, history of recurrent UTI, and long-term antibiotic use were associated with ESBL status with a p-value <0.15 and were included in the multivariate analysis. In the multivariate analysis, antibiotic use 3 months before UTI (OR 8.2, 95% CI 3.4-19.2), immunosuppression (OR 7.9, 1.4-44.4), and long-term antibiotic use (OR 4.4, 1.3-14.6) were significantly associated with ESBL UTI (p<0.05). Conclusions The study findings may have important implications for understanding the causes and potential prevention strategies for ESBL UTI, and further research is needed to confirm and expand upon these results.

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INFECTIOUS DISEASE

Kawasaki disease in the time of COVID-19 and MIS-C -The International Kawasaki Disease Registry

Background The considerable overlap in case definition and clinical features between patients with COVID-19-associated Multisystem Inflammatory Syndrome in Children (MIS-C) and Kawasaki disease (KD) suggests shared pathogenesis. We sought to compare demographics, clinical presentation, management and outcomes of patients by COVID-19 status. Methods The International KD Registry (IKDR) began enrolling patients with clinical features of either acute MIS-C, KD, or fever with hyperinflammation in January 2020. The IKDR includes patients from North, Central, and South America, Europe, Asia, and the Middle East. Patients were stratified by COVID-19 status into four groups: Positive (household contact or positive polymerase chain reaction (PCR) or serology), Possible (suggestive clinical features with negative PCR or serology), Negative (negative PCR and serology and no known exposure), and Unknown (incomplete testing and no known exposure). Results 2,345 patients were included. The Positive and Possible groups had fewer clinical features of KD compared to the Negative and Unknown groups (p<0.001), but more gastrointestinal symptoms (p<0.001). Patients in the Positive and Possible groups were more likely to present in shock and respiratory dysfunction, be admitted to the intensive care unit (ICU), receive respiratory support, and have longer length of stay compared to those in the other groups (p<0.0001). More patients in the Positive and Possible groups received heparin, anticoagulants, interleukin blocker, inotropes, and intravenous and oral steroids compared to those in the Negative and Unknown groups (p<0.0001). Positive and Possible groups had higher serum creatinine, C-reactive protein, ferritin, procalcitonin, B-type natriuretic peptide (BNP), N-terminal BNP, and triglycerides than other groups (p < 0.0001). More patients in the Positive and Possible groups developed mitral valve regurgitation (p<0.0001), pericardial effusion (p=0.037), heart failure (p<0.001), worse left ventricular ejection fraction (p<0.001), and arrhythmia (p=0.0003). Meanwhile, patients in the Negative and Unknown groups developed worse coronary artery aneurysms (p=0.002) and patients in the Negative group had higher maximum coronary artery z-score (p=0.017). Conclusion There is considerable overlap regarding presentation, management, and outcomes between COVID-19 Positive/Possible (presumed MIS-C) and COVID-19 Negative/Unknown (presumed KD) patients. Positive/Possible patients had more severe presentations and required more intensive management, with a greater likelihood of ventricular dysfunction but less severe coronary artery outcomes. There appears to be a clinical continuum from MIS-C to KD with a great deal of heterogeneity, and the primary differentiating factor is COVID-19 status. Our findings support the continued inclusion of COVID-19 exposure in the case definition of MIS-C.

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Ashraf Harahsheh, Brian McCrindle **INFECTIOUS DISEASE**

The Effects of Mitochondrial Redox Stress Resistance Gene Over-expression on the EC50 of Fexinidazole in Trypanosoma brucei.

Great strides have been made in the fight against Trypanosoma brucei gambiense, the organism that causes African sleeping sickness, thanks to fexinidazole, a groundbreaking new therapy that was developed thanks to the Drugs for Neglected Diseases Initiative in partnership with the Swiss Tropical and Public Health Institute and Sanofi Pharmaceuticals. This 10-day, once-daily oral therapy, has considerable advantages over the previous standard of care, nifurtimox-eflornithine combination therapy (NECT), that requires hospitalization and lumbar punctures. Because this new standard of care has unique benefits in terms of adverse effects and ease of delivery, it is crucial to understand potential mechanisms of resistance to fexinidazole in Trypanosoma brucei. Eleven genes have been identified from gain of function drug resistance studies, five of which have been identified to have implications for mitochondrial oxidation-reduction (redox) stress. These five genes implicated in mitochondrial redox stress will be cloned for overexpression and transfected into the T. brucei genome using Blasticidin to ensure successful transfection of the genes of interest. Genomic DNA from the sets of clones transfected with their respective resistance genes will be isolated to confirm success of the transfection using gel electrophoresis. Subsequently, qRT-PCR will be used to confirm mRNA expression of the respective resistance genes. Finally, an alamarBlue ™ cell viability assay will be conducted to determine levels of oxidation-reduction to determine if the EC50 values of fexinidazole has changed for clones transfected with the resistance genes in comparison to controls. Understanding potential mechanisms of resistance of T. brucei to fexinidazole is essential for ensuring that this revolutionary new drug remains effective in continuing the remarkable drop in mortality that has been achieved over the years.

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INFECTIOUS DISEASE

RNA biomarkers of host immune activation in suspected sepsis to predict severity of illness.

Sepsis is an acute, severe, systemic host response to infection which can be difficult to diagnose, and in which the chances for survival are improved by early recognition and treatment in an emergency department (ED) setting. In this observational study (IRB: NCR213645), we aim to identify biomarkers that can indicate increased risk of sepsis in patients meeting SIRS (systemic inflammatory response syndrome) criteria. We hypothesized that patients who progress to septic shock would exhibit significantly higher neutrophil activation markers at the time of enrollment in the ED compared to patients that do not progress to septic shock. Adult patients presenting to the ED meeting the SIRS criteria, indicated by notification from Cerner Sepsis Management System, are consented and enrolled in the study. A 3 ml blood sample is drawn in an RNA preservative (Tempus) for an analysis of blood RNA biomarkers of infection. Frozen blood samples were analyzed by an established droplet digital PCR test for RNA transcripts related to neutrophil activation, including bacterial, viral, and biofilm markers of infection. The subjects' medical progress is followed for 30 days to obtain clinical information and likely diagnoses for analysis. This study is still enrolling patients. An initial cohort of subjects (n=20) were grouped by likelihood of infectious cause of SIRS presentation, which was assessed by clinical markers including elevated white blood cell (WBC) count, fever, heart rate, and respiratory rate. Subjects with a high likelihood of infection showed, on average, greater upregulation of the biofilm marker alkaline phosphatase (ALPL) mRNA, than those with low or uncertain likelihood of infection (t-test, p<0.05). No significant difference was observed in viral and bacterial RNA markers of infection between these groups, though fold-change increases in biofilm markers and bacterial marker DEFA1 were seen in both groups. The long term goal of these studies is to track RNA expression through recovery with ICU-level care in the subset of patients that develop sepsis. Collecting blood samples from patients while they are in the ICU can help us fill this current gap in our understanding of the role of host immune activation in the progression of sepsis. At present, the RNA quantification method requires hours, which is problematic for the acute setting, but technologies that allow point-of-care RNA quantitation are evolving rapidly, and could allow nearly real-time tracking of the activity of the host immune system's response to infection

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INFECTIOUS DISEASE

Effects of Dorsal Slit Circumcision on the Penile Microbiome

Background: Male circumcision reduces HIV risk. However, it is not known if the protective effect of male circumcision against HIV is mediated primarily by reducing at-risk genital mucosa surface area, or via anatomic (e.g., increased keratinization), microenvironmental (e.g., moisture), or microbiome changes driven by foreskin removal. To better understand how the penile microbiome changes with increased oxygenation in the presence of intact foreskin, we compared the penile microbiome in men who are uncircumcised and fully circumcised to those who engage in a cultural practice of partial circumcision in Papua New Guinea, which result in the aeration of subpreputial space without removing the foreskin. By comparing microbiome composition in men with different circumcision practices, we can better assess the effects that aeration and foreskin removal have independently on the microbiome. Methods: Coronal sulcus swabs were collected from male study participants at Port Mosby in Papua New Guinea. DNA was extracted from swab eluent. Total penile bacterial density was measured using 16S rRNA gene-based qPCR, and the microbiome was characterized by sequencing the V3V4 region of the 16S rRNA gene. Microbiome composition was visualized by nMDS and compared using PerMANOVA and indicator analysis. Chi-square tests and Wilcoxon rank sum tests were used to compare bacteria prevalence and abundances, respectively. Results In total, 95 microbiome samples were collected from 64 unique study participants (mean age = 22.8, SD = 2.8). While penile microbiome composition was significantly different between uncircumcised versus men with partial or full circumcision (PerMANOVA p = 0.001), there was no significant difference in the penile microbiome of men with partial versus full circumcision (PerMANOVA p = 0.406). Indicator analyses show that anaerobic bacteria, including Dialister propionicifaciens (p = 0.002), Prevotella (p= 0.003) Peptoniphilus (p= 0.006), and Mobiluncus (p=0.02) are significantly associated with uncircumcised men, as compared to men with either partial or full circumcision. Discussion Our findings indicate that partial circumcision, which does not remove the foreskin, results in similar penile microbiome composition as those who are fully circumcised. This suggests that aeration, and not the complete removal of foreskin is necessary to reduce the penile anaerobic bacteria linked to higher rates of HIV acquisition. Further studies are needed to elucidate how these microbes associated with partial circumcision affect foreskin immune outcomes that are relevant to HIV susceptibility.

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INTEGRATIVE MEDICINE

Practice of Ayurvedic Medicine in A Team-Based Integrative Care Setting Within an Academic Medicine Center: Narrative Case Presentation

Objective: Ayurveda, derived from a Sanskrit term meaning "science of life" is one of the world's oldest medical systems. We conducted an observational narrative of an Ayurvedic approach to patients with chronic conditions within an integrative clinic at an academic medicine center. These patients were struggling with management via standard care and have chosen an Ayurvedic approach. Methods: Combination of literature review of the benefit of Ayurvedic practices for chronic condition management, and observation of Ayurvedic practice applied to small cohort of patients. Outcomes: Observed patients reported high satisfaction from added Ayurvedic care. Patients were able to appreciate their health in a more holistic framework and begin implementing continuous lifestyle changes that led to improvement in quality of life. For example, one patient reported that Ayurveda "helps reflect more inward versus outward," and "understanding the inner workings of not just the body but also the soul." Integration of Ayurveda into an academic integrative medicine center was seemingly easy. Ayurvedic provider fit very well into the existing clinic system, providing valuable insight during staff meetings, not just to patients she was treating but to others as well. The practitioner quickly became a full member of the team and was able to quickly build her panel of patients while also serving in a part-time academic/administrative role. Conclusions: Despite large differences in practice of Ayurveda versus existing biomedical model, integration of Ayurveda into the clinical work of at least one academic health center was achieved with ease and clear benefit to existing patients. Additionally, having an Ayurvedic practitioner engaged in workings of administrative aspect of the integrative training programs provided additional insight and broadening of teaching offerings for trainees.

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INTEGRATIVE MEDICINE

Outdoor Physical Activity as a Confounder for Vitamin D Status: A Scoping Review Protocol

Background: Vitamin D (vitD) has been correlated with a number of health outcomes and disease states; however, these relationships are likely confounded by the role of outdoor physical activity (PA) and sun exposure during such PA. While there is a wealth of research that considerson the health benefits of vitD status and the importance of UV-B induced endogenous vitD (photoproduction) in avoiding deficiency, there are few studies that consider the strength of the relationship between outdoor PA and vitD status using a large dataset. and Specifically, there is very little research exploring the potentially spurious relationships between PA and vitD status is rare to throw off nutrition research. Methods: This scoping review will employ Arksey and O'Malley's five-stage approach (2005). With the help of a university reference librarian, Ppublications related to vitD and outdoor PA will be identified through a review of five research databases: CINAHL, Cochrane Library, PubMed, Scopus, and SportDISCUS. Manuscript eand reviedw will occur in using Covidence. Four researchers will complete an initial title/ abstract screen to identify immediately irrelevant manuscripts for removal. In this phase, tTwo of four researchers will review each title/abstract to determine inclusion with a third serving as a tie-breaker where necessary. Next, the four researchers will divide the included manuscripts forconduct full-text review and data extraction to identify participants, contexts, type of study, and results to conduct a thematic analysis informing the creation of a complete scoping review. Results: The findings are expected to help identify what information is presently available regarding the correlation between outdoor PA and vitD status and confounding effects in humans. The results of this scoping review will help to inform the research questions guiding the quantitative analysis of the National Institutes of Health's (NIH) All of Us database. Conclusions: It is unclear what effect outdoor PA may have on the relationship between vitD status and health outcomes and if they are spurious, e.g. effect is due to fitness from outdoor PA. This scoping review will initiate an exploration of the relationship between vitD and PA to determine the strength and magnitude of potential confounding. Ultimately, we hope to estimate the bias in this relationship to be able to reassess previous findings and determine the true effect of vitD alone by isolating the effect of outdoor PA.

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INTEGRATIVE MEDICINE

Gut Microbiome Knowledge & Behavior Study

Background: The gut microbiome (GM) is a dynamic collection of microorganisms residing in the gastrointestinal tract that influences health and disease. Importantly, the composition and function can be viewed as a surrogate for the overall health status of the host. Lifestyle behaviors that correlate with positive health outcomes such as plantbased nutrition, physical activity, etc. also optimize the status of the GM. The GM is a relatively new field; thus, patients may not be aware of its involvement in health. We measured the change in patients' mindset regarding health practices as well as their dietary intake and physical activity after learning about the connection between healthy lifestyle behaviors and GM function. Methods: Patients were recruited at the GW MFA Internal Medicine clinic. Patients initially completed a baseline survey consisting of questions about demographics, GM knowledge, mindset regarding lifestyle behaviors, dietary intake, and physical and mental health status. Knowledge based questions were evaluated on a 4-point scale ranging from strongly disagree (SD) to strongly agree (SA). After completion, patients were prompted with an educational module: a 5-minute video and handout describing the GM and how pursuing healthy behaviors such as a plant-based diet, physical exercise, etc. enhance the GM. A final survey was sent one month later to gather follow-up data. We analyzed the change in survey responses from before and after the intervention. Results: 119 patients completed the baseline survey and 60 returned the final survey. Two questions had statistically significant changes. The number of people who chose SA for the statement, "Exercise influences the types of bacteria present in the digestive system" increased from 7 (12%) to 24 (41%) (p = 0.004). The number of people who chose SD for the statement, "An inactive lifestyle promotes the growth of healthy types of digestive system bacteria" increased from 12 (20%) to 24 (41%) (p = 0.035). There was no change in the median number of servings consumed of fruit (2), beans (1), whole grains (2), or processed snacks (1). There was no change in frequency of physical activity. Discussion: We observed a greater change in patients' mindset than behavior. Lifestyle changes are challenging to adopt and require a deep commitment for maintenance. Although we didn't see a significant change in behavior, our results show that patients are likely now more aware of how lifestyle choices affect health outcomes and may be open to embracing change in the future.

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Revolutionizing Heart Healthy Nutrition Education in Cardiac Rehabilitation

Background: Each year, thousands of Americans with coronary artery disease are referred to cardiac rehabilitation (CR) centers for outpatient lifestyle modification programs focusing on exercise and heart-healthy nutrition. Despite the importance of nutrition education in CR, implementation is variable and long-term impact is questionable (1). There is a need for more standardized and accessible nutrition programming in CR, and the advent of on-line virtual technology provides opportunity to greatly improve access and quality of nutrition education delivery for patients. Methods: The objectives of this study were 1) to visit local CR sites and review the literature to determine current practices and barriers surrounding nutrition education in CR, utilizing PubMed and various heart and cardiovascular association websites to select publications, reviews, and international guidelines on CR nutrition interventions, and 2) to launch a randomized trial providing virtual hands-on cooking classes with training in Mediterranean diet principles (MEDdiet). Outcomes: Our literature search generated guidelines and recommendations which included basic information on appropriate diets for improving cardiovascular health, but found minimal integration of hands-on skills. Interviews with CR staff provided additional valuable information. Some sites lack access to a registered dietician (RD), and even with a RD on-site, not all patients participate in consults and sessions can be short. We noted numerous potential barriers preventing full utilization of nutrition education, including limited RD interactions, insurance requirements for consultation, and not including the primary family cook. Based on this information, we created a research protocol with the GW Culinary Medicine program and Inova CR sites. This IRB-approved research project will compare participating CR patients randomized into 2 groups: a control group receiving the standard RD education care provided at Inova, and an interventional group receiving the same standard care plus the GW Health meets Food 7-week virtual hands-on MEDdiet cooking class series. These 2.5-hour classes cover the key elements of the MEDdiet allowing patients to join and learn virtually with family members. Patients will be administered self-efficacy questionnaires at three points to measure feasibility, patient adherence, dietary knowledge growth and long-term sustained adoption of MEDdiet. Participant enrollment is ongoing. Should this program demonstrate success, it has the potential to be expanded nationally positively impacting thousands of CR patients. References: (1) Lara-Breitinger, K., Lynch, M., & Kopecky, S. (2021). Nutrition Intervention in Cardiac Rehabilitation: A REVIEW OF THE LITERATURE AND STRATEGIES FOR THE FUTURE. Journal of cardiopulmonary rehabilitation and prevention, 41(6), 383-388. https://doi.org/10.1097/HCR.000000000000660

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Rachel Volke, Maya Fiellin, Kerri Dotson, Wendy Johnson, Timothy S. Harlan, Richard Katz **INTEGRATIVE MEDICINE**

Prior Exercise Influences Postprandial Triglycerides and Fat Oxidation after a High-Fat meal in Active Cannabis Users

Adults residing in industrialized nations spend most of their day in a postprandial state. This can cause prolonged elevated levels of triglycerides and glucose post-meal, leading to increased risk of cardiovascular and metabolic disease. In epidemiological literature, cannabis users have been reported to have similar or lower levels of blood lipids compared to nonusers. However, postprandial responses to a high-fat meal and whether prior exercise improves postprandial lipemia (PPL) in this population is not known. PURPOSE: To examine the influence of prior exercise on PPL in active cannabis users compared to non-users. METHODS: Nine active cannabis users and six non-user controls (Age: 29 +/- 6 years; BMI: 23.7 +/- 3.2 kg/m2; VO2max: 45.7 +/- 10.0 mL/kg/min) either rested or completed 1 hour of exercise at their ventilatory threshold (VT) the evening before a high-fat, high-sugar liquid meal containing 15 kcal/ kg body mass. Substrate oxidation, blood pressure, and capillary blood samples were obtained before and every 30-60 minutes post-meal for 3 hours. Blood samples were analyzed for glucose, triglycerides, and total and LDL cholesterol. Repeated-measures ANOVAs were utilized to examine differences in variables between conditions, across time, and their interaction. Area-under-the-curve (AUC) for glucose, triglycerides, and cholesterols were calculated by the trapezoidal rule using a published spreadsheet. RESULTS: Participants exercised at an intensity of 96 ? 6 % VT (70 +/- 7 % VO2max) and expended 702 +/- 228 kcals with an average RER of 0.91 +/- 0.03. Post meal (1061 +/- 237 kcals), all variables had significant effects of time (p < 0.05), but no significant effect of condition (Control vs. Exercise) or interaction (p > 0.05). AUCs for triglycerides and total cholesterol were significantly lower, and fat oxidation significantly higher, in the exercise condition compared to the control trial condition, with no differences observed between users and non-users. CONCLUSION: The present study indicated that prior exercise improves lipid metabolism in cannabis users and non-users after a high-fat meal test. Future studies should incorporate additional meals and variables related to cardiovascular health and metabolism.

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NEUROLOGY AND NEUROSURGERY

Child Opportunity Index and Time to Surgery in Pediatric Epilepsy

Background: Despite guidelines encouraging early surgical intervention for pediatric epilepsy patients with resectable lesions, delays in receipt of surgery persist. Attempts to explain this gap have identified several medical and sociodemographic factors impacting time to surgery at the individual level. However, no study to date has examined social and structural drivers of time to epilepsy surgery at the population level. Objective: To examine associations between Child Opportunity Index (COI) score and time to surgery in children who underwent resective epilepsy surgery at Children's National Hospital (CNH) Methods: 111 patients (age 2.2 months-24.8 years) who underwent epilepsy surgery at CNH between 2000-2022 were identified from the CNH Epilepsy Surgery database. The primary outcome was time to surgery, defined as the interval between age at habitual seizure onset and age at surgery. COI values were obtained from medical records based on home address. The COI measures overall child opportunities that impact children's health across three domains: Education (e.g., educational access, quality, outcomes), Health and Environment (e.g., access to healthy food, healthcare, green space) and Social and Economic (e.g., income, employment, poverty); higher scores indicate higher opportunity. Multiple regression analyses were conducted to examine main effect associations between COI and time to surgery. Results: 28% of patients were from very high, 21% from high, 25% from moderate, 17% from low, and 10% from very low opportunity neighborhoods using metro norms. Mean time to surgery was 5.7 years. Regression analyses found no association between COI and time to surgery (R_=0.003, F(1,109)=0.334, p=0.564). None of the three COI subdomains (Education, Health and Environment, and Social and Economic) were associated with time to surgery. Our results were unexpected, given documented associations between time to surgery and social factors including income quintile, English proficiency, and race and ethnicity. However, our sample drew from a high-resource area near a nationally ranked children's hospital with a comprehensive pediatric epilepsy program. Future work should investigate whether neighborhood opportunity impacts time to surgery in less-resourced settings. Additionally, subsequent work should examine whether neighborhood opportunity matters at different points along the epilepsy continuum of care, including time to referral to a comprehensive epilepsy center and likelihood of receiving epilepsy surgery.

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NEUROLOGY AND NEUROSURGERY

A Journey of Weakness Through Space and Time: An Unusual Case of Multiple Sclerosis

A 70 year-old man with lumbar stenosis presented with bilateral lower extremity weakness for the past three years. He also noted recent difficulty with ambulation and dizziness. Exam was notable for 4/5 motor strength in lower extremities. MRI showed multilevel degenerative changes with stenosis and multifocal T2 hyperintense lesions. Lesions were within the supratentorial compartment, medulla, as well as scattered throughout the cervical and thoracic spinal cord. CSF studies were significant for oligoclonal bands and increased IgG index. B12 was borderline normal and the patient was positive for C-ANCA. Further diagnostic testing was largely negative for rheumatological disorders. With a leading diagnosis of MS, a five-day course of methylprednisolone 1gm daily was initiated. Patient's weakness improved with steroids and physical therapy. Diagnosis of late onset MS (LOMS) is defined as those diagnosed with MS after the age of 50, can be a challenge for the internist. Clinical signs are often misdiagnosed with some studies suggesting a delay of three years before establishing the correct diagnosis. Misdiagnosis may occur due to differences in LOMS clinical presentation, imaging, and overall female predominance in receiving this diagnosis. It is important to understand how clinical presentation may differ in those with LOMS. Studies have shown that 90% of patients with LOMS present initially with motor symptoms in comparison to 67% of those diagnosed before age 50. MRI is the gold standard for diagnostic study. The incidence of white matter lesions of the brain not due to MS increases with age. This poses a challenge for diagnosis as hyperintensities can be a result of other pathologies including vasculitis or small vessel disease. Furthermore, white matter lesions in the brain can be found at a higher rate in healthy asymptomatic elderly adults. Spinal cord hyperintensities are less associated with normal aging and can be useful when brain MRI is equivocal. Clinical signs of LOMS should prompt high suspicion for MS even with unclear MRI results. it is important to recognize the predominance of motor symptoms and higher proportion of spinal cord lesions as more prevalent in LOMS. Motor deficits represent a broad differential including demyelinating diseases, spinal cord compression, rheumatological diseases, and peripheral neuropathy. CSF analysis positive for oligoclonal bands, while not explicitly required according to the 2017 McDonald criteria, can assist in the diagnosis of MS given the opacity of MRI findings in elderly populations.

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NEUROLOGY AND NEUROSURGERY

Development and Validation of a Bayesian Network Predicting Neurosurgical Intervention after Injury in Children and Adolescents

Traumatic brain injury (TBI) is the leading cause of morbidity and mortality after injury in children and adolescents. Among injured patients with a TBI whose neurological examination can be difficult to monitor or are deemed high risk to develop intracranial hypertension, intracranial pressure (ICP) monitors can be placed to coordinate early medical or surgical interventions. Several studies in adults have shown a correlation between the peak ICP and mortality and functional outcomes. This study aimed to develop a model to evaluate the variables that were most influential to a child or adolescent receiving neurosurgical intervention. This model could later be adapted into a probabilistic model to predict the need for neurosurgical intervention without radiographic or laboratory findings for children and adolescents. Patient demographic, injury, resuscitation, and intervention characteristics of children and adolescents (ages 1 to 18-years-old) from the 2017 to 2019 Trauma Quality Improvement Project (TQIP) database, including age, gender, prehospital and emergency department physiological values, presence of prehospital cardiopulmonary resuscitation (CPR), the patient's origin prior to arrival, pupillary reactivity, mechanism of injury, and need for neurosurgical intervention was collected. The 27 mechanisms of injuries within TQIP were consolidated into 'firearm', 'motor vehicle crash', 'pedestrian struck', 'struck by, against', 'fall', and 'other'. Craniotomy and ICP monitor placement were identified using the International Classification of Diseases Clinical Modification (ICD-CM) procedure codes. Neurosurgical intervention was defined as the need for craniotomy with or without ICP monitor placement or ICP monitor placement alone first. Using these variables, a Bayesian belief network was trained using a supervised learning algorithm, each model was re-calibrated using isotonic regression, and validated by using a held-out dataset. Model performance was assessed using the validation held-out data by using the area under the receiver operator characteristic curve (AUROC) and calibration. The study population consisted of 386,859 injured children and adolescents, among which 2,585 (51.7%) underwent craniotomy/craniectomy with or without ICP monitor placement and 2,413 (48.3%) had an ICP monitor placed first. The median time to surgical intervention was 3.2 hours (IQR 1.8, 10.8). Identification of patients at risk for a TBI requiring neurosurgical intervention before neurological deterioration may reduce the time to imaging and operative intervention and improve outcomes. The study models predicted the probability of neurosurgical intervention within a median of four hours and performed with partially observed data. External validation of the models is needed before clinical use.

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NEUROLOGY AND NEUROSURGERY

Assessing the Association Between Amyloid Imaging and Cognitive Change in a Cohort with Racial and Ethnic Diversity

Previous research has shown that amyloid is limited in specificity, sensitivity, and reliability as a biomarker for predicting the trajectory of cognitive decline. Racial disparities may exist in using biomarkers such as amyloid in assessing cognition in underrepresented groups. Few clinical studies have examined neuroimaging biomarkers and longitudinal cognitive data in underrepresented groups in Alzheimer's Disease (AD). The Alzheimer's Disease Research Center at the Icahn School of Medicine at Mount Sinai (MSADRC) has a sizable cohort of diverse participants who have undergone longitudinal amyloid-PET imaging, clinical characterization of cognitive status, and neuropsychological testing. In a prior study, the MSADRC assessed amyloid status in non-Hispanic White, Hispanic, Black, Asian, and other research participants. Participants completed the Unified Data Set (UDS) and amyloid imaging from 2011-2019. The UDS includes a neuropsychological battery that assesses how memory disorders affect cognitive abilities. The study assessed data from a sample of 186 participants. Results showed that the rate of amyloid positivity was lower in minority cohorts despite poorer cognitive performance. This study aimed to assess whether results of amyloid imaging predict different cognitive trajectories, measured by longitudinal change in clinical diagnosis and neuropsychological scores in cognition, in cohorts with racial and ethnic diversity. Data were selected from the MSADRC's original sample. Only participants who completed two or more annual cognitive assessments were included. The current study includes data from a sample of 119 participants. Primary outcomes were baseline to last visit change in: (1) Clinical Dementia Rating (CDR) Global Score and (2) clinical diagnosis. The relationship between primary outcomes and ethnicity, and the relationship between primary outcomes and amyloid positivity for the total sample and ethnic subsamples were assessed. Baseline analysis revealed a significant difference in amyloid positivity across ethnic groups (p<0.01). There was an association between change in CDR Global Score and ethnicity, with NH White participants worsening more than other groups (p<0.05). Within subsamples, amyloid status and change in CDR were associated for both NH White (p.004) and NH Black participants (p<0.001). Amyloid status and deterioration in diagnosis were associated for NH white (p<0.05), but not NH Black (p 0.284). These preliminary results suggest differences in rate of cognitive decline by ethnicity and amyloid status. Race and ethnicity are social constructs without biological basis. Therefore, to improve understanding of AD overall, these differences must be further explored, and more complex etiologies of cognitive decline considered.

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NEUROLOGY AND NEUROSURGERY

Investigating the Effects of Cardiopulmonary Bypass on Structural Networks of the Neonatal Piglet Brain using Connectome Analysis

Newborns and infants with congenital heart disease (CHD) are now living longer and healthier because of the advancement in surgical techniques and medical care. However, necessary cardiopulmonary bypass (CPB) surgery can cause systemic inflammatory responses and reperfusion/reoxygenation injury, leading to delays in neurodevelopment. While cellular analysis is commonly used in detecting microstructural changes to study brain development and abnormalities, it is often limited to whole-brain analysis. Connectome analysis, on the other hand, is considered an efficient and unbiased method to quantitatively investigate whole-brain development, neurodevelopmental disorders, as well as the effects of intervention. This study aims to investigate the impact of CPB on the neonatal piglet brain using structural connectome and network analysis. Healthy two-week-old Yorkshire piglets were designated for one of two surgical groups: no intervention (control) and CPB surgery via ascending aortic perfusion with right atrial drainage. High-resolution diffusion tensor images (DTI) were collected from each of the piglets 4 weeks post-treatment. Tractography was performed on denoised DTI scans to reconstruct whole-brain fibers using MRtrix3 software. Whole-brain fibers were then registered to an in-house 3D piglet brain atlas with 68 individual regions to generate brain connectivity matrices. The resulting matrices were analyzed using graph theory by the MATLAB Brain Connectivity Toolbox for global, intermediate, and local characteristics. Global characteristics such as clustering coefficients, small-world indices, global efficiency, local efficiency, and network density were extracted. We found that the global clustering coefficients differ significantly between the random and biological networks in both the control (p<0.001) and CPB datasets (p<0.0001). We compared the global and local efficiency of our samples' biological networks to random networks and a rigid lattice. Similar to the clustering coefficient, both global and local efficiency followed the expected trend which suggests the high capacity for exchanging information in the brain networks. For intermediate measurements, there was no significant change between the rich club coefficients between the two conditions. Local measurements showed that there was more dynamic activity in the following regions in normal groups compared to the CPB group: basal ganglia, hippocampus, visual cortex, and frontal cortex. With these findings, connectome analysis can be established as an unbiased approach to observing whole-brain connectivity and neurodevelopment. For future works, our team has shown that intra-arterial infusion of mesenchymal stromal cells derived from bone marrow (BM-MSC) can mitigate oxidative stresses. Local network analysis will be done to investigate its effects on brain connectivity.

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NEUROLOGY AND NEUROSURGERY

Combined Neuroinflammatory & Neurovascular Molecular Screening for Early Detection of Blood-Brain Barrier (BBB) Dysfunction in Patients with Traumatic Brain Injury (TBI) at risk of Neurocognitive and Neurological Disorders

Traumatic brain injury can cause cerebrovascular impairment and Blood-Brain Barrier (BBB) dysfunction, which in turn can lead to neuronal cell death, and axonal damage, as well as gliosis and neuroinflammation. In this study the blood level of a comprehensive panel of neurovascular biomarkers associated to BBB impairment and leaky brain were tested in patients with traumatic brain injury and various levels of brain injury to determine if BBB biomarkers, measured early after injury are detectable prior to neuro-imaging traits of neurological damage, and are helping to reclassify patients by their level of agreement or disagreement between the patient's clinical profile, neurovascular biomarkers, and neurocognitive and behavioral disorders. In addition, if the BBB biomarker panel is predicting brain injury level -improving prediction compared with Glasgow Coma Scale alone-, neurocognitive and behavioral disorders (delirium, etc.), mortality and clinical/radiologic outcomes, and enhancing psychiatric disorders in vulnerable patients with underlying neuropathogenicity, such as Long COVID, encephalopathy, gut dysbiosis, cerebral small vessels disease, behavioral and neuropsychiatric disorders, and stroke. Multiplexed sandwich immunoassays, based on flowmetric Luminex[™] xMAP technology were conducted. Assays were carried out on a Luminex 100 Bio-Plex Platform to determine blood levels of BBB protection molecular biomarkers (including Pigment epithelium-derived factor, Osteopontin, Brain-derived neurotrophic factor, Neural cell adhesion molecule (NCAM), Growth differentiation factor-11, Fibroblast growth factor-21, AGP-Orosomucoid, Interleukin-10, Lactadherin, alpha-2 Macroglobulin, Kallistatin and Melatonin), and Blood-brain barrier disruption molecular biomarkers (including Contactin-1, Kallikrein-6, Soluble receptor for advanced glycation endproducts, Neurogranin, Fetuin-A, Serum Amyloid Protein, Angiotensinogen, Myeloperoxidase, Cathepsin D, Plasminogen activator inhibitor-1, RANTES/CCL5, Soluble ICAM-1, Soluble VCAM-1, Interleukin-18, Interleukin-6, Glial cell line-derived neurotrophic factor, PDGF-AB/BB, and S100B).

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NEUROLOGY AND NEUROSURGERY

Establishing the Feasibility of EEG Gamma Power as a Biomarker in Dravet Epilepsy

Context Dravet syndrome is one of the best described monogenic drug-resistant epilepsies, and is caused by SCN1A variants. It is the target for new antiepileptic drug development and gene therapies. However, disease-specific biomarkers are needed to identify which of these compounds demonstrate successful target engagement. We aim to test whether gamma power (30-80 Hz) can be reliably measured from scalp EEG and whether there are differences between gamma power in participants with and without Dravet syndrome. Design Scalp ambulatory EEG was performed for 24 hours on participants with Dravet syndrome. A second 24-hour EEG was performed approximately six weeks later based on participant availability. Gamma frequency band was defined as frequencies between 30 and 80 Hz, excluding activity at 60 Hz due to environmental electrical artifact. Two five-minute segments of similar sleep stages were taken from each participant and non-Dravet epilepsy patients. Intrasubject comparisons were performed, and comparisons were then made among participants with Dravet syndrome and the healthy controls and non-Dravet epilepsy subjects. Setting and Participants EEGs were performed at a Level 4 Pediatric Epilepsy Center by certified electroneurodiagnostic technicians. EEGs were interpreted by a board-certified Epileptologist (MT, AR). Participants were recruited from Boston Children's Hospital with referrals from clinical faculty within the Division of Epilepsy and the Neurogenetics program. Four patients with Dravet syndrome were enrolled, 2 withdrew after the first EEG was completed, with a total of six 24-hour EEGs collected. EEGs from two age-matched non-Dravet epilepsy subjects and ten healthy controls were also analyzed. Outcome Measures Primary outcome measure was total gamma power per sleep segment per EEG, as a raw and normalized measurement. Power was calculated using EDFBrowser software. Differences in gamma power between sleep segments per EEG, across subjects, and compared to healthy controls and non-Dravet epilepsy subjects were calculated. ANOVA, t-tests, and linear regression were utilized. Results There was poor test-restest reliability of raw and normalized gamma power between sleep segments within an EEG and across the 2 time points for a given participant. Sleep EEG was used to reduce the likelihood of myogenic artifact falsely inflating gamma frequency band power. Unreplicated gamma power increases were noted in 2 patients. No significant difference in raw or normalized gamma power was identified between EEGs of patients with Dravet syndrome and age-matched controls or non-Dravet epilepsy subjects. No correlation was present between gamma power and age among any of the three groups.

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NEUROLOGY AND NEUROSURGERY

The Relationship Between Plexin A and Corpus Callosum Development

The corpus callosum (CC), one of the largest fiber tracts in the brain, is responsible for the coordinated transfer of information between the left and right cerebral hemispheres and is essential for higher associative and cognitive processes. Agenesis of the CC (AgCC) - complete or partial absence of the CC - is associated with several congenital syndromes, affecting an extensive range of neurologic disorders and cognitive deficits. More subtle alterations have been attributed to disruptions of executive function, emotional regulation, and higher cognitive function, all of which are implicated in neurological and psychiatric disorders including Autism Spectrum Disorder (ASD). This project will focus on the underlying mechanisms that perpetrate corpus callosum malformation, specifically the relationship between Plexin-A4, a CC caspase inhibitor, and development of ASD. Because Snd1 gene upregulation is associated with increased Plexin-A gene upregulation as well, my project focused on the implications of Snd1 expression in CC development in relation to Plexin A4.

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OBSTETRICS AND GYNECOLOGY

Acceptability of Intramuscular Injection of Tranexamic Acid in Postpartum Hemorrhage Prevention

BACKGROUND: Newer research comparing routes of medication administration has extended beyond efficacy as a primary endpoint to incorporate patient preference. However, little is known about the preference of pregnant women towards routes of medication administration, specifically with regards to hemorrhage prevention and control. OBJECTIVE: To understand the preference of pregnant women for medical interventions to prevent hemorrhage at the time of delivery. STUDY DESIGN: Surveys were distributed from April to September 2022 using electronic tablets at a single urban center with an annual delivery volume of 3,000 women per year to >18 year old women who are either currently pregnant or have been pregnant in the past. Subjects were asked to choose their preferred route of administration from the following options: intravenous (IV), intramuscular (IM), or subcutaneous (SC). The primary outcome was patient preference towards the route of medication administration during a hemorrhage event. RESULTS: The study cohort included 300 patients, mostly African American (39.8%), followed by Caucasian (32.1%), with the majority of the participants ranging from 30-34 years of age (31.7%). When asked which method of administration they would prefer to prevent hemorrhage before birth, the results were as follows: 31.1% IV, 23.0% no preference, 21.2% unsure, 15.9% SC, and 8.8% IM. Additionally, 69.4% of respondents reported that they have never declined or avoided IM administration of medication if recommended by their physician. CONCLUSION: Although some survey participants prefer IV route of administration, 68.9% of subjects were unsure, had no preference or prefer non-IV routes. This information is helpful particularly in low resource settings, where IV is not readily available, or in urgent clinical situations where IV is not easily obtainable in high-risk patients.

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OBSTETRICS AND GYNECOLOGY

Correlation of Non-Invasive Hemoglobin Measurement with Bleeding During Cesarean Delivery: The PPHgb Study

Background: Early recognition of postpartum hemorrhage (PPH) and decision to transfuse is challenging. Noninvasive hemoglobin measurement (SpHb) offers point of care hemoglobin measurements that may demonstrate acute changes in blood loss for early intervention. Objectives: Our primary objective was to assess the association between clinically meaningful change in SpHb from the start of surgery and the decision to intervene. Our secondary objective was to compare the pre and postoperative SpHb with standard laboratory hemoglobin (Hgb). Methods: This was a prospective, observational study of 66 women during non-urgent cesarean delivery (CD) at George Washington University Hospital from 2020-2022. We included women 18-50 years old with CD at >34 weeks. Logistic regression compared those with >20% decrease from first SpHb after the start of surgery and risk ratio (RR) and 95% confidence intervals (CI) were calculated for receiving interventions and for experiencing PPH. Pre and postoperative SpHb and Hgb values were compared using t-tests. Results: Mean age of participants was 35.0 years. Twelve women received intervention to reduce bleeding during CD, which included more than the two standard doses of oxytocin, misoprostol, carboprost, methergine, and/or tranexamic acid. Thirteen women progressed to PPH, five with early intervention for bleeding. Women with >20% decrease in SpHb from the start of surgery compared to those without >20% decrease had a RR of 2.88 (95%CI: 1.07-7.74) for receiving intervention during CD and RR of 2.36 (95% CI: 0.93- 6.06) for experiencing postpartum hemorrhage. Mean preoperative SpHb (14.13 g/dL) was 2.43 g/dL higher than the mean preoperative Hgb (11.73 g/dL), (p< 0.001) and mean postoperative SpHb (13.34 g/dL) was 3.5 g/dL higher than postoperative Hgb (10.0 g/dL), (p< 0.001). Conclusions Our data suggest that hemoglobin measures collected continuously during surgery may provide earlier indication for intervention than pre and postoperative lab measurements alone. Pre and postoperative measurements of SpHb were significantly higher than Hgb, suggesting that device hemoglobin may not be reflective of the current gold standard hemoglobin value.

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OBSTETRICS AND GYNECOLOGY

Geospatial Analysis of Postpartum Hemorrhage

Postpartum hemorrhage is the leading cause of maternal mortality and is widely considered to be a significant cause of preventable pregnancy mortality. In the US, maternal mortality rates are increasing among non-Hispanic Black women compared to the general population, and risk factors for mortality in postpartum hemorrhage are also increased in the non- Hispanic Black population. Thus, insight into social determinants that may be underlying these rising trends could be instrumental in lowering these maternal morbidity and mortality rates. This project aims to identify and map out the rates of postpartum hemorrhage throughout the country based on data from the National Inpatient Sample (NIS), which contains records of millions of hospital stays per year. NIS postpartum hemorrhage data from the years 2000-2015 has been cleaned and analyzed in Python to obtain counts of postpartum hemorrhage morbidity and mortality. These counts were stratified into the rural-urban categories for each census year. As a result, there are raw counts of postpartum hemorrhage morbidity and mortality rates for each census year 2000-2015, stratified by urban-rural status. Weighting the NIS data is necessary to produce regional and national estimates of trends; the data for this project was not weighted, and thus these morbidity and mortality estimates are not fully representative. Future studies can incorporate the methodology of this project while using weighted data to produce representative estimates.

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OPTHALMOLOGY

A Case Series of Polytetrafluoroethylene Scleral Suture Erosions and Failure of Pericardial Graft Revision

Purpose To report three cases of exposed polytetrafluoroethylene scleral sutures (Goretex, W. L.Gore & Associates, Flagstaff, AZ, USA) for sutured intraocular lenses and their management, including failure of pericardial patch and success of irradiated corneal patch. This series aims to inform management options for this uncommon adverse event. Methods Retrospective case series of three patients who were followed at a tertiary care center following 25-gauge pars plana vitrectomy (PPV) with an intraocular lens (IOL) sutured through the sclera using off-label polytetrafluoroethylene sutures, with eventual exposure of scleral sutures and subsequent revision with a pericardial graft. Chart review was conducted to assess past ocular history, operative technique for the lens fixation surgery, time from this surgery to suture exposure, subsequent management including pericardial patch graft, and long-term outcomes. Literature review was performed to assess published management techniques for this complication. Results Patients were followed for an average of 43.8 months following scleral IOL fixation. In each case, polytetrafluoroethylene scleral sutures were tied and left loose, without burying or rotating knots, and covered with conjunctiva. Patients presented at 1, 9 and 13 months postoperatively with exposed scleral sutures. Pericardial patches showed signs of failure after 2 months, 3 months, and 6 months. One patient underwent further revision with irradiated corneal graft with still successful outcome at 15 months, one had concomitant severe scleromalacia due to previous pterygium surgery and required IOL explantation. The third patient was lost to followup for two years, sutures remain exposed. Conclusion In three cases, pericardial patch grafting was an ineffective solution for polytetrafluoroethylene suture exposure. Possible risk factors for suture erosion were surgical history and loose scleral knots. Irradiated corneal patch graft may be a good option to avoid IOL explantation.

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OPTHALMOLOGY

The Effect of Selective Laser Trabeculoplasty in Patients with Angle Recession Glaucoma

Purpose: Selective laser trabeculoplasty (SLT) is a commonly used primary or adjunctive therapy in glaucoma to lower intraocular pressure (IOP). Currently, there is no consensus on whether SLT is safe and effective in decreasing IOP in eyes with ARG. Our study investigates the pre-vs post-operative change in IOP in a patient's treated and untreated eye within 12 months after receiving SLT. Methods: Patients receiving SLT at the George Washington University Hospital between January 1st, 2008, to January 1st, 2022 were retrospectively queried. Pre- vs post-SLT IOP and the number of medications in each eye were analyzed using a paired samples t-test. Patients were excluded if they did not have SLT done on the eye with ARG, did not have an ARG diagnosis, or received surgery during the 12-month follow-up period. Treatment success was defined as an IOP reduction greater than or equal to 20% of the baseline IOP level after SLT and was calculated at each time point for the untreated eye. Results: A total of 9 cases were included in this study. Case 5 and 9 were excluded from the t-test at months 6 and 12 (surgical intervention) and month 12 (lost to follow-up), respectively. Mean IOPs for the SLT treated eyes at baseline, 6-week, 6-month, and 12-month visits were 20 ± 6.22 mmHg, 17.39 ± 5.11 mmHg (P > 0.05), 17.88 ± 5.93 mmHg (P > 0.05), and 17.29 ± 6.62 mmHg (P > 0.05), respectively. For the same time points, the mean IOP for the untreated eyes were 15 ± 3.28 mmHg (P > 0.05), 16 ± 5.66 mmHg (P > 0.05), $13.81 \pm 4.29 \text{ mmHg}$ (P > 0.05), and $14.29 \pm 3.77 \text{ mmHg}$ (P > 0.05), respectively. The number of medications did not change. Conclusions: SLT can produce a greater than 20% decrease in IOP in both the treated eye with ARG and untreated eye without ARG for up to 1 year after treatment. While the average IOP decreased during the 6 week, 6 month, and 12-month follow-up visits post-SLT, this reduction was not statistically significant as a cohort. This report differs from previous research in showing safety and efficacy in decreasing IOP in not only the ipsilateral eye but also the contralateral eye after SLT. This study also improves on the previous study's external validity. There were 9 patients (previously 4) who had diverse backgrounds (African American (66.7%), Caucasian (22.2%), Hispanic/Latino (11.1%)) (previously unreported).

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ORTHOPEDIC SURGERY

Genetic Variation in Vitamin-D Binding Protein (VDBP) rs4588 Influences Musculoskeletal Phenotypes

Introduction: Several authors including Rozmus 2022, Pekkinen 2014, Palmer 2021, and Bevilacqua 2021 have found associations between genetic variant VDBP rs4588 and bone mineral density in pediatrics and adults. The goal of this project was to explore the range of musculoskeletal phenotypes impacted by this variant. Methods: Cohorts: The Functional Single Nucleotide Polymorphism Associated with Human Muscle Size and Strength (FAMuSS) cohort was comprised of Caucasians (n=377; 147 male, 230 female; ages 17-40) who participated in non-dominant arm 12-week resistancetraining program. The Assessing Inherited Markers of Metabolic Syndrome in the Young (AIMMY) cohort was comprised of Caucasians from University of Calgary (n=153; 83 males, 70 females; ages 18-35) and African Americans from Howard University (n=77; 21 males, 56 females; ages 18-25). Genotyping: This study used Applied Biosystems QuantStudio 7 Flex Real-Time PCR System and Applied Biosystems Taqman Allelic Discrimination Assays to genotype DNA samples. Phenotypes: FAMuSS: height, BMI, isometric strength, one-repetition maximum strength, whole-arm volume, wholemuscle volume, total bone (+marrow) volume, cortical bone volume, marrow volume. AIMMY: height, weight, BMI, right and left grip strength, maximum grip strength, VO 2 max, total MET hours/week, total PA index, total BMD. Statistical Analysis: All SNPs were tested for Hardy Weinberg equilibrium (HWE) with age and weight covariant adjustments. Analysis of covariance (ANCOVA) using additive genetic models determined associations among SNP genotypes and musculoskeletal phenotypes. For analyses with significant ANCOVA model, post-hoc pair-wise comparisons were performed, and the resulting p-value adjusted for multiple comparisons using Sidak method. IRB: This study was approved by the Children's National Hospital IRB. Results: FAMuSS: rs588 was found to be in HWE and significantly associated with baseline isometric strength of dominant arm in females (p=0.024). In males, phenotypes were associated with baseline whole-arm volume in dominant (p=0.031) and non-dominant arm (p=0.012), post whole-arm volume in dominant (p=0.045) and non-dominant arm (p=0.039), baseline whole-muscle volume in dominant (p=0.012) and non-dominant arm (p=0.012), and post whole-arm muscle volume in dominant (p=0.018) and nondominant arm (p=0.035). In all associations, the TT genotype was associated with greater size and strength. AIMMY: rs4588 was not found to be in HWE in either subcohort. Discussion: This study found associations between VDBP gene variants in rs4588 SNP in FAMuSS cohort, but not AIMMY cohort. Males and females had associations with arm volume, but only females had associations with strength, indicating a sexually dimorphic impact on genetic variation, which prior studies have not shown before.

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ORTHOPEDIC SURGERY

Amyloidosis and Carpal Tunnel Syndrome: A Database Study of Associated Risk Factors and Comorbidities

Immunoglobulin light chain and transthyretin systemic amyloidoses are diseases of protein misfolding that can result in protein accumulation. If these proteins accumulate in the carpal tunnel, this can result in carpal tunnel syndrome (CTS), a compressive neuropathy of the median nerve. The aim of this study was to investigate which patient specific factors in those diagnosed with CTS suggest that the compression may be due to accumulation of amyloid proteins, as evidenced by a later diagnosis of amyloidosis. Patients with a diagnosis of carpal tunnel syndrome or those underwent carpal tunnel release (CTR) from 2010 to 2020 were identified using the PearlDiver Database and stratified based on whether they had a later diagnosis of amyloidosis. Patients were identified using Current Procedural Terminology and International Classification of Disease codes. Patients were then further stratified into age and gender cohorts to analyze trends of initial CTS onset. Pearson chi-squared analysis was used to compare comorbidities in patients with CTS who later developed amyloidosis to patients with CTS without a diagnosis of amyloidosis. Of 689,975 patients with CTS identified,5,454 (0.76%) were later diagnosed with amyloidosis and comprised the amyloidosis cohort. Age stratification within gender divisions showed that in the amyloidosis cohort, most men were aged 60 years or older at the onset of CTS, and most women were between the ages of 40-59 at the onset of CTS. Comorbidity analysis demonstrated that, compared to the control cohort, the amyloidosis cohort had a five-fold higher incidence of lymphoma, a two-fold higher incidence of cancer, a two-fold higher incidence of pulmonary circulation diseases, a three-fold higher incidence of coagulopathy, and higher incidences of cardiac comorbidities, among others. Our study demonstrated that amongst all patients presenting with carpal tunnel syndrome, those who are men aged 60 or older, women aged 45-59, or who present with additional comorbidities including lymphoma, pulmonary circulation diseases, coagulopathy, and cardiac comorbidities are more likely to later be diagnosed with amyloidosis. Presence of these patient demographics may suggest that the CTS symptoms are caused by amyloid protein deposits in the carpal tunnel. Physicians may consider obtaining a biopsy in this patient population to potentially diagnose a patient's amyloidosis prior to the development of end organ symptoms. Implementation of this strategy offers the opportunity for early diagnosis and intervention of systemic amyloidoses, improving patient health and safety, and reducing economic burden on the healthcare system.

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ORTHOPEDIC SURGERY

Peripheral Nerve Blocks Associated with Reduced Hospital Length of Stay and Increased Likelihood of Home Discharge After Pilon Fracture Fixation

Introduction: Peripheral nerve blocks have been increasingly incorporated into postoperative multimodal pain control regimens in recent years, mainly in the context of arthroplasty, secondary to their capacity to allow earlier mobilization and shorter length of hospital stay. Early mobilization can prevent post-operative stiffness, posttraumatic arthritis, deep vein thrombosis, and pulmonary complications. The goals of this study are to examine the impact of peripheral nerve blocks on hospital length of stay (LOS) and location of discharge after operative treatment of pilon fractures. Methods: Patients who sustained pilon fractures from 2010 to 2020 were identified through the PearlDiver Database using current procedural terminology and international classification of disease codes. Patients were stratified according to nerve block (sciatic versus femoral) and the type of fracture (open versus closed). Discharge locations were stratified into home versus secondary facilities. Univariate analysis was conducted on demographic characteristics, comorbidities, and discharge location using Pearson chi-square analysis or analysis of variance (ANOVA). If a postoperative outcome was significant on univariate analysis (p <0.05), a multivariable analysis using logistic regression was conducted to adjust for demographics and comorbidities (P<.2) as possible risk factors. Results: In total, 16,204 patients sustained pilon fractures (2,313 open and 13,891 closed). 3,433 patients received a sciatic nerve block and 2,981 received a femoral nerve block. Demographic information is displayed in Table 1. Univariate analysis demonstrated that all patients with a pilon fracture who received any peripheral nerve block had lower length of stay compared to those who did not (p<0.001; Table 2). Additionally, univariate analysis demonstrated that patients with pilon fractures who received any form of peripheral nerve block were more likely to be discharged home (p<0.001; Table 2). When stratified into open vs. closed fractures, patients with a closed pilon fracture who received a peripheral nerve block were more likely to be discharged home (p<0.001; Table 2). Multivariable analysis confirmed that patients with closed pilon fractures who received a peripheral nerve block had a higher likelihood of being discharged home (p<0.001). Conclusion and Discussion: Among patients with pilon fractures, those with perioperative nerve blocks had shorter LOS. Additionally, patients with closed pilon fractures that had a perioperative nerve block were more likely to discharge to home. Orthopedists should consider peripheral nerve blocks for tibial plafond fracture surgery, as reducing LOS and the need for skilled rehabilitation prevents adverse outcomes and reduces healthcare costs. Randomized trials and prospective studies need to confirm these results.

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ORTHOPEDIC SURGERY

The Effect of Diabetes Mellitus on Total Ankle Arthroplasty Outcomes

Introduction: The utility of total ankle arthroplasty (TAA) for management of endstage ankle arthritis continues to increase. Postoperative infection after TAA is a devastating complication, leading to additional surgeries, hospitalizations, long term antibiotics, arthrodesis and sometimes amputation. Diabetes has been shown to be associated with postoperative infections following other orthopedic procedures. While the majority of literature demonstrates an association between diabetes and post-operative complications following TAA, other studies have demonstrated no such association. The goal of this study was to determine if diabetes influences the outcomes following TAA. Methods: An insurance database was utilized to identify patients undergoing TAA for end-stage ankle arthritis with a concurrent diagnosis of diabetes based on CPT, ICD-9, and ICD-10 diagnosis and procedure codes from 2010 to 2015. The postoperative outcomes of hospital readmission, prosthetic loosening, revision procedure, periprosthetic joint infection, and manipulation under anesthesia were compared between diabetic and nondiabetic patients with a 5 year follow up. Patient demographics, comorbidities, and Charlson Comorbidity Index was queried and analyzed via univariate and multivariate analysis. Results: The study population included 3,576 patients who underwent TAA, 647 of which had a concurrent diagnosis of diabetes, with a minimum of 5 year follow up from 2010 to 2015. After multivariate analysis, diabetes was associated with an independently associated increased risk for 90day hospital readmission (OR= 3.81, p<0.01), 90-day surgical site infection (OR 10.19, P <0.001), and 5-year risk of periprosthetic joint infection (OR= 3.26, P=0.03). Conclusions: The incidence of post-operative complications, including increased risk of 90-day hospital readmission, 90-day surgical site infection, and 5-year risk of periprosthetic joint infection, was higher among diabetic patients compared to nondiabetic patients.

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ORTHOPEDIC SURGERY

Association of Prior Fragility Fractures on 8-Year Periprosthetic Fracture Risk Following Total Hip Arthroplasty

Background: Fragility fractures are often the initial clinical presentation of osteoporosis. Patients who have a history of fragility fractures undergoing total hip arthroplasty (THA) have an increased risk of 2-year postoperative complications. However, the association of recent fragility fractures with complications beyond 2 years following THA remains unknown. The purpose of this study was to characterize the association of prior fragility fractures with 8-year risks of revision THA, periprosthetic fracture, and secondary fragility fracture. Methods: Patients 50 years of age and older who underwent THA for osteoarthritis were identified in a large national database. Patients were stratified based on whether they sustained a fragility fracture within three years prior to THA. There were 18,529 patients who had a prior fragility fracture and 408,753 who did not have a prior fragility fracture. Demographics and comorbidities were collected. Kaplan-Meier and Cox Proportional Hazards analyses were used to observe the cumulative incidences of all cause revision, periprosthetic fracture, and secondary fragility fracture within 8 years of index surgery. Results: Patients who had a prior fragility fracture showed significantly higher incidences of revision THA (4.1 vs. 2.5%), periprosthetic fracture (4.4 vs. 1.7%, and secondary fragility fracture (36.3 vs. 9.5%; p<0.001 for all). After adjusting for covariates, patients who had recent fragility fracture had significantly higher risks of revision THA (Hazard Ratio (HR) 1.7; p<0.001), periprosthetic fracture (HR 2.2; p<0.001), and secondary fragility fracture (HR 4.9; p<0.001). Conclusion: Prior fragility fracture was shown to be a significant risk factor for revision THA, periprosthetic fracture, and secondary fragility fracture within 8 years of THA. Identification of these high-risk patients with an emphasis on preoperative and postoperative bone health optimization may help minimize these complications.

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Periprosthetic Fracture Rates Using Collared Stems in Uncemented Primary Total Hip Arthroplasty with a Posterior Approach

Background Periprosthetic femur fracture (PFF) is a major complication following total hip arthroplasty (THA) that carries significant morbidity, mortality, and economic burden. Uncemented femoral stems are highly preferred in primary THA, but have been associated with higher risk of PFF compared to cemented stems. Collared stems have shown promise in reducing PFF rates following primary THA when compared to collarless stems, while maintaining a similar prosthetic design. Thus, the purpose of this study is to investigate PFF rates after uncemented primary THA among two surgeons at one institution who switched from using collarless stems to collared stems at a similar point in time. Materials and Methods This retrospective study included 2,294 uncemented primary THAs using the posterior approach performed by two attending surgeons from January 2016 to December 2022. Both surgeons switched from a collarless femoral stem design to a collared design in May 2020. Data was collected regarding stem design, frequency of PFF, and requirement for revision surgery. Periprosthetic fractures were identified and confirmed using medical records and/or radiographic imaging. Fracture rates and percentages between collared and collarless stems were then analyzed. A Fisher's Exact Test was performed to determine if there was a significant association between collared and collarless stem use on PFF rates. Results A total of 2,294 uncemented primary THAs performed by 2 surgeons were eligible for analysis. 903 (39.4%) patients received a collared stem, and 1,391 (60.6%) patients received a collarless stem. In total, 14 (0.6%) PFFs occurred over the study period. There was 1 fracture (0.1%) out of 903 collared stems, and 13 fractures (0.9%) out of 1,391 collarless stems (p = 0.012). Conclusion Collared stems were associated with a significant decrease in PFF rate when compared to collarless stems in uncemented primary THA. Future studies are encouraged to continue to investigate PFF and other complication rates with the use of a collared stem design.

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ORTHOPEDIC SURGERY

Isolated Liner Exchange and Bone Grafting for the Management of Periacetabular Osteolysis in Well-Fixed Cups with an Intact Locking Mechanism at Short- to Medium-Term Follow-Up: A Systematic Review

Background Polyethylene liner exchange and bone grafting is an effective surgical option for the management of periacetabular osteolysis following total hip arthroplasty with well-fixed cups and intact liner locking mechanisms. No systematic review of the literature to date has evaluated the revision-free survivorship and radiographic lesion progression after liner exchange. Methods Medline, EMBASE and Cochrane Library were queried for articles published from January 1999 to January 2023 using: "osteolysis" AND "well-fixed", "osteolysis" AND "retro-acetabular", "bone graft" AND ("retention" OR "retained" OR "stable") AND "cup", and "cemented liner" AND "well-fixed." Quality assessment for each study was calculated using the Modified Coleman Score. Results 9 articles were included (227 cases, mean follow-up time 43.6 months). The overall cup revision rate after liner exchange was 6.6% (15 hips) due to progressive liner wear or osteolysis (5 hips), aseptic loosening of the acetabular component (5 hips), dislocation (4 hips), and periprosthetic infection (1 hip). There was either radiographic resolution or regression of periacetabular osteolysis in all reported cases that provided measurements (52 hips) except 1 requiring revision. All studies reporting on clinical outcomes indicated improved pain and functional scores. Conclusion Isolated liner exchange with bone grafting for the management of periacetabular osteolysis was associated with a high revision-free survival rate (93.4%) and minimal radiographic progression (1.9%) of osteolytic lesions at short- to medium-term follow-up. Liner exchange with bone grafting is recommended for the management of large sized periacetabular osteolytic lesions (>450 mm2) in a wellfixed acetabular cup. We encourage future studies to develop a grading scale for lesions to better guide the clinical management and risk stratification for patients.

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THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY CLINICAL AND TRANSLATIONAL RESEARCH

ORTHOPEDIC SURGERY

Revision Rate Following Posterior and Anterior Lumbar Fusion Based on Age

Lumbar fusion is commonly performed for degenerative disc disease of the lumbar spine. While these procedures typically have satisfactory outcomes, revision surgery carries significant morbidity. Age is a patient characteristic that may contribute to the need for revision surgery. This study aimed to determine 1-year and 2-year revision rates for posterior and anterior lumbar fusion in different age cohorts. Data was collected using the PearlDiver Patient Records Database from 2010 to 2019. Patients who underwent posterior or anterior lumbar fusion were identified using Current Procedural Terminology codes. We defined a revision procedure as another lumbar fusion performed after 30 days from the initial procedure. Stratum specific likelihood ratio analysis was performed within each cohort to determine age intervals corresponding to increased revision rates. Patients in the posterior lumbar fusion cohort were divided into three cohorts: 18-40 years, 41-62 years, and 63-80 years. Patients in the anterior lumbar fusion cohort were divided into three cohorts: 18-44 years, 45-50 years, and 51-80 years. The youngest age interval in each cohort was used as the control group for further statistical analysis. In total, 175,567 patients who underwent posterior lumbar fusion were identified. Of these, 13,947 patients (7.94%) were between 18-40 years, 73,434 (41.83%) between 41-62 years, and 88,186 (50.23%) between 63-80 years. Patients in the 41-62 years and 63-80 years cohorts were found to have decreased odds of 1-year revision ([OR: 0.726; 95% CI: 0.649-0.813; p<0.001), [OR: 0.512; 95% CI: 0.446-0.587; p<0.001]) and 2-year revision ([OR: 0.731; 95% CI: 0.665-0.803; p<0.001], [OR: 0.476; 95% CI: 0.425-0.534; p<0.001]) compared to the 18-40 years cohort. For the anterior fusion cohort, there were 40,147 patients who underwent anterior lumbar fusion identified. Of these, 9,859 patients (24.55%) were between 18-44 years, 5,611 (13.98%) between 45-50 years, and 24,677 (61.47%) between 51-80 years. Patients in the 45-50 years and 51-80 years cohorts had greater odds of 1-year revision ([OR: 1.164; 95% CI: 1.024-1.323; p<0.001], [OR: 2.388; 95% CI: 2.176-2.624; p<0.001]) and 2-year revision ([OR: 1.183, 95% CI: 1.051-1.332; p=0.005, [OR: 2.188; 95% CI: 2.005-2.391; p<0.001]). Our data shows older patients undergoing posterior lumbar fusion had a lower likelihood of needing revision surgery following the initial procedure. Older patients undergoing anterior lumbar fusion had a higher likelihood of needing revision surgery. Further investigation should be done to determine reasons for revision and compare rates of revision within the same age group between the two fusion techniques.

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Why are we Giving Additional Parenteral Antibiotics to Non-ambulatory Cerebral Palsy Patients with Isolated Acute Post-operative Fevers Following Posterior Spinal Fusion?

Introduction Children with neuromuscular scoliosis secondary to cerebral palsy (CP) are at a heightened risk for complications following surgical treatment. The purpose of this study is to evaluate post-operative fevers in non-ambulatory (GMFCS IV and V) CP patients after posterior spinal fusion (PSF) for scoliosis. Methods A retrospective review in a single-center was performed for children with non-ambulatory CP (GMFCS IV and V) undergoing PSF for scoliosis. Independent chart review was performed to characterize maximal temperatures recorded during the hospital stay. Postoperative fever was defined as temperature >38°C. Patient, surgical, and postoperative variables were collected including additional imaging studies, labs, antibiotics, and antibiotic related complications prescribed as result of a documented fever. Univariate and multivariate analyses were performed. Results 122 non-ambulatory (GMFCS IV and V) CP children were included in the study (82% GMFCS V, mean 14.3 years (+/- 3.4 years) at time of surgery). Post-operative fever was documented in 92 patients (75.4%) reaching a mean 38.5°C on post-operative day 1.67 (+/- 1.3 days). A fever resulted in 138 additional CBC panels, 88 chest radiographs, 47 CRP panels, 28 blood cultures, and 6 urine cultures. Of the added culture studies, 100% reported negative results. Twelve children were administered additional or new parental antibiotic therapy for a mean of 7 days after completion of peri-operative antibiotics. One patient sustained an acute renal injury from Vancomycin toxicity. GMFCS V patients experienced post-operative fevers at a higher rate than GMFCS IV patients (83.2% vs 61.9%, p=0.03). The presence of a postoperative fever resulted in longer length of hospital stay but not statistically significant (4.8 days vs 7.3 days, p=0.08). Readmission within 90 days of surgery occurred in 15.6%, at a mean 27.6 days and was statistically associated a pulmonary complication (47.4% vs 24.3%, P=0.039), which was independently predictive of readmission (odd's ratio 2.8, P=0.044). Conclusion GMFCS IV and V CP patients undergoing posterior spinal fusion have a 75% rate of developing fevers in the acute post-operative period. In the setting of an immediate post-operative fever in isolation, reflexive work-up and empiric antibiotics provide limited utility but can expose the patient to antibiotic related complications.

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Paraspinal Muscle Gene Expression Across Different Aetiologies in Individuals Undergoing Surgery for Lumbar Spine Pathology

Purpose: The purpose of this study was to understand potential baseline transcriptional expression differences in paraspinal skeletal muscle from patients with different underlying lumbar pathologies by comparing multifidus gene expression profiles across individuals with either disc herniation, facet arthropathy, or degenerative spondylolisthesis. Methods: Multifidus biopsies were obtained from patients (n = 44) undergoing lumbar surgery for either disc herniation, facet arthropathy, or degenerative spondylolisthesis. Diagnostic categories were based on magnetic resonance images, radiology reports, and intraoperative reports. Gene expression for 42 genes was analysed using qPCR. A one-way analysis of variance was performed for each gene to determine differences in expression across diagnostic groups. Corrections for multiple comparisons across genes (Benjamini-Hochberg) and for between-group post hoc comparisons (Sidak) were applied. Results: Adipogenic gene (ADIPOQ) expression was higher in the disc herniation group when compared to the facet arthropathy group (p = 0.032). Adipogenic gene (PPARD) expression was higher in the degenerative spondylolisthesis group when compared to the disc herniation group (p = 0.013), although absolute gene expression levels for all groups was low. Fibrogenic gene (COL3A1) had significantly higher expression in the disc herniation group and facet arthropathy group when compared to the degenerative spondylolisthesis group (p < 0.001 and p = 0.038, respectively). When adjusted for multiple comparisons, only COL3A1 remained significant (p = 0.012). Conclusion: Individuals with disc herniation and facet arthropathy demonstrate higher COL3A1 gene expression compared to those with degenerative spondylolisthesis. Future research is required to further understand the biological relevance of these transcriptional differences.

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Survivorship of Custom Coupling Devices and Distal Femoral Replacements for Management of Total Knee Arthroplasty Failure in patients with Ipsilateral Hip Replacements

Background Patients who experience total knee arthroplasty (TKA) failure in the setting of poor femoral bone stock and an ipsilateral THA present a very serious orthopaedic problem. Treatment options for this unique situation are limited, as the remaining diaphyseal bone is often compromised. Total femoral replacements and femoral allografts have been previously described in the literature but are limited in terms of outcomes. More recent interventions have involved the use of custom coupling devices that link a primary TKA to a primary THA, bridging the intervening femoral bone to prevent stress riser fractures. The purpose of this case series is to evaluate the indications, survivorship, and clinical outcomes of custom coupling devices in 8 patients who received treatment for a failed TKA in the setting of an ipsilateral THA. Patients and Methods Patients who received a custom coupling device for management of TKA failure in the setting of an ipsilateral THA from 01/01/2000 to 12/01/2022 were included (N = 8). Charts of included patients were reviewed for demographics, coupler description and dimensions, laterality of procedure, indications for coupler implantation, postoperative complications, coupler survivorship, and requirement for revision surgery. Survivorship was assessed primarily by review of clinical follow-up notes for the most recent follow-up date. The most recent radiographs of the femur were also reviewed in all cases to confirm presence of the coupling device. Results Indications for coupler implantation included TKA failure due to loosening, instability, or pain (N = 4, 50%), infection (N = 2, 25%), and distal or supracondylar femoral fracture (N = 2, 25%). Coupler survivorship ranged from 1.6 months to 138.3 months, with a mean survivorship of 52.9 months. Data regarding postoperative complications and reoperations were available for 4/8 (50%) patients. 1 patient suffered a dislocated knee hinge prosthesis and required open reduction and internal fixation of the distal femur with repair of the extensor mechanism. Conclusion Custom coupling devices are a safe and effective option to treat TKA failure in the setting of compromised bone stock and ipsilateral THA. While these cases are rare, implantation of these components results in satisfactory medium-term survivorship on average and is a less invasive option than complete femoral allografts or total femoral replacements.

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Impact of Hip Surveillance Program on Radiographic Evaluations and Surgical Intervention in Pediatric Patients with Cerebral Palsy

Background and Objectives: Hip displacement is a common issue among pediatric patients with cerebral palsy (CP) that can cause significant morbidity. Surveillance programs that monitor hip displacement have been shown to reduce the incidence of hip dislocations and improve patient outcomes by timing surgical interventions appropriately. The objective of our study was to determine if the implementation of a hip surveillance program at our institution in 2017 increased the frequency of radiographic evaluations and changed the timing of surgical intervention. Methods: We analyzed data from 246 pediatric patients with CP who received treatment at a tertiary academic teaching hospital between 2012 and 2022. Patients were divided into two groups based on the year of their initial X-ray, before or after the initiation of hip surveillance: 2012-2016 (160 patients) and 2017-2022 (86 patients). We performed statistical analysis using techniques such as two-sample t-test, Mann-Whitney U test, Chi-square/Fisher's exact test, and multivariable linear regression analysis. All tests were two-sided and performed at the 0.05 level of significance. We used R statistical software, version 4.0.03, for the analysis. Results: The mean and median average number of X-rays per year were significantly higher in the 2017-2022 group than in the 2012-2016 group. The mean average number of X-rays per year in the 2017-2022 group was 0.11 (95% CI: 0.02, 0.20, p = 0.017) higher than in the 2012-2016 group. After adjusting for confounders using multivariable linear regression analysis, the difference was even larger (difference 0.16, 95% CI: 0.06, 0.25, p = 0.001). The rate of surgical intervention was significantly lower in the 2017-2022 group compared to the 2012-2016 group (12.9% vs. 40.6%, p <0.001). Conclusions/Significance: Our study results suggest that implementing a hip surveillance program resulted in more frequent radiographic evaluations, earlier identification of patients with CP, and a reduction in the need for surgical intervention from 2017-2022. Conversely, in the 2012-2016 group, patients presented with more advanced disease, leading to a higher rate of surgical interventions due to the lack of a hip surveillance program. Implementation of a hip surveillance program led to more frequent evaluations and a decrease in surgeries due to better disease progression awareness.

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ORTHOPEDIC SURGERY

Shoulder Arthroplasty Patients are Under-Screened for Osteoporosis

Introduction: Osteoporosis and osteoporosis related complications present a large public-health issue in the United States. Osteoporosis screening and subsequent treatment has been shown to be efficacious in decreasing the rates of fragility fractures and periprosthetic fractures. However, current screening and treatment rates are low. This study aims to determine 1) the prevalence of total shoulder arthroplasty (TSA) patients who meet criteria for osteoporosis screening, 2) the prevalence of those screened, and 3) the 5-year cumulative incidence of fragility fracture (FF) and periprosthetic fractures (PPF). Methods: The PearlDiver database was utilized to identify all patients over the age of 50 who underwent TSA. Guidelines from the American Association of Clinical Endocrinologists were used to stratify patients into "high-risk" and "low-risk" of osteoporosis cohorts using International Classification of Disease (ICD) codes for various risk factors. The prevalence of osteoporosis screening using dual-energy x-ray absorptiometry (DXA) scan was analyzed and the 5-year cumulative incidence of FF and PPF was calculated between the "low-risk" and "high-risk" groups using Kaplan-Meier analysis. Results: In total, 66,140 (65.5%) who underwent TSA were considered "high-risk" for osteoporosis. Of the "high-risk" patients, 11.7% patients received routine osteoporosis screening preoperatively. Of the risk factor groups, chronic steroid users were the most likely screened (30.9%), followed by females aged 65 years and older (19.7%) and patients considered underweight (14.1%). Within 5-years, "high-risk" TSA patients had significantly higher cumulative incidence for PPF (HR: 1.4; 95% CI: 1.0-1.9; p=0.037) and FF (HR: 2.42; 95% CI: 2.1-2.8; p<0.001) when compared to those at "low-risk". Conclusion: There is a high prevalence of osteoporosis among patients undergoing TSA, but a low rate of routine osteoporosis screening in this cohort. Patients with osteoporosis who are categorized as "high-risk" have an increased rate of fragility fractures and periprosthetic fractures following surgical intervention. Therefore, there is an opportunity for shoulder arthroplasty surgeons to intervene and increase appropriate osteoporosis screening and management in this cohort which may reduce future risk of fragility fracture and periprosthetic fracture.

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ORTHOPEDIC SURGERY

Patients with Periprosthetic Fracture after Total Hip and Knee Arthroplasty Have Higher Incidence of New-Onset Anxiety and Depression

Background: As the volume of total joint arthroplasty (TJA), including total hip arthroplasty (THA) and total knee arthroplasty (TKA), increases, understanding the impact of postoperative complications on patient quality of life is important. Periprosthetic fractures (PPF) requiring revision surgery are a significant and stressful event when they occur. This study aimed to investigate the new-onset of mood disorders within 2-years following revision surgery due to PPF by analyzing the cumulative incidence and risk of depressive disorders and anxiety disorders when compared to revision surgery due to aseptic loosening and no revision surgery following TJA. Methods: Patients who underwent revision THA or TKA for periprosthetic fracture were identified in the PearlDiver Administrative Claims Database using Current Procedure Terminology (CPT) codes and International Classification of Diseases (ICD) codes. Additionally, patients who underwent aseptic revision and primary THA/TKA were also identified using CPT codes. The incidence of depression and anxiety were identified within 2-years following the index procedures. Cumulative incidence was observed using Kaplan Meier Analysis and Cox Proportional Hazard Model Analysis. Results: In patients undergoing PPF revision THA, the risk of depression and anxiety were significantly higher than those who underwent aseptic revision THA ([HR: 1.457; p<0.001,][HR 2.951; p=0.012], respectively) and those who underwent primary THA ([HR: 1.914; p<0.001], [HR 2.991; p=0.012] respectively). In patients undergoing PPF revision TKA, the risk of depression was significantly higher than those who underwent aseptic revision TKA (HR: 1.350; p=0.003) and those who underwent primary TKA (HR 1.598; p<0.001). Conclusion: Patients who undergo revision surgery for PPF following TKA or THA have increased rates of new onset anxiety and depression compared to patients who do not undergo further surgery following the primary procedure. This study brings attention to the possible negative impact that revision surgery can have on a patient's psychosocial well-being and highlights an area of patient care that can be better addressed. Orthopaedic surgeons can collaborate with psychiatrists and other mental health professionals to identify and treat mental health disorders in this patient population to potentially improve patient outcomes and quality of life.

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ORTHOPEDIC SURGERY

Risk of UPROR Increases with Increased Curve Correction After Fusion in Severe Syndromic and Neuromuscular Early Onset Scoliosis (EOS)

Introduction: Posterior spinal fusion and instrumentation surgery (PSIF) for neuromuscular (NM) and syndromic early-onset scoliosis (EOS) has high risk of complications.A goal of PSIF is major coronal curve correction; however, maximum correction does not necessarily equate best outcomes clinically. Anecdotal evidence suggests that greater correction in patients with severe syndromic or NM spinal deformity results in greater complications. This study aims to explore the relationship between the amount of surgical correction and the risk of complications for patients with syndromic or NM EOS. Methods: In this retrospective cohort study, syndromic or NM EOS patients with preoperative major coronal curves =90 degrees, undergoing index fusion or growth-friendly (GF) instrumentation followed by definitive fusion, were identified in a multicenter registry. Radiographs were assessed prior to fusion and post-fusion. Major coronal curve percent correction from pre-fusion to post-fusion was calculated. The postoperative complications, unplanned return to the operating room (UPROR), and hospital length of stay (LOS) were recorded. Results: 102 patients (average age 12; 62% female, 38% male;75% NM, 25% syndromic) were included. 58% underwent fusion primarily and 42% were fused after previous GF surgery. Prefusion and post-fusion major curve average was 102Ű and 57Ű respectively. 44% experienced any postoperative complication, 12% UPROR, and 23% had prolonged LOS (>14 days). There was no difference in risk of complications between patients with previous GF and those without (p=0.412). Patients were categorized by percent correction to determine if a threshold existed with increased risk of complication, UPROR, and hospital LOS. While we did not identify a single threshold demonstrating a significant increased risk of these adverse outcomes, we did discover a strong correlation between increasing percentage of correction and increasing risk of UPROR (R^2=0.98). Conclusions: This study demonstrates a strong correlation between increasing curve and risk of UPROR. Limitations include small sample size for patients with more correction: only 13 patients had >70% correction. Significance: Levine et al found that NM EOS patients with a curve correction =50% had a decreased risk of postoperative pneumonia5 while this study demonstrates increasing risks of UPROR with more correction. This prompts the questions of what the optimal correction is and how much is too much correction. Adding additional patients and perhaps including slightly smaller baseline curves may help better define this relationship.

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ORTHOPEDIC SURGERY

Risk Severity Score (RSS) for Surgical Site Infection (SSI) is associated with Length of Hospital Stay in Growth Friendly Index Surgeries for Early Onset Scoliosis (EOS)

Introduction Surgical site infection (SSI) is a well-recognized complication of pediatric spine surgery. The senior authors developed a risk calculator utilizing patient factors to produce a risk severity score (RSS) that predicts the probability of SSI in patients with Early Onset Scoliosis (EOS). The RSS is useful for identifying high risk patients before surgery to optimize perioperative care and potentially reduce SSI incidence. Little is known about how the RSS may influence length of stay (LOS) in the hospital or Intensive Care Unit (ICU). The purpose of this study was to determine whether a higher RSS for SSI is associated with a longer hospital and/or ICU stay. Materials and Methods EOS patients who had undergone an index growth-friendly (GF) instrumentation were identified from a multicenter registry. Data on their hospital and ICU length of stay was extracted. Their RSS score was calculated based on patient comorbidities. Data was analyzed in full and stratifying by etiology. Results 896 patients were included. Pearson's correlation demonstrated a significant positive relationship between RSS score and hospital LOS r=0.156 (p <0.001), and a correlation between RSS score and ICU LOS, r=0.286 (p < 0.001). Spearman's correlation for patients with neuromuscular EOS showed a positive correlation between RSS and both hospital LOS rs=0.106 (p=0.05), and ICU LOS rs=0.151 (p=0.006). Threshold analysis found that an RSS >5% was associated with a 55.6% chance of a hospital stay >4 days (p=0.0001). An RSS >10% was associated with a 55.1% chance of an ICU stay >1 day (p<0.0001). Conclusion RSS is positively correlated with hospital and ICU LOS. A score >5% is associated with a hospital LOS >4days and a score >10% is associated with ICU LOS >1day. These results help to further validate the RSS as a measure of patient fragility.

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ORTHOPEDIC SURGERY

Compliance with Best Practice Guidelines for Preventing Wrong Level Surgery in Spinal Deformity

Purpose The senior authors published Best Practice Guidelines (BPGs) in 2017 to prevent wrong-level surgery in spinal deformity patients. We evaluated compliance and hypothesized higher compliance among BPG authors and surgeons with more experience, higher case volume, and awareness of the BPGs, and no compliance differences between Study Groups or surgeons' continent of origin. Methods We queried North American and European surgeons, authors and non-authors, and members of different Study Groups using an anonymous survey. Responders provided years in practice, yearly case volume, adherence to BPGs, and knowledge of the guidelines. We developed a mean compliance score to assess adherence ranging from 0 to 3 (0=no compliance, 1=weak to moderate, 2=high, 3=perfect). Results Of the 134 respondents, 73.6% reported high or perfect compliance. Less than average compliance was defined as <60%. Mean compliance was 2.4?0.37. There was no compliance difference between North American and European surgeons (2.5 vs 2.3 p=0.07). There were significantly different compliance scores between authors and nonauthors (2.7 vs 2.4 p<0.001) and between surgeons with and without knowledge of the BPGs (2.5 vs 2.2 p<0.001). There was a medium correlation between BPG awareness and compliance (r=0.48 p<0.01) and no relationship between years in practice (r=0.41 p =0.64) or case volume (r=0.02p=0.87) with compliance. Conclusion Surgeons reported high or perfect compliance with BPGs for preventing wrong level surgery 73.6% of the time. Authors and those with knowledge of the BPGs had increased compliance. Location, participation in a study group, years in practice, and yearly case volume did not affect compliance.

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ORTHOPEDIC SURGERY

Compliance with the Best Practice Guidelines for Preventing Surgical Site Infections (SSI) in High-risk Pediatric Spine Surgery

Purpose The senior authors published Best Practice Guidelines (BPGs) in 2013 for preventing surgical site infection (SSI) in high-risk pediatric spine surgery. We evaluated compliance and hypothesized higher compliance among BPG authors and surgeons with more experience, higher case volume, and awareness of the BPGs, and no compliance differences between Study Groups or surgeon's continent of origin. Methods We queried North American and European surgeons, authors and non-authors, and members of different Study Groups using an anonymous electronic survey. Respondents provided years in practice, yearly case volume, adherence to BPGs, and knowledge of the guidelines. The survey included 14 Likert scale questions. A mean compliance score was developed assessing adherence, ranging from 0-3 (0=no compliance, 1=weak to moderate, 2=high, 3=perfect). Results Of the 142 respondents, 73.7% reported high or perfect compliance. Less than average compliance was defined as <60%. Mean compliance was 2.2? 0.41. There were significantly different compliance scores between North American and European surgeons (2.3 vs 1.8 p<0.001), authors and non-authors (2.5 vs 2.2 p=0.023), and surgeons with and without knowledge of the BPGs (2.3 vs 1.8 p<0.001). There was weak correlation between BPG awareness and compliance (r=0.34 p<0.001) and no correlation between years in practice (r=0.0 p=0.37) or case volume (r=0.2 p=0.78) with compliance. Conclusions Surgeons reported high or perfect compliance with BPGs for preventing SSI 73.7% of the time. North American surgeons, BPG authors, and surgeons aware of the BPGs demonstrated higher compliance. Participation in a Study Group, years in practice, and yearly case volume did not affect compliance.

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OTOLARYNGOLOGY

Risk of Noise-Induced Hearing Loss in Pediatric ENT Operating Rooms

Introduction: Operating room (OR) sound may surpass noise exposure thresholds and induce hearing loss in both patients and surgeons alike. The intensity of noises emitted by various surgical instruments during common pediatric otolaryngologic procedures were compared at the ear-level of the surgeon and patient to evaluate the need for quality improvement measures. Methods: Noise levels were measured using the RISEPRO Decibel Meter and the SoundMeter X application 10.0.4 at the ear-level of the surgeon and patient every five minutes. For each measurement, operative procedure type, presence of music, and the type of instrument (suction bovie, microdebrider, COBLATOR, otologic drill) were recorded. All noise measurements were statistically compared against control measurements (background noise). Additional noise measurements will be measured with the Apple Watch Series 8 and analyzed for improving surgeon's situational awareness of harmful noise levels. Results: 242 total occasions of noise measurements were recorded for 62 cases from seven different surgeons. Cochlear implantation was found to be the loudest case for both surgeon (88.5 Lq Peak dBA; p=0.001) and patient (91.8 Lq Peak dBA; p< 0.001). Tympanomastoidectomy was the second loudest, with the surgeon's noise exposure 87.6 Leq Peak dBA (p=0.001) and patient's noise exposure 84.8 Leq Peak dBA (p< 0.001). The loudest instrument at the ear-level of the surgeon (89.4 Lq Peak dBA; p< 0.001) and patient (92.1 Lq Peak dBA; p< 0.001) was the otologic drill. Conclusions: Pediatric ENT OR noises can surpass safe thresholds and may induce hearing loss in providers. Fortunately, these operations are short in duration so there is probably no long-term harm to the patient. However, chronic loud noise exposure to healthcare providers needs to be further addressed. Quality improvement measures, such as confirming the presence of a sound level meter in the OR, will increase OR noise awareness and promote mitigation strategies to maximize hearing conservation and long-term hearing preservation in surgeons.

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OTOLARYNGOLOGY

Confirmatory ABR Testing Results in Discordant Outcomes: Implications for Timely Care

Objectives: The purpose of this study is to evaluate for discrepancies in diagnostic Auditory Brainstem Responses (ABR) between Children's National Hospital (CNH), a pediatric medical center, and outside facilities (OSF) that referred patients to CNH for confirmatory evaluation. Such discrepancies impact Early Hearing Detection and Intervention (EHDI) timelines. Methods: Retrospective chart review was conducted from an internal database of patients who underwent diagnostic ABR from 2017-2021. Only patients with ABR results from both CNH and OSF were analyzed. Demographic data, external and internal test results, and intervention data were obtained. Hearing loss (HL) severity was graded on a scale of 0-8, where 0 indicated normal hearing and 8 indicated profound. Each ear was analyzed separately. Results: Forty-nine patients met the inclusion criteria and each ear was evaluated separately. Median HL severity was 1.0 [0.0, 4.3] at CNH compared to 3.0 [1.8, 6] at OSF (p = 0.004). Forty-seven ears (48.0%) showed lower severity at CNH. Twenty-seven patients (55%) received hearing amplification devices. The median age at time of hearing intervention was 220 days. Conclusion: Our results showed statistical significance in median severity of hearing loss between CNH and OSF. A substantial proportion (70%) of children in our dataset who received amplification via cochlear implant or hearing aids were shown to have discrepancies in ABR findings from CNH and OSF. These findings have implications with regards to appropriate usage of healthcare resources and maintaining EDHI timelines.

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OTOLARYNGOLOGY

In-office transoral hilar sialolithotomy: A cost-effective and patient-centered procedure

Introduction and Objectives: Sialolithiasis of the submandibular gland is a common presentation in otolaryngology clinics. Patients may present with pain and/or swelling of the floor of the mouth or jawline. In cases where conservative management fails, surgical removal of the salivary stone is indicated. A common practice is the transoral sialolithotomy, which is typically performed under general anesthesia but there has been documented success in removal of stones within the submandibular duct while under local anesthesia. The purpose of this case series is to showcase the efficacy and efficiency of in-office transoral submandibular sialolithotomy, particularly for deeper hilar and intraglandular stones. Methods: A retrospective chart review was conducted for patients who underwent in-office transoral sialolithotomy for hilar or intraglandular sialoliths by the senior author (A.J.) from January 2020 to July 2022. Each chart was reviewed to determine patient demographics, sialolith size and laterality, procedure success, and associated complications. Results: A total of 40 patients met inclusion criteria. Of the 40 attempted in-office sialolithotomies, 36 (90%) were successful. Two complications were reported: one patient with temporary lingual nerve paresis and a second with a postoperative intraglandular abscess. Only 3 (8%) patients experienced recurrence of salivary stones after the procedure. Conclusions: The in-office transoral sialolithotomy for hilar and intraglandular stones is an effective and advantageous practice for both patients and physicians. Patients who have undergone this procedure show similar rates of success, complications, and recurrence with overall decreased costs and anesthesia exposure. With proper training in this procedure and in the identification of suitable candidates, there is an opportunity to maximize benefits and minimize costs.

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OTOLARYNGOLOGY

Impact of Upper Airway Obstruction Management in Robin Sequence on Need for Myringotomy Tubes

Objective: Investigate an association between upper airway obstruction (UAO) management in Robin Sequence (RS) and need for bilateral myringotomy and tubes (BMT) Study Design: Cohort study of RS patients from 1995-2020 Setting: Tertiary free-standing pediatric hospital Methods: Patients were grouped based on airway management: conservative, tracheostomy, tongue-lip adhesion (TLA), and mandibular distraction osteogenesis (MDO). Demographic data, cleft palate (CP) association, audiogram data, and numbers of BMT and ear infections were collected. One-way ANOVA/Kruskal-Wallis and Chi-square/Fisher's exact tests were used to compare continuous and categorical data, respectively. A multivariable Poisson regression analysis was used to compare BMT rates between treatment groups. Results: One hundred and forty-eight patients with RS were included, 70.3% of which had CP. Most patients (67.6%) had at least one BMT; 29.1% required two or more. Mean number of BMT was higher in patients with CP compared to those with intact palates or submucous clefts (1.36 vs. 0.67 and 0.58, respectively, p=0.002) and in patients treated with TLA or tracheostomy (IRR=1.49, p=0.035 and IRR=1.66, p=0.015, respectively). Surgically managed patients were more likely to have hearing loss (67.5% vs. 35.3%, p=0.017) and ear infections (42.1% vs. 20.0%, p=0.014). Conclusion: Most RS patients require at least 1 set of BMT. Those with CP and treated with tracheostomy or TLA have a higher likelihood of needing BMT. Rate of hearing loss and ear infection was higher in surgically managed patients.

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OTOLARYNGOLOGY

Complications associated with microdebriders in otolaryngology procedures from 2011-2021: a MAUDE study

Objective - The microdebrider is a powered surgical instrument that is widely used in the field of otolaryngology. We aim to identify the type and frequency of device malfunctions, patient complications, and subsequent interventions related to the use of microdebriders. Materials and Methods - The US Food and Drug Administration's (FDA) Manufacturer and User Facility Device Experience (MAUDE) database was queried for reports of "microdebrider," with adverse events selected that pertained to usage in head and neck surgeries from 1/1/2011 - 12/31/2021. Results - There were 282 adverse events in 268 individual medical device reports (MDR). Although the majority of the reports did not specify the specific operation, endoscopic sinus surgery was the most common reported procedure (89, 33.2%). The most common cause of device malfunction was due to a broken piece (120, 48%) followed by overheating of the microdebrider motor (78, 31.2%). Of the reports which specified patient injury, the most commonly reported was "unintentional tissue damage," (10, 32.3%). Conclusions - The microdebrider has demonstrated utility within the field of otolaryngology, but is not without risk of malfunction that can cause patient injury. By understanding possible risks of microdebrider usage, including tissue damage, burns, and bleeds caused by device malfunction or operator error, physicians can be better prepared to address complications and educate patients.

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OTOLARYNGOLOGY

Understanding Genetic Variants in the Pathogenesis of Otitis Media

Background: Over the past decade, an unprecedented volume of biological data has been produced by large-scale big data efforts. Bioinformatics allow for utilization of the human genome to determine the role variants play in the development of disease. The purpose of this study is to review the latest literature pertaining to the pathogensis of otitis media and highlight pertinent genetic variants that have been identified in the last 5-10 years. Objective: To review the medical literature on recent large-scale studies elucidating genetic underpinnings of otitis media (OM) disease susceptibility. Methods: A comprehensive review of the biomedical literature was conducted. PubMed was used as the search engine with the following search terms being employed: 'genomics, genetics, and polymorphisms' in conjunction with the terms 'otitis media', and 'middle ear'. 55 PubMed indexed peer-reviewed articles published in English from January 1, 2015, until June 1, 2022, were included for analysis. Discussion: Large scale genetic studies over the past five years lend credence to the paradigm of the innate immune response playing a critical role in host defense against bacteria contributing to Otitis Media (OM) progression. However, the pathogenesis of OM remains widely misunderstood. Through our review, genetic variants and polymorphisms such as EVI1, FBXO11, TLR4, A2ML1 variants, and the FUT2gene have demonstrated a significant association with OM. Future studies should continue elucidating the genetic underpinnings associated with otitis media, as well as identify novel strategies for the diagnosis and management of OM progression.

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OTOLARYNGOLOGY

The Use of Black Tea and Honey for the Treatment of Pharyngocutaneous Fistula

Pharyngocutaneous fistula (PCF) occurs in approximately a quarter of laryngectomies and causes significant morbidity that impacts the quality of life of patients. PCF is much more common in the setting of salvage surgery after chemoradiation. Vascularized tissue closure may reduce but not eliminate the risk of PCF. Other risk factors may include a history of smoking, prior radiation or surgery to the area, poor nutrition status, infection, and diabetes. Pharyngeal secretions containing various aerobic and anaerobic bacteria as well as yeast can increase the risk of wound infection, which can lead to flap failure, spreading cellulitis and sepsis. Antibiotics are typically the first-line treatment, but culture-directed therapy can be difficult; broad-spectrum antibiotics can lead to yeast overgrowth and multidrug-resistant bacterial infections. The use of complementary and alternative treatment modalities can help to alleviate this by providing topical antisepsis, reducing secretions, and promoting wound-healing from within. Honey has a long-standing history as a wound healing agent and has been shown to have antiseptic and therapeutic effects making it an effective treatment modality in terms of bacterial infection, specifically infections of open wounds such as PCFs. The author describes a patient with p16+ squamous cell carcinoma with persistent disease after primary chemoradiation. The patient underwent a neartotal glossectomy via lip-split mandibulotomy approach, with anterolateral thigh free flap reconstruction and bilateral neck dissection. He subsequently developed a postoperative PCF with an associated bacterial infection, including Acinetobacter baumannii and Enterococcus faecalis. In the setting of a failed antibiotic treatment, a conservative method of oral care using food-grade honey and black tea was initiated, followed by Medihoney applications orally, which led to the complete resolution of this patient's PCF and its associated infection. A clear liquid oral diet was established by postoperative day 17. This case is important as it illustrates a potential player in the conservative treatment of localized bacterial infections, potentially reducing the use of antibiotics to avoid contributing to the development of multidrug-resistant bacteria.

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CLINICAL AND TRANSLATIONAL RESEARCH

PSYCHIATRY

Dissociative Episodes Characterized by Trichotillomania in a Late Adolescent Female

A 17-year-old female with a history of Hemoglobin SS, moyamoya disease, cerebrovascular accident, mild intellectual disability, Post-Traumatic Stress Disorder, Psychogenic Non-Epileptic Seizures, Generalized Anxiety Disorder and Transient Psychosis was referred for a psychiatry consultation. She presented with worsening episodes of dissociation characterized by compulsory hair-pulling. Limited research exists regarding patients engaging in activities of automated behavior during episodes of dissociation. Thus, we aim to describe a case of a patient with episodes of hair-pulling during dissociative events to discuss the etiology and treatment.

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CLINICAL AND TRANSLATIONAL RESEARCH

PSYCHIATRY

COVID-19 Psychosis in an Adolescent

A 13-year-old female with no prior medical history was referred for a psychiatry consultation with worsening psychosis while symptomatic for a COVID-19 infection. As the body of literature surrounding COVID-19 expands, a correlation between episodes of COVID-19 infection and subsequent psychosis in the adult population have been documented. However, few reports have been published identifying a relationship between COVID-19 infection and psychosis in adolescents. As there are no current guidelines for treating adolescents with COVID-19 induced psychosis, methods have varied widely. The variability in treatment highlights the need to identify a mechanism underlying adolescent psychosis in order to provide more effective guideline recommendations. We hope to contribute another account to existing research to provide a better understanding of this condition.

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CLINICAL AND TRANSLATIONAL RESEARCH

PSYCHIATRY

Value-driven attitude surveys: Lessons from the refugee crisis in Greece

This study was motivated by the 2018 article "Does exposure to the refugee crisis make natives more hostile?" (Hangartner et al., 2018). The authors argued that "... direct exposure to refugee arrivals induces sizable and lasting increases in natives' hostility toward refugees, immigrants, and Muslim minorities; support for restrictive asylum and immigration policies; and political engagement to effect such exclusionary policies....(p. 1)" Using a number of surrogate measures like distance from the primary host islands as a key factor in assessing exposure to refugees, the study concluded, "Our finding that hostility prevails in the Greek Aegean islands suggests that mere exposure to the chaos of the refugee crisis generates a feeling of threat that can activate latent predispositions against immigrants and mobilize support for exclusionary policies (p. 3)." The unknowable questions of "latent predisposition" and "lasting" hostility alongside sampling of a host community on the front lines of the refugee crisis suggested that a counter-example of survey design could easily be constructed to show how the choice of respondents and questions supported an entirely different conclusion. Following the robust literature on exposure to outsiders that improved attitudes, this combined US and Greek research team undertook to demonstrate the influence of study design by testing the countervailing proposition that exposure to refugees resulted in positive attitudes. The research hypotheses, supported by the literature and the team's experience in the refugee crisis, were that humanitarian aidworkers would be a group that was heavily exposed to refugees while still tolerant, committed, and progressive in their views. Indeed, aid workers have low rates of negative attitudes and tend to have strong affective connections to their work and humanitarian organizations (e.g., Bjerneld et al., 2006; Asgary & Lawrence, 2014; Korff et al., 2015; Candilis et al., 2018). The related point that surrogate measures are no substitute for direct questions would be addressed directly by interviewing respondents.

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The Effects of Prenatal Adversity and Neonatal White Matter Microstructure on Child Language Skills at Age 2

Background: Life adversities, such as neighborhood disadvantage and lower household incomes, are associated with well-established impairments on language development, which predict academic difficulties throughout school. These language delays are observable by age 2, but it remains unclear if adversities experienced in utero affect neurological underpinnings of language development before delays emerge. Of interest are 3 white matter tracts implicated in early language skills: the corpus callosum (CC), inferior fronto-occipital fasciculus (IFOF), and uncinate (Unc). Sample: A longitudinal cohort of 160 healthy term-born (>36 weeks gestation) neonates were recruited from the eLABE study at Washington University, which oversampled urban St. Louis families in poverty. Methods: Structural equation modeling was used to create 2 latent constructs of prenatal adversity. The first, "social disadvantage", aggregates neighborhood disadvantage, family income, insurance status, maternal education, and diet. The second, "maternal psychosocial stress", models maternal depression, stress, life adversities, and perceived discrimination. At birth, diffusion MRI quantified myelination of white matter tracts. In-person follow-up at age 2 evaluated child language skills. To assess the independent and interactive effects of prenatal adversities and neonatal white matter myelination on language skills, stepwise linear regression models were conducted after adjustment for child sex, gestational age, and postmenstrual age at scan. Results: Prenatal social disadvantage (p=.00) and maternal psychosocial stress (p=.00) predicted significantly lower language scores by age 2. However, in a joint model, only the effects due to social disadvantage (p=.00) remained significant. Regarding models with neonatal white matter tracts, lower CC fractional anisotropy (FA) predicted significantly lower language scores (p=.02) independently of social disadvantage (p=.00). IFOF and Unc were not predictive of language. To examine the relationship between CC myelination and social disadvantage, a moderation analysis was conducted after dichotomizing families' income into above and below 200% the federal poverty line. The interaction term was not significant (p= .11), but upon plotting results by income group, higher CC FA seemed to be protective against language delays amongst neonates experiencing less social disadvantage. Discussion: This study suggests that prenatal adversity, particularly social disadvantage, and immature CC myelination are strong predictors of language delays by age 2. Although the interaction term was not significant, it remains plausible that CC myelination is more underdeveloped in infants experiencing higher degrees of social disadvantage in utero. By continuing to explore this relationship, future studies will continue to identify specific neurological markers of early language development to allow clinicians to intervene before delays emerge.

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PSYCHIATRY

Tell Me How You Feel: An Examination of Adolescent Oncology Patients and Their Families' Use of Emotionally Valent and Salient Words in Discussing End-of-Life Care

Adolescent advanced Care Planning (ACP) can be difficult to navigate as health care providers and family members worry the topic will be too distressful to approach. However, this perception may be flawed, discussions about death are seen as a negative and traumatic event. The FAmily CEntered ACP for Teens with Cancer (FACE-TC) study was conducted to examine the use of structured interviews to discuss ACP between adolescents with cancer and their family members. Adolescents and their family members who participated in the guided ACP discussions had higher likelihood of agreeing on treatment plans. The transcripts were further analyzed for the type of emotional language used using the Affective Norms of English Words (ANEW) database, which quantified the valence of words, the extend a word is associated with positive or negative emotions. When analyzing the words in the FACE-TC interventions, the valence associated with the words used by adolescents and their caretakers was generally positive (5.9). The ten most used words were: "know" (6.9), "think" (6.4), "me" (8.1), "want" (5.3), "time" (5.3), "life" (7.3), "cancer" (1.5), "kind" (7.6), "people" (7.3), and "good" (7.5) which had an average valence of 6.3, with most, except "cancer" at 7th (1.5), being positive. This finding was consistent with previous studies examining statements of individuals with terminal illnesses who also used words with positive valence when describing their experiences with end-of-life decisions. While psycholinguistics cannot be a substitute for assessing an individual's state of mind, this demonstrates that talking about death and dying is more positive than previously feared. Given the benefits associated with having end-of-life discussions and ACP, shifting perceptions regarding this topic may encourage healthcare providers to initiate conversations with their patients.

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CLINICAL AND TRANSLATIONAL RESEARCH DAY

PSYCHIATRY

Evidence-Based Digital Interventions for Adolescents with ADHD: Stakeholder-Generated Solutions to Optimize Engagement and Implementation in School Settings

Despite evidence demonstrating the effectiveness of behavioral/organizational skills interventions for adolescents with ADHD, relative to younger children, adolescents with ADHD demonstrate notoriously poor treatment utilization, express limited motivation for treatment, and struggle to engage in behavioral skills interventions. Access to and uptake of these interventions continue to be limited and minoritized families of low socioeconomic status experience significant barriers to treatment engagement. There is a critical need for identifying strategies to improve quality of care and reduce treatment disparities in adolescents, thereby decreasing negative long-term patient outcomes associated with ADHD. The proposed study used a stakeholder-centered, theory-driven, empirical approach for optimizing treatment for ADHD by engaging key adolescent, parent, and school/community stakeholders in the iterative, codevelopment of a technology-enhanced intervention that target skills acquisition/ utilization. ATOM (Advanced Tools for Organization Management) was developed facilitating a user-centered design with iterative stakeholder input collected via focus groups/interviews, and formative usage evaluation. The data were collected by the ADHD & Learning Differences Program under the directorship of Melissa Dvorsky, PhD with funding from the National Institutes of Health (NIMH # K23MH122839; https:// theatomprogram.com). Participants included adolescents (N=26; Mage=12.4 years 50% female), parents (N=16), teachers (N=8), and providers (N=8). This study included mixed method results including analyses of focus group themes (coded using rapid qualitative analysis) and an open usability trial including collecting stakeholder and user ratings on the System Usability Scale (SUS), which informed the technology design and refinement. Key themes identified from focus group and qualitative interviews emphasized adolescent, family, and provider preferences for features and design of ATOM, including immediate points, in-vivo prompts for skills, and interactive rewards (see summary of key themes and exemplar quotes in Table). Results from extended usability testing found high usability (SUS scores ranging from Ms = 73.0-83.7) across informants, and iterative development addressed stakeholders' feedback via enhanced features. ATOM was continuously revised until it met key stakeholders' needs, and ratings suggest high usability (SUS scores > 80). Results highlight the importance of stakeholders input in intervention refinement in order to understand the lived experiences and adequately reduce barriers and promote treatment engagement.

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CLINICAL AND TRANSLATIONAL RESEARCH

PSYCHIATRY

Buprenorphine Dosing in the ANCHOR Study

Background In people who use drugs(PWUD) with opioid use disorder(OUD), buprenorphine is a vital treatment to decrease opioid use and overdose. FDA prescribing information for buprenorphine advises dosing up to 24mg/day, however doses of buprenorphine up to 32mg have been shown to be safe and effective. Further, treatment retention increases linearly with higher doses of buprenorphine up to 32mg and doses over 16mg are associated with decreased opioid use. In a low barrier setting, we aimed to understand the harm reduction and drug use outcomes associated with buprenorphine dosing of 32mg/day relative to 24mg/day. Methods ANCHOR is a single center study of PWUD with HCV, OUD, and opioid misuse within 3months, who were treated for HCV and offered buprenorphine. Patients initiating buprenorphine were induced on 16mg/day and up titrated to 32mg/day as needed. Patient-endorsed drug use, mode of drug use and urine drug screens(UDS) were collected at each visit. For analysis, the cohort was divided into individuals stabilized on 24mg(24mg-cohort) and 32mg(32mg-cohort). Comparisons were made looking at drug use factors of both cohorts at 24mg dosing, and within the 32mg-cohort alone, comparing visits on 24mg vs visits on 32mg. Logistic and Poisson regression models were used to compare patient outcomes, conducted using SAS version 9.4. Results 72participants were included in the analysis, patients were predominantly male(78%), Black(96%), and unstably housed(57%). Majority of patients used opioids by IDU(93%) and had a history of overdose(67%). 24(33%)patients stabilized on 24mg(24mg-cohort), and 48(67%)patients stabilized on 32mg(32mg-cohort). There were significantly more patients retained at the end of the study period in the 32mg cohort(78.7%) compared to the 24mg cohort(50.0%, p=0.02). Within the 32mg-cohort, comparing factors at visits while on 24mg vs 32mg, there was a decrease in percent of visits with endorsed opioid use(OR=0.62, CI 95%[0.42, 0.92], p=0.02), decrease in frequency of use per week(RR =0.78, CI 95% [0.68,0.89], p=0.0002) and physiological triggers for use(OR =0.14, CI 95% [0.08,0.25], p<0.0001), and an increase in non-physiological triggers as an explanation for use(OR =7.23, CI 95% [3.91,13.4], p<0.0001). Conclusion In our cohort, 32mg/day dosing of buprenorphine was associated with increased retention, decreased rates of endorsed drug use, reduced use frequency and reduced physiological triggers for use compared to 24mg/day dosing. These data reinforce the significance in access to higher buprenorphine dosing to reduce harm associated with opioid use and demonstrate the necessity in modifying existing guidelines to facilitate increased access to effective treatment for OUD.

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CLINICAL AND TRANSLATIONAL RESEARCH

PSYCHIATRY

Valacyclovir-Induced Psychosis in an Elderly ESRD Patient with Herpes Zoster

Valacyclovir is a common antiviral drug primarily used to treat herpes virus infections, such as herpes zoster or shingles infection. It is renally metabolized, thus, dose adjustments for patients with impaired renal function or comorbidities are instituted to mitigate side effects due to accumulation. This retrospective case report explores an incidence of valacyclovir-induced neurotoxicity in a patient with hemodialysisdependent end-stage renal disease. Psychosis presented after recommended renal-adjusted dosing of the medication. This patient was originally prescribed a seven-day course of valacyclovir, however, returned to the hospital on day four with neurologic sequelae, including blurry vision, weakness, and falls. After a full workup for CVA, encephalopathy, and dementia, the patient's symptoms were found to be most associated with the timing of valacyclovir initiation and in concordance with the understood neurologic manifestations of valacyclovir use. We attribute the missed hemodialysis sessions to be a major contributor to the accumulation of toxic drug and metabolite levels in this patient. Thus, we advise that patients with ESRD on valacyclovir either be closely monitored for adherence to the dialysis schedule or that the dose is further lowered given the low threshold for toxicity in this patient population. This risk is magnified in patients with frailty, advanced age, or multiple comorbid conditions.

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CLINICAL AND TRANSLATIONAL RESEARCH DAY

PSYCHIATRY

Influence of Hospitalization and Death of Loved One on End-of-Life decision making for Adolescent Oncology Patients

The influence of personal experiences on end-of-life decision making among adolescents living with cancer has not been studied extensively. The purpose of this study is to understand how experiences with hospitalization and death may influence end-of-life decision-making for adolescent oncology patients. 30 transcripts of the Next Steps: Respecting Choices conversation, Session 2 of the FACE-TC pediatric Advance Care Planning (pACP) intervention, were analyzed. FACE-TC was designed to facilitate conversations between adolescents with cancer and their family to give patients a voice in their end-of-life treatment. Session 2 asked about adolescents' experiences with hospitalization, as well as experiences with a critically ill or dying loved one. The frequency of reported experiences during the interview of personal hospitalization and death of a loved one was counted. Data were missing for three subjects. The Statement of Treatment Preferences, administered immediately following Session 2, measured adolescent's treatment preferences in four cancer-specific scenarios. Choices were to continue all treatments, to stop all treatments, or unsure. Chi-square or the Fisher's Exact Test assessed the association between adolescents' experiences and adolescents' choice to discontinue treatment in at least one of four medical scenarios. During the interviews, 23/27 adolescents reported experiences with hospitalization and 15/24 reported experiences with the death of a loved one. No significant association was found between those without and those with experiences with hospitalization and the choice to discontinue treatments in at least one of the four medical scenarios [3 (75%) vs. 21 (91%), p=0.395]. No significant association was found between those without and those with the experience(s) with the death of a loved one and the choice to discontinue treatments in at least one of the four scenarios [9 (100%) vs. 12 (80%), p=0.266]. Experiences with hospitalization or death and dying of a loved one did not influence adolescents' choice to limit treatments in some situations. Due to small sample size, we powered to detect only large effect sizes. Most adolescents choose to limit treatment in at least one of the situations, suggesting "continue all treatments" should not be the default choice. While this exploratory study cannot define the exact relationship between adolescent oncology patients' personal experiences and their ACP decision making, each unique experience may influence their decisions in different ways. Therefore, holding these conversations is imperative with these patients, clinicians, and families.

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CLINICAL AND TRANSLATIONAL RESEARCH

RADIOLOGY

Magnetic Resonance Imaging vs Transient Elastography in Assessing Pediatric Non-Alcoholic Fatty Liver Disease

Purpose Non-alcoholic fatty liver disease (NAFLD) stands as the most common chronic liver disease in the pediatric population and is increasing in prevalence alongside the childhood obesity epidemic. Lab tests and biomarkers alone provide low sensitivity and specificity for pediatric NAFLD, while the most stringent diagnostic method of liver biopsy is invasive and expensive. Thus, non-irradiating, non-invasive imaging modalities are the ideal approach for diagnosing and staging NAFLD in pediatric patients. Presently, ultrasound is not sensitive enough to detect liver steatosis below 33% of hepatocyte involvement. As a result, magnetic resonance imaging (MRI) and transient elastography (TE) are promising diagnostic options for identifying and guantifying liver steatosis in pediatric NAFLD patients. This review article will compare MRI to TE to determine which method offers higher sensitivity for NAFLD diagnosis in children. Materials and Methods A PubMed database literature review was performed to compare the sensitivity of MRI to TE in diagnosing pediatric NAFLD. Results from 5 studies were compiled based on predetermined inclusion criteria. Between the 5 studies, a total of 480 cases were imaged. Of these cases, 224 were analyzed with MRI, while 256 were analyzed by TE.1,2,3,4,5 Results Of the 224 NAFLD pediatric patients analyzed using MRI, the calibrated MRI fat fraction measurements produced an average sensitivity of 64.9%.1,2 Of the 256 pediatric patients assessed using TE techniques, measurements for hepatic steatosis demonstrated an average sensitivity of 81.1%.3,4,5 Thus, TE shows significantly superior sensitivity compared to MRI in pediatric NAFLD diagnosis (p < 10.00001). Conclusion The childhood obesity epidemic coupled with rising rates of pediatric NAFLD poses a need for accessible and noninvasive diagnostic technologies. This review suggests that TE offers greater sensitivity than MRI for NAFLD, with the convenience of a bedside imaging technique. Additionally, the less lengthy scan is of particular advantage in the pediatric population who may have difficulty complying with awake MRIs. More research should be done to determine the differences in specificity, exam time, and cost. Clinical Relevance Statement This review shows that in pediatric Non-Alcoholic Fatty Liver Disease, the quantification of liver steatosis is more sensitive when Transient Elastography is used over Magnetic Resonance Imaging.

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CLINICAL AND TRANSLATIONAL RESEARCH DAY

RADIOLOGY

Superb Microvascular Imaging vs. Contrast-Enhanced Ultrasound in the Detection of Endoleaks Following Endovascular Aneurysm Repair

PURPOSE More than 175,000 deaths occur globally each year due to abdominal aortic aneurysms (AAA). Although the advent of endovascular aneurysm repair (EVAR) has improved AAA patient outcomes, approximately 45% of EVAR patients will experience a graft endoleak following their procedure. Endoleaks often remain asymptomatic and pose a high risk of rupture. The current standard of follow-up for patients involves endoleak surveillance using computed tomography angiography (CTA). Regular reliance on CTA for endoleak screening subjects patients to superfluous medical costs, radiation dosages, and nephrotoxic contrast. Safer, more economical imaging modalities with comparable diagnostic accuracy must be considered. Superb microvascular imaging (SMI) and contrast-enhanced ultrasound (CEUS) are promising diagnostic options. This review article will compare SMI to CEUS to determine which method offers higher sensitivity and specificity for endoleak identification. MATERIALS AND METHODS A PubMed database literature review was performed to compare the sensitivity and specificity of SMI to CEUS for identification of endoleaks following EVAR. Results from 7 studies with a total of 4,391 cases were analyzed based on predetermined inclusion criteria. Of these cases, 209 used SMI, and 4182 utilized CEUS. RESULTS Based on the 209 patients assessed with SMI post-EVAR, it offered an average sensitivity and specificity of 88.2% and 98.5%, respectively, in detecting endoleaks. Alternatively, in the 4182 patients monitored with CEUS post-EVAR demonstrated an average sensitivity and specificity for endoleaks of 95.5% and 93.1%, respectively. Based on these findings, CEUS offers a significantly higher sensitivity for post-EVAR endoleaks (p < 0.00001) while SMI stands as a significantly more specific imaging approach (p < 0.05). CONCLUSION This study demonstrates that SMI offers a significantly higher specificity for detecting post-EVAR endoleaks, while CEUS is a significantly more sensitive technique. Based on these results we conclude that CEUS is recommended over SMI as an alternative to CTA. Due to the limited data that exists regarding SMI detection of endoleaks, further studies must be conducted regarding its efficacy as it could prove to be a useful alternative.

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RADIOLOGY

Magnetic Resonance Imaging vs. Inferior Petrosal Sinus Sampling in The Diagnosis of Pituitary Adenoma Induced Cushing's Disease

Purpose Cushing's Disease (CD) is defined by hypercortisolism secondary to adrenocorticotropic hormone (ACTH) overproduction by a functioning pituitary adenoma. 2-3 million new cases of endogenous hypercortisolemia (Cushing's Syndrome) are reported each year, 70% of which are due to CD. The overall prevalence of CD is estimated to be higher due undiagnosed cases. Current diagnosis of CD involves identifying abnormal plasma levels of ACTH and cortisol followed by imaging studies to confirm the ACTH-secreting tumor; however, imaging modalities have historically faltered in reliably visualizing small pituitary tumors. In cases highly suspicious for CD but without an identifiable pituitary adenoma on Magnetic Resonance Imaging (MRI), Inferior Petrosal Sinus Sampling (IPSS) can be used. This technique can localize the adenoma for surgical planning and exclude an ectopic, extra-adrenal source of ACTH production. This review article compares MRI and IPSS in the detection and localization of ACTH-secreting pituitary adenoma. Materials and Methods A literature review was done using the PubMed database to compare the sensitivity of MRI to IPSS. Results from 5 studies were compiled and reviewed based on inclusion criteria. Between the 5 studies, a total of 392 cases were imaged or sampled. Of these cases, 309 were analyzed with MRI, while 83 were analyzed by IPSS. Results Of the 309 patients that were analyzed using MRI, the location of the tumor was accurately identified 230 times (sensitivity=74.4%). IPSS analysis correctly identified the location of the tumor 75 of 83 times (sensitivity=90.4%) which is significantly superior compared to MRI (p=0.00194). Conclusion IPSS has a improved sensitivity for assessing pituitary adenoma location when compared to MRI; however, due to its procedural invasiveness, IPSS is considered a second line diagnostic measure when MRI is non-diagnostic. In conclusion, patients with suspected CD, but a negative MRI result, a subsequent IPSS procedure should be the gold standard to confirm or exclude the presence of an ACTHproducing adenoma. Clinical Relevance Statement This review compares the sensitivity of Magnetic Resonance Imaging to Inferior Petrosal Sinus Sampling in the diagnosis of Pituitary Adenoma induced Cushing's Disease, and shows that IPSS is superior.

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CLINICAL AND TRANSLATIONAL RESEARCH

RHEUMATOLOGY

An Atypical Presentation of a Polyarticular Gout Flare: Case Report

Gout is the most common form of inflammatory arthritis in the United States, with a global prevalence between 3-6% and a classic presentation of monoarticular pain and swelling. However, an atypical presentation with misleading features can make this diagnosis difficult. A 54-year-old-man with a history of hypertension, atrial fibrillation, osteoarthritis, and gout presented with dysuria, painful scrotal swelling, severe bilateral flank pain, back pain, and atraumatic right arm pain and swelling. On arrival, he was febrile (39.3C), tachycardic (111 bpm), and in significant distress. He had bilateral CVA tenderness. Bilateral knees and right upper extremity from elbow to fingertips were erythematous, edematous, and exquisitely tender. His scrotum was tender and enlarged. No rashes or skin lesions were noted. Laboratory analysis demonstrated an elevated ESR and CRP, and a WBC count of 24K. The patient was given Ceftriaxone for presumed septic pyelonephritis and admitted. After 24 hours of antibiotics, the patient remained febrile without symptom improvement. The differential was broadened to include right upper extremity DVT, disseminated gonoccocal infection, and septic arthritis with seeding from spinal foci. Workup including urinalysis, blood and urine cultures, abdominal/spinal CT, scrotal and right upper extremity ultrasound, STI panel, and X-rays of involved joints, was unremarkable. Rheumatology was consulted and recommended an empiric dose of Anikara due to a high index of suspicion for a crystaline polyarthropathy. The patient experienced marginal clinical improvement and allowed bilateral knee arthrocentesis which revealed uric acid crystals and 3K WBCs confirming a final diagnosis of polyarticular gout flare. Polyarticular gout can present with a systemic inflammatory state concerning for sepsis and mislead providers away from the diagnosis and treatment of a non-infectious crystalline arthropathy. Current literature, while limited, has shown the variability in presentation of polyarticular gout and its diagnostic challenges. Few case studies have shown how these patients are subjected to extensive diagnostic testing and unnecessary interventions putting them at higher risk for further complications and delaying appropriate treatment. As in this patient, a septic pyelonephritis with polyarthritis picture delayed correct diagnosis and effective clinical management by the primary team. This case highlights the importance of maintaining a broad, flexible differential for patients without a straightforward diagnostic path and early involvement of specialists facilitating a timely diagnosis and correct treatment.

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SURGERY

Venous Thoracic Outlet Syndrome: Is Emergent Treatment Necessary?: A Single-Institution Retrospective Cohort Analysis.

The timing of surgical rib resection for venous thoracic outlet syndrome (TOS) has been heavily debated in the literature. Our objective was to analyze cases of TOS and compare outcomes in patients presenting at various time intervals after diagnosis to determine whether the timing of treatment had effects on subclavian and axillary vein patency. A retrospective chart review of patients operated on between 2017-2022 at George Washington University Hospital was conducted. Patients were divided into 2 groups based on the time from initial diagnosis to surgical rib resection. This variable was called time to surgery (TTS). The first group was patients whose TTS was < 15 and Group 2 was patients whose TTS was >15 days. Subclavian and axillary vein patency was analyzed at 3- and 6-months post-op. A two-sample t-test was used to measure significance of difference in outcomes between groups. This study was IRB exempt by the George Washington institutional review board. Fourteen patients met the inclusion criteria for our study from 2017-2022. Of those 14 patients, 7 (50%) had a TTS of < 15 days (group 1) and 7 (50%) had a TTS of >15 days (Group 2). The average TTS for groups 1 and 2 were 9 days and 296 days respectively. Group 2's TTS is skewed by one patient who was lost to follow-up for 5 years after initial diagnosis and discharge on anticoagulation alone. Excluding this patient, the average TTS for group 2 was 41 days. 5/7 patients (71%) in Group 1 had fully patent vein with minimal residual scarring at 3 and 6 months and 2/7 (29%) had residual scarring with narrowed vein. Group 2 had 6/7 patients (86%) with fully patent vein and 1 patient (14%) present with re-occlusion at 3 months with unsuccessful re-intervention and residual chronic occlusion managed on anticoagulation (p=.3). All patients in Group 1 were inpatient admissions while 3/7 patients (43%) in group 2 were outpatient referrals. There is no significant difference in venous patency outcome in patients who receive immediate surgical intervention versus those that receive elective outpatient surgical intervention. Therefore, surgical intervention for Venous TOS should be done electively at the convenience of the patient.

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SURGERY

30 Day Complication Rates After Gender-Affirming Bottom Surgery-An Analysis of the NSQIP Database from 2010-2020

Purpose: Gender-affirming bottom surgeries (GABS) play a central role in treating gender dysphoria to improve quality of life for transgender and nonbinary (TGNB) patients.3-6 However, there exists limited data on operative risks and outcomes for patient populations undergoing GABS. The goal of this study is to identify sociodemographic and clinical risk factors for determining 30-day postoperative complications in patients undergoing GABS. Methods: The ACS-NSQIP database from 2010 to 2020 was used to identify patients undergoing gender affirmation surgery (GAS) using Current Procedural Terminology (CPT) codes included in transfeminine and transmasculine bottom surgery. IBS-SPSS software was used to perform a multivariate analysis to determine risk factors for increased 30-day postoperative complications including unplanned reoperation and readmission rates. Results: A total of 1,809 GABS were performed in the NSQIP database from 2010 to 2020. Overall 30-day complication rates were 7.5%, with the most common complication being unplanned reoperation (2.8%). Patients aged 36 and older were at a greater risk for readmission and wound complications (p < 0.05). Patients with diabetes mellitus type 2 had an increased risk for reoperation (p < 0.05). Black or African American race had an increased risk for readmission and unplanned reoperation (p < 0.05). Conclusions: This study identified several sociodemographic and clinical risk factors, such as older age, diabetes mellitus type II, and black race had increased postoperative complications for patients undergoing gender-affirming bottom surgeries. Racial disparities in outcomes are especially worthy of further investigation. Physician awareness of risk factors and social determinants of health can help prevent and improve postoperative care education and patient compliance.

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SURGERY

Wound Disruption Causing Increased Reoperation Rates in Transfeminine Bottom Surgery? An Analysis of the NSQIP Database from 2010-2020

Purpose: Our study aims to evaluate the potential risk factors for postoperative complications and re-operation rates following transfeminine bottom surgery to improve surgical outcomes in the male-to-female (MtF) transgender population. Methods: ACS-NSQIP database (2010-2020) was utilized to identify patients undergoing GAS with the relevant CPT codes, filtered by relevant ICD 9 and ICD 10 codes to further specify patients specifically undergoing GAS. Multivariate regression analysis was performed to identify risk factors for unplanned reoperation. A risk-adjusted multivariate regression analysis controlling for BMI, age, race, smoking status, and diabetes was also performed to identify other risk factors using odds ratio (OR). Results: Those who had a wound disruption were 73.85 times more likely to have an unplanned reoperation compared to those who had no wound disruption (p = <0.001). History of steroid use for a chronic condition (OR=11.56, p=0.05) and longer operation times (OR=1.27, p=0.04) were also shown to be risk factors. Patients who needed a red blood cell transfusion intraoperatively or postoperatively within 72 hours were 6.40 times more likely to undergo an unplanned reoperation compared to those who did not need a transfusion (p=0.05). Conclusion: Our results suggest that plastic surgeons should consider wound disruption/dehiscence as the highest risk factor for an unplanned reoperation following MtF surgeries, along with the long operative times, bleeding requiring intra/postoperative blood cell transfusion, and history of steroid use for a chronic condition.

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THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY CLINICAL AND TRANSLATIONAL RESEARCH SURGERY

Socioeconomic influence on surgical management and outcomes in patients with craniosynostosis - A systematic review

Background: Disparities in insurance and socioeconomic status (SES) may impact surgical management and subsequent postoperative outcomes for patients with craniosynostosis. This systematic review summarizes and assesses evidence on possible differences in surgical care including procedure type and age at surgery, and differences in surgical outcomes such as complications, length of hospital stay, and child development based on SES. Methods: The databases Scopus, PubMed, and CINAHL were searched between May and July 2022. Following PICO (participants, intervention, comparison, outcome) criteria, studies included focused on: patients diagnosed with craniosynostosis; corrective surgery for craniosynostosis; comparison of insurance, income or zip code; and surgical management or postoperative outcomes. Results: The initial search yielded 336 articles. After three stages of screening, 15 studies were included. Assessed outcomes included: type of procedure (6 articles), age at time of surgery (3 articles), post operative complications (3 articles), referral delay (2 articles), length of stay (2 articles), child development (1 article) and hospital costs (1 article). Of the studies with significant results, insurance type was the main SES variable of comparison. These studies indicated that patients with public medical insurance were more likely to have open rather than endoscopic procedures, cranial vault remodeling rather than strip craniectomy, older age at time of surgery, more complications, greater referral delays, longer length of stay, and higher medical charges. It is important to note that two articles found no significant association between insurance type and postoperative outcomes. Similarly, one article analyzing referral delays and another assessing length of stay found no significant association between these outcomes and insurance type. Conclusions: This systematic review demonstrated that SES may be associated with several differences in the management of patients with craniosynostosis, though insufficient data precluded any definitive, quantifiable results. Further investigation into the impact of SES on the management of patients with craniosynostosis is warranted.

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THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY CLINICAL AND TRANSLATIONAL RESEARCH SURGERY

Intraoperative Blood Product Transfusion in Pediatric Cardiac Surgery Patients: A Retrospective Review of Adverse Outcomes

BACKGROUND: Resuscitation with blood products is often required for pediatric cardiac surgery patients following cardiopulmonary bypass. However, data suggest that blood product transfusion is an independent predictor of adverse outcomes. Most studies have specifically found detrimental effects of overall transfusion of red blood cells in particular, but few have analyzed outcomes by the other specific blood product components. AIMS: The objective of this study is to analyze adverse outcomes associated with intraoperative transfusion of specific blood product components. METHODS: A retrospective review was performed on 643 pediatric patients who underwent cardiac surgery requiring cardiopulmonary bypass to evaluate the risk of selected adverse outcomes associated with intraoperative blood product transfusion. Adverse outcomes included thrombotic complications, stroke, acute kidney injury, prolonged mechanical ventilation, and death. Univariate logistic and linear regression analyses were performed to explore the association between various blood products and the occurrence of postoperative complications. Multiple logistic and linear regression analyses were performed adjusting for age, cyanotic status, The Society of Thoracic Surgeons-European Association for CardioThoracic Surgery Score (STAT score), and cardiopulmonary bypass time. RESULTS: Unadjusted analysis using univariate logistic and linear regressions showed statistically significant associations of almost all blood components (per 10 mL/ kg dose increments) with multiple postoperative complications, including mortality, thrombotic complications, stroke, and days of mechanical ventilation. After adjusting for patient age, cyanotic status, STAT score, and cardiopulmonary bypass time, multivariable logistic and linear regression analyses revealed no association between transfusion of blood products with acute kidney injury and stroke. Administration of red blood cells was the only category significantly correlated with increased days of mechanical ventilation (0.5?days increase in mechanical ventilation per 10 mL/kg transfusion of red blood cells). The only blood product to show complete lack of a statistically significant association with any of the studied outcomes was cryoprecipitate. CONCLUSIONS: Transfusion of blood products following cardiopulmonary bypass is associated with postoperative adverse outcomes. Future studies aimed at strategies to reduce intraoperative bleeding and decrease the amount of blood products administered are warranted.

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SURGERY

Concurrent Abdominal Body Contouring and Hernia Repair is a Safe Choice: An analysis of the 2015-2020 ACS-NSQIP Database

Background: Many of the patients who undergo abdominal body contouring (ABD) procedures are at a higher risk of having weakened abdominal walls. As a result, many of these patients can develop abdominal wall hernias intraoperatively or postoperatively. Given the significant co-existing nature of hernias at the time of abdominal body contouring procedures, concurrent hernia repair (HR) with abdominal body contouring (ABD) has been discussed as a strategy. Although combining these two procedures is to decrease postoperative morbidity, potential risks such as wound complications, infection, venous thromboembolism, and increased operating room and anesthetic time must also be considered. The purpose of this study is to evaluate potential medical and surgical complications following combined abdominal body contouring procedures, with a greater emphasis on cosmetic abdominoplasty, concurrently done with hernia repairs. Methods: ACS-NSQIP was accessed on June 13, 2022, and patients who underwent ABD or ABD-HR between 2015 and 2020 were identified. Given the non-randomized and retrospective nature of this study, a propensity score (PS) matching was used to reduce selection bias by equating groups based on covariates. Bivariate analyses of independent variables were performed using Pearson Chi-Square and Fisher's Exact tests for categorical variables and the Wilcoxon rank-sum test for continuous variables. Results: Out of the 14,115 patients who were identified in the 2015-2020 ACS-NSQIP databases, 13,634 patients had only ABD, while 481 patients had both ABD-HR. The comparison of unmatched ABD and ABD-HR patient characteristics revealed significant differences in numerous covariates. Following the matching of propensity scores, bivariate analysis for the combination of all hernia types indicated significant differences in longer operative times (mean: 209.6 min) (P < 0.001) and longer hospital length of stay (mean: 1.9 days) (P < 0.001). The incidence rate of postoperative complications such as wound dehiscence, venous thromboembolism, unplanned return to the operating room within 30 days, sepsis, and other medical complications, displayed no significant differences between the two cohorts. Following a sub-group analysis, which was conducted to examine wound complications more precisely, there was no significant association found between the two groups. Conclusion: Our results show no increase in postoperative morbidity when combining ABD and HR compared to ABD alone, suggesting that these procedures can be safely performed concurrently, regardless of the type of hernia.

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CLINICAL AND TRANSLATIONAL RESEARCH

SURGERY

Trends in Medicare Reimbursement for Transgender Plastic Surgery Procedures

Title: Trends in Medicare Reimbursement for Transgender Plastic Surgery Procedures Authors: Mira Johnson, MSII; Waleed Rashid, MSIII Advisors: Bharat Ranganath, MD ; Jerry Chao, MD Objectives: The goal of this project was to examine trends in Medicare reimbursement rates for transgender plastic surgery procedures from 2007 to 2020. Methods: Year to year changes in reimbursement rates were measured for 35 commonly used gender-affirming Current Procedural Terminology (CPT) codes. Reimbursement rates were obtained from January 2007 to January 2020 using the Centers for Medicare & Medicaid Service Physician Fee Schedule (CMS) and adjusted for inflation to 2020 U.S. dollar value.1 The Unadjusted Percent Change in Consumer Price Index (CPI) was calculated using data from the U.S. Bureau of Labor Statistics.2 Reimbursement rates were adjusted for inflation using the CPI for each year, and the average annual and total percent changes in reimbursement rates were calculated using these adjusted prices. Results: The mean percent change in the reimbursement rates from 2007 to 2020 was +16.01% while the percent change in the Consumer Price Index (CPI) from 2007 to 2020 was +27.45%. Using a two-tailed t test, results indicated that the rate of change in inflation from 2007 to 2020 was significantly higher (p < 0.0001) than the change in rate of medical reimbursement for all gender-affirming CPT codes analyzed. After adjusting for inflation, the Compound Annual Growth Rate (CAGR) for each CPT code was also shown to be negative, with an average change of -0.76%. The adjusted total percent change was also calculated at an average of -8.97%. ? Conclusion: This is the first study evaluating trends in Medicare reimbursement rates for commonly selected gender-affirming procedures in the United States. After adjusting for inflation, Medicare reimbursement rates for all gender-affirming surgeries analyzed declined from the years 2007 to 2020. Using a two-tailed t-test comparison of means, the rate of change in medical reimbursement coverage from 2007 to 2020 was significantly more (p < 0.0001) than the change in inflation during that time period. Increased consideration of these trends will be important for U.S. policymakers, hospitals, and surgeons to ensure ease of access to gender-affirming care for transgender individuals. Citations: • Physician fee schedule. CMS. https:// www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched. Accessed March 2, 2022. • Consumer price index (CPI) databases. U.S. Bureau of Labor Statistics. https://www.bls.gov/cpi/data.htm. Accessed March 2, 2022.

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SURGERY

A Retrospective Review of Patient-Reported Outcomes Following Postaxial Polydactyly Ligation and Surgical Excision

Background: Interventions for type B postaxial polydactyly include suture ligation and surgical excision. To date, there is a paucity of literature comparing the long-term outcomes of these procedures. Thus, this study sought to analyze and compare the patient-reported long-term outcomes of these procedures. Methods: A six-question survey was distributed from January 2021 to March 2022 to patients who underwent treatment for type B postaxial polydactyly at a single pediatric institution from 2010 to 2016. The patients were queried about the incidence of sensitivity or pain, keloid healing, and/or persistent presence of bump ("nubbin") at the site of the excised supernumerary digit. Results: A total of 158 responses accounting for 258 digits were attained for a 53% response rate. Seventy-six percent of digits (n=196) were surgically excised whereas 24% of digits (n=62) were ligated. Overall, median age at excision was 59 [29, 134] days with a median age at survey of 8 [5.4, 10.2] years. Patients treated surgically were significantly older at the time of excision and survey (p<0.005). The likelihood of postoperative sensitivity was similar in both groups; however, a significantly higher incidence of "nubbin" (48.4% vs. 31.6%, p=0.016), and lower incidence of postoperative hypertrophic scar (10.6% vs. 15.1%, p=0.363) was seen in the ligation group. These findings remained significant in the adjusted analysis. Conclusion: This study suggests that suture ligation can be used in select cases without increasing the prevalence of long-term pain or sensitivity. Time to treatment remains a key variable in deciding either treatment.

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SURGERY

Concurrent Muscle Flap with Infra-inguinal Bypass is Associated with Multiple Morbidities Including Higher Wound Complications.

Muscle flaps are typically performed to salvage infected but functional lower extremity bypasses. Nevertheless, they are occasionally used prophylactically when done concurrently with the bypasses, presumably to mitigate anticipated wound complications, but there is little data supporting these benefits. We utilized the ACS-NSQIP database to extract non-emergent infrainguinal bypasses from 2005-2020 with concurrent muscle flaps (FLAP) and those without them (NoFLAP) using CPT codes. Propensity match was performed to obtain two comparably studied groups based on demographics and comorbidities. 30-day outcomes such as mortality, MACE, pulmonary, renal, and wound complications were measured. There were a total of 404 FLAP and 84,777 NoFLAP cases. FLAP had significantly higher COPD, CHF, pre-operative sepsis, recent weight loss, anemia, and ASA class 4/5. After propensity match, there was no significant difference in preoperative characteristics between FLAP (404 cases) and NoFLAP (1,212 cases). There was no significant difference in 30-day mortality, MACE, pulmonary, or renal complications between the two groups. FLAP was associated with significantly longer operative time (329 ± 150 minutes vs. 231 ± 112 minutes, p <0.0001), higher risk of bleeding requiring transfusion (46.3% vs. 22.8%; p<0.0001) and longer hospital stay (11.4 ± 9.6 days vs. 8.3 ± 8.8 days, p<0.0001). Furthermore, FLAP was associated with significantly higher wound complications (14.9% vs. 10.5%; p=0.02), sepsis (7.4% vs. 3.8%; p<0.01, and venous thromboembolism (3.0% vs. 0.9%; p<0.01). Concurrent muscle flap with lower extremity bypass is typically performed in higherrisk patient populations, but even after correcting for those differences, the procedure is still associated with multiple morbidities including more wound complications rather than mitigating them. Caution and judgment in individual cases should be exercised.

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CLINICAL AND TRANSLATIONAL RESEARCH DAY

Evaluating the Use of Hyperbaric Oxygen for Treatment and Prevention of Postoperative Ischemia in Breast Reconstruction: A Systematic Review

Background: Complications and poor outcomes following breast reconstruction are often related to tissue ischemia and subsequent necrosis of mastectomy skin. Hyperbaric oxygen therapy (HBOT) has shown promising results for reducing these adverse effects. This systematic review summarizes and assesses evidence on the role of HBOT in breast reconstruction patients in treating ischemic complications following surgery and/or radiotherapy. Methods: A comprehensive literature search was conducted in January 2023 using publications extracted from Pubmed, Scopus, Medline and CINAHL. Studies published after 2000 that investigated the impact of HBOT on postoperative outcomes of female patients undergoing implant or autologous breast reconstruction were included. Studies that had fewer than 5 patients, no full-text access, and/or were not in English were excluded. Systematic reviews and view-point articles were also excluded. Results: Our initial search yielded 263 studies. After three stages of screening, 4 eligible studies were included. All 4 studies were retrospective casecontrol chart review studies of various sizes (n = 7 patients). 3 of the 4 studies reported that HBOT had a significant advantage over alternative methods in reducing the risk of postoperative complications following post-mastectomy breast reconstruction, including successfully rescuing "at-risk" ischemic breast skin flaps and preventing subsequent ischemic necrosis. Contrarily, one study reported that HBOT did not make a statistically significant difference on ischemic nipples following nipple-sparing mastectomy, though did not negate its potential benefit. Generally, the studies found that initiating HBOT sooner rather than later following reconstruction and increasing the number of HBOT sessions administered were associated with improved clinical outcomes. Conclusion: This systematic review demonstrated that HBOT has shown to be advantageous at treating and preventing postoperative ischemic complications following breast surgery, though the current literature on this topic is sparse. Of the literature that currently exists, findings are notably limited by numerous factors including the studies' small sample sizes and lack of standardized treatment algorithms and clinical endpoints. Additionally, as these studies speculated the cost-saving implications of HBOT but did not specify any actual or estimated cost savings, data analysis concerning HBOT-related cost savings is something that must be further explored. We believe that although the beneficial potential of HBOT in this context is promising, further investigation is warranted for more robust evaluation on its application. References: Meier, et al. 2021. doi: 10.28920/dhm51.3.288-294. PMID: 34547780. Rajpal, et al. 2019. PMID: 31509902. Shuck, et al. 2017. doi: 10.21037/gs.2017.07.08. PMID: 29302483. Spruijt, et al. 2021. doi: 10.28920/dhm51.1.2-9. PMID: 33761535.

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CLINICAL AND TRANSLATIONAL RESEARCH

SURGERY

Assessment of Predicted In-hospital Mortality by Elixhauser Comorbidity Index in Vascular Surgery

The Elixhauser Comorbidity Index (ECI) is a comorbidity measurement tool based on ICD diagnostic codes that predict in-hospital mortality. Although it has been validated in large patient populations, the accuracy of prediction has not been examined in vascular surgery. Patients undergoing open abdominal aortic aneurysm repair (AAA), endovascular aneurysm repair (EVAR), carotid endarterectomy (CEA), carotid artery stenting (CAS), aortoiliac open bypass (AIO), aortoiliac endovascular repair (AIE), lower extremity open (LEO) and endovascular (LEE) interventions from 2015-2020 were identified using ICD-10 codes in the National/Nationwide Inpatient Sample (NIS). Traumatic cases were excluded. Elixhauser Comorbidity Indices were calculated and were used with age to predict in-hospital mortality in logistic regression (C-statistic>0.7 indicates good predictor). ECI best predicted in-hospital mortality for CAS (C-statistic=0.87, 95%CI 0.85-0.94) and CEA (C-statistic=0.87, 95%CI 0.83-0.92), followed by AIO (C-statistic=0.74, 95%CI 0.71-0.76), LEO (C-statistic=0.71, 95%CI 0.69-0.72), and AIE (C-statistic=0.70, 95%CI 0.68-0.72). ECI did not predict in-hospital mortality well in AAA open (C-statistic=0.68, 95%CI 0.65-0.70), EVAR (C-statistic=0.64, 95%CI 0.62-0.66), or LEE (C-statistic=0.67, 95%CI 0.65-0.68). The ECI is a useful tool in predicting in-hospital mortality for certain aspects of vascular surgery, such as CEA and CAS. However, it underestimates mortality in aortic surgery; this is concurrent with previous studies using the ACS-NSQIP Risk Calculator that underestimated mortality. Despite the additional comorbid conditions exclusive to the ECI, these findings suggest the presence of aortic surgery-specific preoperative factors that are not identified or well-calibrated in either predictive model. More research is needed to identify and implement these unknown factors.

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THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2023 RESEARCH DAY CLINICAL AND TRANSLATIONAL RESEARCH

SURGERY

An Extensive Retrospective Analysis on The Interactive Effect of Socioeconomic Status and Patient Location on Vascular Surgery Outcomes

The effect of socioeconomic status (SES) has been implicated in the outcomes of vascular surgery. In previous studies, selective vascular diseases and procedures under different time frames were investigated. This makes it challenging to draw a conclusion from a cross-study comparison. Moreover, the definition of SES stratification and the healthcare experience of the same-level SES are dynamic based on geographic locations. In fact, SES and patient location have been shown to synergistically influence health status in other fields of medicine such as primary care. However, the interactive effect of these two factors has not been investigated in vascular surgery outcomes. This study investigated the interaction of SES and geographical location and how they affect the peri-operative outcomes, such as mortality and morbidity, of patients who underwent different major vascular surgeries including abdominal aortic aneurysm (AAA), aortoiliac occlusive disease (AOD), carotid artery stenosis, and lower extremity arterial disease. Open and endovascular surgeries were studied separately. All analyses were based on the National (Nationwide) Inpatient Sample (NIS) database.

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THE GEORGE WASHINGTON UNIVERSITY

CLINICAL AND TRANSLATIONAL RESEARCH

SURGERY

Uterine Transplantation in Transgender Individuals as Gender-Affirmation Surgery

Uterine transplantation is a rapidly developing field that has important implications for the transgender population. The first attempt at uterine transplantation took place in 2000, but it was not until 2014 when the first successful live birth from a uterine transplant recipient was reported in Texas (1). The primary focus thus far has been on cis gendered women who suffer from infertility. There has been little research done on the application to the transgender population and the potential for uterine transplantation to become a transformative part of gender affirming care. We conducted a retrospective review of literature from the past 10 years (2013-2023) surrounding the success of past uterine transplantation procedures in cisgender women and applications to transgender individuals. The research terms used included "uterine transplantation" AND "gender affirmation"; "uterine transplantation" AND "transgender"; as well as "uterine transplantation" NOT "gender affirmation" NOT "transgender." This yielded 50 results spanning between clinical trials, meta-analyses, RCTs, reviews, and systematic reviews. Currently, there has not been a successful uterine transplant done in a male to female (MTF) transgender individual. Special considerations in MTF individuals receiving a uterine transplant include anatomical and hormonal differences, as well as infertility and ethics concerns. Potential bioethical concerns include extending the right to reproductive liberty to the transgender population as well as prioritization between cisgender women and transgender individuals as the practice of uterine transplantation advances. While there are still many considerations that need to be made, extending efforts of uterine transplantation to transgender females can play a crucial role in reducing the gender dysphoria that many trans individuals experience. (1) Gomel V. Uterine transplantation. Climacteric. 2019;22(2):117-121. doi:10.1080/13697137.2018.1564271

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UROLOGY

A Prospective Cohort Study of Assisted Bladder Emptying Following Primary Cloacal Repair: the Children's National Experience.

Introduction: Although the combination of bladder dysfunction and upper tract anomalies puts patients with cloaca at risk for renal disease, the rarity of this condition makes it difficult to study empirically. As a high-volume center, we uniquely capture bladder function outcomes following our cloacal repairs. Objective: 1) Describe the rates of incomplete bladder emptying following primary cloacal repair (at 2-3 months after repair and last follow up), and 2) Identify clinical factors associated with assisted bladder emptying. Study Design: We performed a prospective cohort study of patients undergoing primary cloaca repair by our Children's National Colorectal Center team between 2020 and 2021. The primary outcome was assisted bladder emptying at 2-3 months postoperatively and last visit. Covariables included preoperative characteristics (cloacagram measurements, ARM severity, vesicoureteral reflux (VUR) status, sacral ratio, spinal cord status, & preoperative bladder emptying), and operative details (age at repair, repair type, & concomitant laparotomy). Results: Eighteen participants were eligible. A majority had moderate cloaca (78%), VUR (67%), spinal cord abnormalities (89%), and good sacral ratios (56%). Preoperatively, 10 patients were diapered for urine and 8 had assisted bladder emptying. Surgical repairs were performed at a median age of 8 months (range 4 - 46). Nine (50%) patients underwent urogenital separation (UGS), eight (44%) total urogenital mobilization, and 1 (6%) perineal sparing posterior sagittal anorectoplasty with introitoplasty. Exploratory laparotomy was performed in 7 (39%) patients. At 2-3 months, 7 patients were voiding and 11 required assisted bladder emptying. Median length of long-term follow up was 12 months (range 5 - 25), and 8 patients were voiding and 10 required assisted bladder emptying. Postoperative need for assisted bladder emptying was significantly associated with assisted bladder emptying preoperatively, a shorter urethra and increasing common channel length, UGS and exploratory laparotomy. Spinal cord imaging findings were not associated. Discussion: Bladder emptying following cloaca repair is likely a result of congenital function and surgical effects. Indeed, increasingly cloaca complexity requiring UGS and laparotomy was associated with both pre- and post-operative assisted bladder emptying. The lack of association with spinal cord imaging may reflect a divergence between anatomy and function. Conclusion Approximately half of patients required assisted bladder emptying in this study. Associated factors included urethral and common channel length, the need for assisted bladder emptying preoperatively, the type of surgical approach and additional laparotomy. Being diapered with seemingly normal voiding prior to surgery did not guarantee normal bladder function postoperatively.

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Faculty and Student Perceptions of Unauthorized Collaborations: Student or System Failure?

Purpose: Unauthorized collaboration among medical students, including the unauthorized provision of assistance and sharing of curricular and assessment materials, is a reported problem. While many faculty view such sharing as academic dishonesty, students do not always perceive these behaviors as problematic. With the trend toward more small-group and team-based learning and the proliferation of resource-sharing and online study aids, collaboration and sharing may have become a student norm. This multi-institutional, qualitative study examined faculty and student perceptions of and student motivations for unauthorized collaboration. Method: Using a constructivist approach, the authors conducted scenario-prompted semistructured interviews with faculty and students in the preclinical curriculum. Participants were asked to reflect on scenarios of unauthorized collaboration and discuss their perceptions of student motivation and the influence of personal or environmental factors. The authors performed inductive thematic analysis of the interview transcripts using open and axial coding followed by abstraction and synthesis of themes. Results: Twenty-one faculty and 16 students across three institutions were interviewed in 2021. There was variation in perceptions among faculty and among students, but little variation between faculty and students. Both participant groups identified the same three areas of tension/themes: faculty/curriculum goals vs student goals, inherent character traits vs modifiable behavioral states, and student relationships with their peer group vs their relationships with the medical education system. Student behaviors were perceived to be influenced by their environment and motivated by the desire to help peers. Participants suggested cultivating trust between students and the education system, environmental interventions, and educating students about acceptable and unacceptable behaviors to prevent unauthorized collaboration. Conclusions: Given the various tensions and positive motivations behind unauthorized collaborations, institutions should consider explicitly preparing students to make thoughtful decisions when faced with competing priorities in addition to developing mitigation strategies that address the environment and its interactions with students.

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Differences in Verbal and Gestural Communication Strategies Between In-person and Remote Medical Procedure Training Cohorts

Background: A shift in procedural training from in-person to virtual requires a better understanding of how verbal guidance and gesture use may change to convey the action that needs to be performed. We developed a mixed reality system to train students on how to perform ultrasound guided central venous catheter placement (US-CVC). Methods: Twenty trainees with limited US-CVC experience were assigned to training via in-person or MR using the HoloLens 2. Instructors were emergency medicine physicians. During the in-person training, instructors used the kit to demonstrate the procedural maneuvers. In the MR training, instructors used representations of virtual hands, needle, and US probe to demonstrate the correct orientation of the tools in the learner's field of view. The training sessions were video recorded and analyzed using a checklist. Each evaluated step was assigned a number one through five to indicate if instruction was completely gestural (1), mostly gestural with some verbal (2), half gestural half verbal (3), mostly verbal with some gestures (4), or completely verbal (5) by two reviewers. Results: Recordings of ten instructors in each of the in-person and MR conditions were analyzed. Five key training steps were identified: A) how to position the ultrasound probe to acquire a transverse view of the vessel in the midpoint of the image B) tracking the needle tip as it advances through the blood vessel using dynamic imaging, C) advancing the wire, D) using a twisting motion to use a dilator and E) threading the catheter over a wire making sure to never let go of the wire. For inperson studies, the mode for the communication type utilized for steps A, B, C, and D is 4 and for step E was 5. In MR training, all five steps utilized communication type 5 and 5 was the mode for all steps evaluated. In both groups, no step was rated completely gestural. Discussion: The preliminary results of this data analysis suggest that instructors in the MR setting used completely verbal communication most often, whereas the instructors in the in-person training used mostly verbal communication with some hand gestures. Instructors were provided with brief training in the novel MR technology, perhaps limiting comfortability in utilization of the MR system's virtual tools and gestures. Future work should further analyze the specific verbal communication and enumerate the hand gestures used within each step as well as examine the effect of practice.

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Facilitators of Parent Skill Use in ADHD Treatment

Behavioral parent training is a well-documented evidence-based treatment for youth with Attention-Deficit/Hyperactivity Disorder (ADHD), however parent adherence to treatment-prescribed parenting skills is variable. Although a range of barriers to parent adherence are described in the literature, little is known about mechanisms that facilitate parent engagement and skill utilization. The present study examined the role of parent engagement (e.g., parents' motivation, skill understanding, and interest in treatment) during treatment sessions for facilitating parent skill utilization at post treatment. Participants included 129 children with ADHD (73% male; Mage = 8.22; grades 2-5) and their parents who received the Collaborative Life Skills (CLS) program: a multicomponent school-home intervention, including a ten-session behavioral parent training program led by school mental health providers at their school sites. Clinician- and parentreported facilitators of parent skill utilization (understanding, motivation, interest) were assessed weekly during treatment. Both clinician- and parent-reported engagement factors significantly predicted parents' post-treatment skill utilization. An exploratory model revealed that cognitive facilitators of treatment engagement predicted parental strategy use at post-treatment, which in turn predicted strategy use at maintenance (i.e., six-months follow-up). Findings underscore the importance of targeting parental treatment engagement during behavioral parent training to optimize adherence.

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3D Printing in Surgical Education: A Visuospatial and Kinesthetic Learning Module of Inguinal Hernia Repair for Third Year Medical Students

Introduction: High-fidelity three-dimensional (3D) models provide a better understanding of spatial relationships among complex anatomical structures. Medical students often lack hands-on opportunities to develop an in-depth understanding of applied anatomy prior to their clinical years, a trend exacerbated by the COVID-19 pandemic. There is limited research on the utilization of 3D models in the clinical years. This study evaluates the effectiveness of an interactive 3D-printed inguinal hernia model in teaching applied surgical anatomy to third-year medical students (MS3). Materials and Methods: 3D-printed models of inguinal anatomy were created using de-identified CT scans, 3D-modeling software, and 3D-printing services. A single-blind randomized control trial of third-year medical students was conducted at a single academic institution. The tactile-group received three educational tools describing inguinal hernia anatomy and repair: an established video module (WISE-MD), an illustrated procedure guide, and a 3D-printed model. The non-tactile group was provided the WISE-MD module and the illustrated procedure guide. Both groups received pre- and post-tests on direct and applied anatomy. Statistical analysis was performed using a t-test or Mann-Whitney U test for continuous variables and Chisquare or Fisher's exact tests for categorical variables. Statistical significance was defined by p<0.05. Results: One hundred and three third-year medical students participated in this study. There were no differences in pre-test scores between study groups (p=0.98). The tactile-group scored better on post-test questions on applied anatomy (p= 0.03), but no differences were noted in scores on basic anatomy questions (p=0.41). The tactile-group trended towards significance (p=0.09) overall between pre-test and post-test scores when questions were not grouped into applied vs. direct anatomy categories. Conclusions: Third-year medical students using high-fidelity 3D-printed models demonstrated improved test scores on applied anatomy as compared to students who were exposed to conventional educational resources. With the rising use of virtual learning environments, interactive learning tools like 3D-printed anatomy models may have an important role in skill and knowledge acquisition in surgical clerkships.

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FLiP Navegadores: The Effect of Spanish Resources on Health Literacy in DC Latinx Communities via FLiP Navigator Program

Hypothesis Implementation of Spanish speaking patient navigators, along with Spanish translated educational materials such as brochures, will improve health literacy among Spanish speaking communities and increase adherence to medical services. Background information The FLiP Navigators program consists of a group of trained medical and health professions student volunteers who use their knowledge and understanding of FLiP, the D.C. landscape, and its accompanying Community Resource Guide to offer suggestions and navigate families to the wealth of resources available throughout Washington, DC and its surrounding metropolitan areas. Its mission is to support families and clinical practices, connect to meaningful geographic, goal specific community resources to support health goals. Since the genesis of the program, families have reached more than 250 referrals to resources. However, navigators continue to struggle expanding services to reach the marginalized spanish speaking population in DC and would like to increase their efforts. Goal is to design a programmatic/ research intervention to enhance navigators skills and ability to provide quality care to a Spanish speaking population in the DC metro area experiencing food insecurity and other diet related chronic diseases. Related studies: A study showed that 53% of spanish speaking participants reported either sometimes having difficulty or always having difficulty with written health information, and 25% reported always asking for help or being not so confident in completing health forms (Christy et al, 2021) Findings highlight the need for interventions that address health beliefs and health literacy among Hispanic/Latino patients who have low confidence in completing written forms and difficulty understanding written information and reinforce the use of plain language and salient design features when developing patient education materials. A study used surveys to establish health literacy among patients filling out medical forms. Results concluded that Spanish speaking patients had less confidence with the English form compared to the Spanish form. Health literacy screening practices need to consider the patient's language and the language of the healthcare system and use questions that are less ambiguous in order to improve adherence to medications, satisfaction rates, and trust in a physician-patient relationship (Hadden, et al 2019).

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Perceptions of Homelessness: How Do They Vary Across a Medical Career and Among Different Specialties?

Introduction: Medical students, residents, and faculty are all capable of holding biases towards stigmatized groups like people experiencing homelessness. This study sought to investigate how level of training may influence perceptions of homelessness among medical students, residents, and faculty. Additionally, we sought to understand how different specialty's perceive people experiencing homelessness and whether this changes over the course of a career. Methods: The Health Professionals' Attitudes Toward the Homeless Inventory (HPATHI) was used to collect data over a two month period from one urban academic tertiary care facility. HPATHI is a 19 question, 5 point Likert scale survey that measures Social Advocacy, Personal Advocacy, and Cynicism of healthcare professionals regarding people experiencing homelessness. Medical students from the George Washington University Classes of 2023 through 2026 were sampled, as well as residents and faculty from the 4 largest training programs at the George Washington University Hospital; Emergency Medicine, Internal Medicine, Obstetrics and Gynecology, and General Surgery. Basic demographics as well as length of time spent in practice were collected in addition to HPATHI responses. Results: A total of 1141 individuals were invited to complete the survey, totaling 736 medical students, 214 residents, and 191 faculty. 290 individuals participated in the survey and 238 recorded complete responses were analyzed for a response rate of 24.3%. Overall perceptions of homelessness across the entire sample were positive and not greatly influenced by level of training during a medical career. Medical students across classes were largely in agreement based on mean HPATHI scores, and there was a noticeable increase in positive perceptions for students engaged in clinical rotations. However, comparing clinical specialties demonstrated wide variation in perceptions towards homelessness, with multiple significant (p < 0.05) differences on items from the Personal Advocacy, Social Advocacy, and Cynicism subscales. These differences were most prominent amongst individuals from the surgical specialties of General Surgery and Obstetrics & Gynecology. Conclusion: Perceptions towards people experiencing homelessness remained stable over the course of a medical career. Medical school students experienced a spike in positive perceptions during clinical rotations. Residents and faculty within surgical based specialties had more negative perceptions. However, overall scores were relatively positive demonstrating the largely favorable attitudes physicians and students have towards people experiencing homelessness.

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A Medical Student Educational Intervention on the Work-Up of Dizziness and Implementation of the HINTS Exam

The chief complaint of "dizziness" comprises 4% of presentations to emergency departments (EDs) in the United States, and the workup of undifferentiated dizziness presentations to EDs costs \$4 billion in the United States annually, mostly due to costly imaging and consultation. The Head Impulse-Nystagmus-Test of Skew (HINTS) exam is a bedside test used to distinguish between persistent vertiginous symptoms of central nervous system or inner ear origin. It is particularly useful for ruling in vestibular neuritis when stroke is on the differential for a patient's dizziness and has potential to reduce costs of unnecessary imaging and consultations. However, the HINTS exam performed by non-specialist physician providers has not been shown to have as favorable test characteristics compared to neurologists and neuro-otologists. A small number of studies on the HINTS Exam's utility in emergency room presentations of dizziness have included non-specialist providers, and a fraction of these describe how non-specialists were trained on performing the HINTS Exam. Retrospective studies have found that non-specialists often do not properly interpret, document, and follow up HINTS exam findings properly. It is important for patient safety and value-based care to teach all types of medical providers how to recognize dangerous dizziness. We believe a knowledge gap between specialists and non-specialists can be narrowed by introducing the HINTS exam earlier in medical education. Our study is unique because it will be the first scenario-based dizziness study to include medical students as the target population and will have a control group. We created Google Classroom modules with in-house and publicly available material to teach medical students about evaluating dizziness and implementing the HINTS exam. Modules will be offered and completed during the neurology clerkship. Topics of lectures include vestibular neuroanatomy, the differential for "dizziness," and interpreting HINTS exam findings. We perform a single-blind study with randomized assignment to a control group and intervention group. The control group will not access the modules and the intervention group will have access. The primary endpoint will be the performance on scenario-based quizzes. Secondary endpoints will be reported via surveys on self-efficacy and clerkship grades. Surveys and quizzes are adapted from published studies and tailored to the medical student level. Controlling for clerkships and electives completed, intended specialty, and attempts to pass USMLE, we hypothesize our modules will improve performance from a baseline on scenario-based guizzes and increase self-efficacy at the end of the study.

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Enhancing Application of Public Health/Population Health Knowledge in Clinical Practice to Address Health Disparities: A Cross-sectional Curricular Assessment

Purpose: Social determinants of health (SDOH) are an inextricably important factor1,2 in health outcomes that have been repeatedly identified as a necessary focus for improving public and population health (PPH).3-6 Upstream interventions, such as expanding physicians' PPH knowledge, could help minimize health disparities due to SDOH.6,7 We identified the core clinical curriculum as an area to enhance PPH in undergraduate medical education, given its requirement for all students, and explored the current state of PPH in the core clinical curriculum through an analysis of curricula keywords. Methods: A keyword list was derived from relevant terms within the 2021-2022 AAMC Curriculum Inventory (https://www.aamc.org/), yielding 12 PPH keywords (Biostatistics/ Epidemiology, Clinical Public Health, Disease Prevention, Evidence-based Practice, Global Health Issues, Health Care Financing, Health Care Systems, Health Determinants, Medical Socioeconomics, Population Health/Community Health, Public Policy, Quality/ Safety). The George Washington University MD curriculum database was searched for these keywords throughout the core clinical curriculum, defined as all required clinical blocks (Foundations of Clinical Practice, Medicine, OB/GYN, Pediatrics, Primary Care, Psychiatry, Surgery, Transitions to Advanced Clinical Practice, Anesthesiology, Emergency Medicine, Neurology, Intersessions). All didactic sessions were tagged with keywords by course directors. Results: Amongst the clinical blocks, Primary Care, Pediatrics, and Medicine cited PPH keywords most frequently. Primary Care and Pediatrics had the most comprehensive distribution of PPH keywords, each citing all 12 keywords. Evidence-Based Practice was by far the most cited PPH keyword. The least cited PPH keyword was Global Health Issues, followed by Health Care Financing, Medical Socioeconomics, and Public Policy. Each clinical block had its own unique distribution of keywords. Discussion: Prevalence of PPH keywords differed vastly between keywords and clinical blocks. Three of the least prevalent keywords centered around health policy/economics, highlighting policy as an area of opportunity for PPH enhancement. The clinical blocks with fewer PPH keywords may reflect either a lesser focus on PPH content, or missed opportunities for acknowledging relevant content as having PPH significance. Only two of 13 clinical blocks cited all 12 PPH keywords, highlighting opportunities to expand the breadth of PPH education in the large majority of clinical blocks. Given that curricula are tagged with keywords by course directors, knowledge gained may differ student-to-student. Future implications: This cross-sectional assessment serves as a formative step in developing and implementing clinical education tools to enhance PPH in the core clinical curriculum within undergraduate medical education.

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Community-Centered Learning: Themes from a Pilot Structural Racism Course for Medical Students

Background: Medical schools across the United States increasingly acknowledge the critical role of anti-racism in achieving equitable health outcomes for historically marginalized groups. Identifying and responding to the harms caused by racism, implicit bias, community disinvestment, and disenfranchisement to racially and ethnically minoritized communities are priorities for future physicians to dismantle structural barriers to patient care. Significance: The voices of community experts in directing these conversations among medical students are often overlooked, but integral to learning the essential local and historical context of disparities to create effective, sustainable solutions to foster community health and trust. Methods: To address this gap, a community-centered structural racism course was piloted among medical students in the Community and Urban Health Scholarly Concentration track at George Washington University School of Medicine and Health Sciences during Spring 2023. The course, "Community Expertise on Racism & Health in Washington, DC," included an introduction to six community experts and three sessions entitled Naming and Framing Racism, The History of Scientific Racism, and Race-Based Medicine. Video module content and course themes were determined by a community advisory board of DC residents alongside GW faculty and students with diverse experiences about the intersections of racism, health, and barriers to care for historically marginalized groups. Student understanding and attitudes were assessed during each session using a 4-point Likert scale combined pre-/post-test, followed by a personal reflection on learning challenges and themes. Participants then joined in moderated discussions to further explore their ideas about incorporating anti-racism and community engagement into their education and future practice. Results: We collected pre-/post-test data from thirty-six first- and second-year medical students, with a median age of 24. 75.0% of students identified as cisgender women (25.0% as cisgender men), 33.3% as LGBTQIA+, and 61.1% as students of color. We observed gains in knowledge about the value of community expertise in discussions about health equity, the need to question scientific norms, and how race is erroneously used as a proxy variable. Reflection data revealed that students feel personally challenged in building trust among historically marginalized groups, disrupting instances of discrimination from superiors, and identifying their role in combating racism in medicine. Conclusions: These results demonstrate the capacity of medical students to reflect on their knowledge of systemic racism. Additionally, they highlight opportunities for change within medical school curricula to better integrate community expertise in the classroom and equip medical students to incorporate anti-racism into their learning and practice.

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An Interdisciplinary Approach to the Introduction of Point-of-Care Ultrasound in an Urban Academic Primary Care Center

This study sought to identify the most useful ultrasound applications for providers in primary and urgent care clinics, to create and implement a structured interdisciplinary point-of-care ultrasound (POCUS) curriculum, and to assess the effectiveness of the course. This prospective cohort study took place at an urban academic medical center. After a needs-based assessment of ultrasound applications in primary and urgent care, Emergency Medicine ultrasound faculty and fellows in an were paired with a primary or urgent care provider (N = 6). The pairings met for scanning sessions in the emergency department to practice image acquisition, documentation, and incorporation of ultrasound into the workflow. Participants were given POCUS prework to review before each session. The final bedside session included a formal Objective Standard Clinical Examination (OSCE) to assess learner proficiency to be cleared for independent imaging. The program was assessed using pre- and posttraining surveys. The survey results demonstrated that renal, gallbladder, and soft tissue scans were the most interesting and useful to providers after completion of the training course. In conclusion, the course was effective, and efficient, simple, high yield POCUS applications should be included in future programs and organizational guidelines for primary and urgent care POCUS education.

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The Implementation of an Introductory Medical Terminology and Abbreviations Session into the GW SMHS Pre-Matriculation Program

Medical students participate in various extracurricular activities in preparation for matriculation, and as a result, have varying levels of medical knowledge. In order to ensure students have a similar baseline level of knowledge, an introductory medical terminology and abbreviations session was developed for the GW SMHS Pre-Matriculation Program (PMP), a summer preparatory course for a percentage of matriculating first-year students. A reference packet was developed, adapted from resources available online which was provided to the 20 PMP students prior to a live session. During the session, students practiced dissecting medical notes. To assess the course's benefit and students' knowledge, surveys and assessments were administered before and after the session. After data analysis was performed, the session materials were provided to GW SMHS for integration into the POM course for first year students. For comparable questions on the surveys, all questions yielded an increase on the post-session survey. The following results compare percentages of students who felt somewhat or very prepared, comfortable, or confident as applicable. Compared to 30% of students who felt prepared for recognizing abbreviations on the pre-survey, 65% felt prepared on the post-survey. 30% of students felt prepared for recognizing prefixes on the pre-survey compared to 60% on the post-survey. 45% of students felt comfortable dissecting unfamiliar terms on the pre-survey compared to 75% on the post-survey. 40% of students felt comfortable defining terms on the pre-survey compared to 65% on the post-survey. 35% of students felt confident understanding abbreviations in an HPI on the pre-survey compared to 60% on the post-survey. 25% of students felt confident understanding terms in an HPI on the pre-survey compared to 65% on the post-survey. The average on the pre-assessment was 79.5% compared to 76.93% on the post-assessment. 87% of students felt this was an effective course. 92% of students felt it was beneficial. It is important for medical students to have a similar baseline level of prior medical knowledge. An introductory session on medical terms and abbreviations is a feasible solution to this inequity. The results show that the course was effective, far more than the assessment comparison. It is possible that the decrease in assessment score was due to the higher difficulty level of questions on the post-assessment compared to the pre-assessment. By implementing this session into the GW SMHS curriculum, medical students will have a solid foundation to maximize their understanding of material that will be presented to them.

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Evaluating Diversity and Inclusion Content on Graduate Medical Education Websites

Websites are essential tools for programs to provide future residency applicants with freely accessible information regarding their program, including diversity, equity, and inclusion (DEI) initiatives. In order to describe the variability of DEI content in residency programs and compare DEI website content by specialty, we used the 2021 Accreditation Council for Graduate Medical Education (ACGME) list of residency programs to evaluate the residency training website. Information was extracted from program websites as indicators of DEI content and Chi-squared as well as one-way ANOVA analysis were performed to assess for statistical differences. In total, 4644 program websites representing 26 specialties were evaluated. Among all the programs, the average DEI completeness of a program website was $6.1\pm14.6\%$ (range 0–100%). While 6.2% of all programs had a diversity webpage, only 13.3% included a commitment to DEI, and few programs (2.7%) provided information about underrepresented in medicine (URiM) faculty. We found that graduate medical education programs can enhance information for current and prospective applicants about DEI initiatives on their websites. Including DEI initiatives on residency, websites may improve diversity recruitment efforts.

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Are We Ready For "Small Data" In Surgical Video Analysis? Advanced Model Architectures Can Study of Rare Neurosurgical Procedures Without Large Datasets for Transfer Learning

Background: Computer vision and Deep Learning (DL) models have allowed groundbreaking, quantitative evaluation of surgical video data for performance improvement, but DL models suffer from an accuracy-generalizability tradeoff. In other fields, models first "learn to see" using a larger training dataset, but few large neurosurgical video datasets exist. If successful, DL on a limited neurosurgical video dataset with the application of "transfer learning" from a similar surgical context would open additional opportunities to study rare neurosurgical procedures. Objective: We aim to compare the classification of surgical instruments in a limited neurosurgical dataset of endoscopic third ventriculostomy (ETV) video, using convolutional neural network (CNN) algorithms with and without transfer learning. Methods/Design: A deidentified neurosurgical video database was optimized for DL (Darwin, V7 Labs). Using our prior published methods and datasets, we pre-trained a one-stage object detection CNN (YOLOv4) on a large, high-quality transsphenoidal neurosurgery dataset (SOCAL, 27,223 frames with 54,957 instruments) and used transfer learning for endoscopic third ventriculostomy (ETV) data (75,581 frames with 55,542 instruments). A second stateof-the-art CNN with optimized pre-training using bag-of-freebies techniques (YOLOv7) was trained only on ETV videos. Both models were tested on unseen ETV video (19,478 frames with 9,532 instruments) and scored using average precision (AP). Results: In single-class classification, YOLOv7 without transfer learning was superior to YOLOv4 (mean AP of 92.7% vs. 65.8%). YOLOv7 was superior to YOLOv4 in all instruments (balloon: 98% vs. 88%, aspirator: 99% vs 51%, grasper: 77% vs 41%, and cautery: 32% vs. 28%) with higher mean AP (76.1% vs. 52.1%). Conclusion: The optimized model architecture of YOLOv7 achieved superior performance without reliance upon transfer learning from higher quality, but unrelated, neurosurgical video. A single YOLOv7 model may be capable of high accuracy in small video datasets, accelerating the study of surgical performance metrics without the need to train in additional surgical contexts.

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COMMUNITY AND URBAN HEALTH

A Quality Improvement Methodology to Improve Diagnosis and Management of Diet Related Chronic Disease in Pediatric Primary Care

Background: Approximately 17% of children and adolescents aged 2-19 years in the U.S. have obesity. The AAP and USPSTF offers evidence-based approaches to diagnosis and management of pediatric obesity but adherence is suboptimal. Objective: Improve the diagnosis and management of pediatric obesity by utilizing Quality Improvement methodology to enhance clinicians knowledge and confidence in appropriate diagnosis and management within a primary care setting. Methods: A needs assessment was completed in the Fall of 2019 along with a preliminary chart review from February 2020-February 2021 using 330 randomly selected charts for patients with obesity. Based on the assessed gaps in knowledge and clinician behaviors key drivers were developed to improve providers adherence to evidencebased guidelines. Interventions included: 1) monthly clinician education sessions 2) Electronic Medical Record changes 3) development/integration of clinical algorithms 4) community resource guides 5) patient education materials. Around 120 randomlyselected charts were reviewed monthly to guide PDSA cycles. Individual clinician feedback was also given during the first 6 months of the intervention. An additional 6 months of post-intervention data was collected. Pre/post intervention surveys utilized a Likert scale to evaluate clinicians' self-identified knowledge and confidence around the diagnosis and management and pediatric obesity. A Fisher exact test was used to assess the pre/post differences in clinicians attitudes toward pediatric obesity care. Results: There were 38 responses in the pre-intervention survey and 14 in the postintervention survey. We report the pre- and post-test frequency of Likert responses (Table 1). There was a significant increase in the proportion of clinicians who felt increased confidence and knowledge in managing obesity and other comorbid chronic diseases. Prior to the intervention, 57.9% of respondents indicated feeling moderate or high confidence in their management of children identified as having obesity which increased to 92.9% after the intervention (p=0.02). However, there was not a significant increase in confidence diagnosing diabetes, dyslipidemia, and PCOS, indicating further support may be needed in these areas. Analysis of pre- and postintervention surveys demonstrated an overall positive and significant change in clinician attitudes toward the diagnosis and management of pediatric obesity. Conclusions: The results of this study show that QI is an effective model in improving clinician behaviors and shifting towards more evidence-based care of pediatric obesity.

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COMMUNITY AND URBAN HEALTH

The Impact of a Culinary Medicine Curriculum on Gestational Diabetes for Expectant Mothers

Perinatal health is profoundly impacted by maternal diet and healthier consumption habits improve outcomes for not only mothers, but also their infants. With the rise in gestational diabetes rates, there is a need for actionable, culturally appropriate, realworld guidance on food as medicine practices to help expectant mothers translate dietary research into practical daily habits. The Culinary Medicine Program (CMP) at the George Washington University (GWU) has deployed an innovative virtual nutrition education model used by over 60 academic medical centers that addresses nutrition knowledge, food security, health, and socialization for diverse populations. This project will assess the impact of a free, 5-session Health Meets Food cooking series on expectant mothers' dietary habits, attitudes, and competencies (DACs). The DAC's include diabetic control, pregnancy outcomes, understanding and adoption of the tenets of a healthy Mediterranean diet, changes in cooking habits, as well as food security status. This will be conducted as a randomized controlled trial of patients at risk for or diagnosed with GDM who are attended to at a Washington, DC clinic. There will be 40 participants in the investigation arm, participating in the Health Meets Food programming, and 40 participants in the control arm, receiving traditional clinical education. Participants will learn to cook delicious recipes and basic nutrition concepts such as building healthy menus, eating on a budget, meal planning, and how to cross-utilize leftovers. Three sessions will be held synchronously over Zoom and two sessions will be delivered asynchronously. This model minimizes barriers to accessibility while offering a platform providing inclusive and culturally considerate programming to underserved populations. The asynchronous modules and resources create an environment for life-long healthy eating. Participants will complete a module and guiz prior to each session. During the session, participants will prepare different recipes and engage in discussion with co-participants regarding the session's topic. All study participants will take the baseline Health meets Food validated Cooking for Health Optimization with Patients (CHOP) questionnaire at the time of enrollment, at the end of session 5, and 3 months after the conclusion of the program. The survey responses will be used to measure the magnitude of change in DAC's between the investigative and control groups. The outcomes of this project will inform the feasibility of culinary medicine programming as an effective tool for improving nutrition and health outcomes in pregnant parents and newly born infants using a virtual model.

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COMMUNITY AND URBAN HEALTH

After Adjusting for Clinical Complexity and Social Determinants of Health, State of residence Only Factor Associated with Hospital Admissions among Children with Spina Bifida Presenting to the Emergency Department.

Introduction and objective ED use and admissions among children with Spina Bifida (SB) may be influenced by social determinants of health (SDoH). Childhood opportunity index is a validated proxy measure of SDoH. Our aim was to determine whether or not there is an association between COI level and admission rates among children with SB presenting at our institution's ED between 2016-2020 and determine clinical and non-clinical factors associated with ED admissions. Methods A retrospective single-institution study of children (age <18 years) with SB presenting to the ED between 2016-2020 was performed. Only encounters for SB-related conditions were included. The primary outcome was hospital admission from the ED. Baseline patient factors (sex, age, race/ethnicity, language, insurance, location of residence, distance from the ED, and COI level) and markers of clinical complexity (SB lesion type, lesion functional level, community ambulation status, and ventricular shunt status [VS]) were collected. Our primary exposure was COI level (high vs. low). We performed descriptive statistics and a random intercept mixed effects multivariable logistic regression (to adjust for patient clustering) to determine factors associated with ED admissions. Results A total of 165 patients accounted for 598 ED encounters between 2016-2020. Nearly a third of encounters (28%) led to admission; 66% of high COI patients were admitted, while 34% of low COI patients were admitted (p = 0.2). COI level was not significantly associated with admission on adjusted analysis (0.9 [0.5-1.6], p=0.7). Factors that were associated with admission on unadjusted analysis included age, race/ ethnicity, language, insurance, location of residence, community ambulation, and VS status. However, on adjusted analysis, only location of residence was significant for admission. Those with a residence outside of the District of Columbia and Maryland areas were significantly more likely to be admitted (Virginia [VA] OR=3.7, p<0.01 and West VA/Pennsylvania/New Jersey/military [OR=9.6, p = 0.049]). Conclusions At our institution, approximately one-third of ED visits led to hospital admissions. COI level was not found to be associated with hospital admissions. Location of residence was the only factor significantly associated. This finding may suggest the need for better access to local care and community partnerships with the Spina Bifida program.

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COMMUNITY AND URBAN HEALTH

Family Experiences with a 6-month Produce Prescription Program: A Qualitative Analysis

Background: 1 in 8 households with children experience food insecurity (FI) in the United States. Produce prescription programs (PPPs) have emerged recently as means of addressing FI while providing a venue for nutritious food. The Children's National Hospital Family Lifestyle Program's (FLiP) Produce Prescription Initiative (FLiPRx) aims to address FI and diet-related disease risk in families with children. FLiPRx 1.0 was a 12-month PPP intervention for families with children 0 to 5 years of age implemented between November 2020 - November 2021. Based on the lessons learned from FLiPRx 1.0, a 6-month PPP intervention (FLiPRx 2.0) was initiated in January 2022 and is currently ongoing on a rolling basis. Objective: To explore the lived experiences of families with FI who completed a 6-month produce prescription program. Methods: A qualitative analysis was conducted after families with children (0-18yo) experiencing FI and diet related chronic diseases completed a 6-month PPP in Washington, DC. Within 2 months of completion of the program, an in-depth semi-structured interview was performed regarding families' experiences, attitudes, and behaviors around eating habits, meal preparation and grocery shopping. Interviews were recorded, transcribed, and analyzed and preliminary themes were developed using content thematic analysis approach. Inclusion criteria included family members >18 years of age who completed the 6-month FLiPRx 2.0 program and were willing to participate in a virtual interview. Results: A total of 18 interviews have been completed to date. Four salient themes were identified: (1) participation led to exposure to new foods, cooking style, and meals; (2) allowed families to save money, to utilize towards other household needs; (3) increased consumption of fruits and vegetables (F/V), reduced their consumption of processed foods, and replaced junk food snacks with F/V; (4) increased quality of family bonding time created through preparing and consuming meals at home and attending interactive virtual cooking classes together. Conclusion: The families interviewed found value in the produce prescription program including exposure to new produce, saving money, consuming healthier foods, and an increase in family bonding. While the program was viewed positively by families, the need for sustainable continued support was salient. Produce prescription programs are a promising means of addressing FI and diet related chronic diseases in households with children.

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COMMUNITY AND URBAN HEALTH

A Geospatial Analysis of Community-Acquired Extended-Spectrum Beta-Lactamase Urinary Tract Infections in Children Living in the Washington Metropolitan Area

Background The incidence of community-acquired extended-spectrum beta-lactamase (ESBL) urinary tract infections (UTI) is rising, and they are associated with adverse patient outcomes and increased healthcare costs. Several clinical risk factors for ESBL UTI have been identified. However, more information is needed about how geographic and social factors affect ESBL UTI and its distribution. The CDC Social Vulnerability Index (SVI) is a composite measure of social risk factors on human health at the community level, and its relationship with UTI is unknown. Objective To identify the distribution and geographic hot spots for ESBL UTI in children from the DC metropolitan area and compare the distribution of the SVI for cases with ESBL UTI. Design/Methods A retrospective casecontrol study was conducted among children 1 month to 18 years of age diagnosed with UTI at an emergency department from January 2019 to December 2021. Our definition for UTI included a positive urine culture ($>=10^{5}$ CFU for clean catch, $>=5x10^{4}$ for catheterized, and >0 for suprapubic puncture samples), abnormal urinalysis (positive leukocyte esterase and/or >=10 WBC), and symptoms consistent with urinary tract infection. We randomly selected matched cases (ESBL UTI) to controls (non-ESBL UTI) by age and gender in a 1:3 ratio. Cases with recent (< 3 months) hospitalization or longterm care facility stay were excluded from the study. The hotspot and SVI maps were created with ArcGIS Pro. Conditional logistic regression was used for the association between SVI and UTI. Results We included 77 ESBL UTI cases and 233 controls. The geographic distribution of the ESBL UTI cases was identified in Figure 1. Significant hot spots for cases appeared in the northeast area (Figure 2). The association between SVI and ESBL UTI was not significant (Figure 3, OR 1.3, CI (0.4-4), p =0.7). Conclusion ESBL UTI has geographical significance in this preliminary study. ESBL UTI hot-spot distribution in the northeast area coincides with low-income neighborhoods where minority populations reside. No association was found between SVI and ESBL UTI. Further geographical analysis of risk factors will strengthen this case-control study.

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Influence of Overweight and Obesity on Outcomes and Severity at Presentation in Children Admitted for Acute Asthma Exacerbation

Background: Asthma, overweight, and obesity are among the most common chronic conditions affecting children in the United States; however, the extent to which overweight and obesity influence asthma exacerbation outcomes in children is unclear. Objective: The objective of this study was to evaluate the influence of overweight and obesity on outcomes and disease severity in children admitted with an asthma exacerbation in 2019. Methods: Discharge records for patients aged 2-18 admitted for acute asthma exacerbation or status asthmaticus were isolated from the 2019 Kids' Inpatient Database. Patients with overweight or obesity were identified using ICD-10CM codes. Multivariate logistic regression was employed to evaluate the odds of status asthmaticus and subsequent intubation and mechanical ventilation in the overweight and obese population. Using log-linked generalized linear models with gamma and Poisson distributions, the influence of overweight and obesity on total cost and length of stay, respectively, was determined. Results: We estimated a total of 93,117 complete records of hospitalizations for asthma exacerbation. Cumulative national costs for asthma exacerbations in patients aged 2-18 were approximately \$649 million (95%CI: \$578 million - \$719 million). Overweight and obesity was associated with increased odds of status asthmaticus (aOR 1.78, 95%CI: 1.61-1.96, p<.0001) and subsequent intubation and mechanical ventilation (aOR 1.76, 95%CI: 1.52-2.05, p<.0001). There were approximately \$1.82 million (95%CI: \$1.25 million - \$2.39 million, p<.0001) in excess medical costs and 824 excess bed-days (95%CI: 485-1,163, p<.0001). Conclusion: Overweight and obesity were associated with greater severity at presentation and worse overall outcomes for children admitted for asthma exacerbation.

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Utilization of Provider Education with Electronic Medical Record and Web-based tools to Improve Diet and Activity Counseling in Primary Care, a Clinical Quality Improvement Initiative for the Management of Diet related chronic disease

Background: Pediatric obesity has rapidly grown in prevalence in the U.S., reaching 19.7% in recent reports. Despite obesity being recognized as a disease, it is often treated as a personal responsibility rather than a clinical diagnosis with specific management quidelines. Objectives: Our study aimed to improve clinician counseling and coding for physical activity and nutrition by $\geq 20\%$ using electronic health records and web based tools. Design/Methods: A 2019 needs assessment of primary care pediatricians in Washington, DC showed disparities between recommendations on pediatric obesity management and realities of clinical practice. Our team then employed a multidisciplinary quality improvement initiative to align management practices with existing guidelines, which involved automating nutrition and physical activity counseling ICD codes in EHR templates, holding monthly educational sessions for providers on counseling and coding, and monthly coaching sessions on management of obesity. A monthly Plan-Do-Study-Act cycle was used to assess effectiveness of interventions. This QI study involved 12 month baseline data collection at two academic community health centers in Washington, DC, then data collection for 12 months during the QI period and 6 months after. Results: After educational intervention specifically on coding of nutrition and physical activity ICD documentation, both sites improved documentation to incorporate correct codes within 15% of charts. However, after implementation of EHR automation in March of 2022, providers were able to improve and sustain documentation of physical activity and nutrition counseling coding to 75% of all charts reviewed. Conclusions: These observed improvements support that while educational sessions and resources are beneficial tools for changing provider behaviors, EHR automation serves as a more effective management approach to optimize billing and coding behaviors for improved management of diet related chronic diseases. These findings support the automation of systems as a sustainable way to transform provider behaviors to improve quality of care.

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COMMUNITY AND URBAN HEALTH

Family Experiences with a 12-month Produce Prescription Program, a Mixed-Methods Analysis

BACKGROUND 12.8% of households with children experienced food insecurity (FI) in 2021. There is evidence that Produce Prescription Programs (PPPs) are a viable intervention to address FI and improve diet quality in adults, however, few studies have explored the impact of PPPs in pediatric populations. OBJECTIVE To explore the feasibility and impact of a novel PPP in a population of families with children 0-5yo who are at risk of FI and diet-related chronic diseases. DESIGN/METHODS To evaluate program feasibility and impact we conducted a mixed-methods study in 15 adult caregivers who completed a 12-month PPP in Washington, DC. Eligible participants had a child aged 0-5 who screened positive for FI and diet-related chronic disease risk. Individual semi-structured interviews were conducted after completion of the PPP. Interviews were recorded, transcribed, and analyzed using thematic analysis to identify emergent themes. Pre-post self-report surveys included questions derived from standardized measures of FI, nutrition, and the home food environment. Univariate descriptive statistics were used to describe demographics and survey results. Student's paired t-test and chi-square were used to examine pre-post differences in continuous and categorical variables. Repeated measures linear regression was used to evaluate the impact of home food environment on nutrition. RESULTS Qualitative interview data were clustered into 3 themes: 1) Challenges with Food Hardship, 2) Nutrition Cooking Knowledge and Behavior, 3) Family and Community Impact (Table 1). Survey results revealed a significant decrease in individuals categorized as having "very high" FI (7% vs 43%, p=0.03). The average parent-reported daily intake of child fruit and vegetables and adult fruit and vegetable intake was higher post-intervention vs baseline (child 2.16+/-0.69 cup equivalents vs. 1.31+/- 0.67, p=0.02; adult 3.5+/-1.5 vs. 2.1+/-1.6, p=0.01). Although pre-post home food environment scores did not differ, regression models showed there was a significant independent effect of the home food environment score on child fruit and vegetable intake (F=7.1, p=0.03), indicating a more favorable home environment was associated with higher child fruit and vegetable intake. CONCLUSIONS PPPs have the potential to improve food security severity, healthy eating, and financial flexibility among families with young children who are at risk of FI. Future research should examine the sustained impact of such programs on behavioral and health outcomes among caregivers and their children.

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Patient Perspectives on Discussing Immigration Legal Status in the Medical Setting

Background: Immigration legal status has been widely recognized as a social determinant of health. However, few studies have published patient feedback on comfort with, and processes for, discussing immigration legal matters in the healthcare setting. Objective: To assess patient/family comfort and acceptability of discussing their immigration legal needs in a healthcare setting. Design: We developed a survey to assess patient attitudes on discussing immigration status and legal needs in healthcare. Survey questions were informed by a literature review of comfort and acceptability with social determinants of health screening tools. The survey was iteratively edited by an expert panel, and cognitive interviewing was employed with bilingual staff. Individuals 18+ years old (either young adult patients or parents of pediatric patients) were recruited during primary care visits at a Children's National Health Center site by a bilingual study team member. Surveys were completed verbally in English or Spanish depending on patient/family preference. Results/Discussion: 51 participants were surveyed, and 91.7% self-identified as Hispanic/Latino/Latinx. Over 80% of participants reported some level of concern regarding their US immigration status, though 45.8% reported never having sought legal assistance for their immigration issues. On a 5-point Likert scale from "very inappropriate" to "very appropriate", most participants (74.5%) shared that they found conversations around legal topics "very appropriate" to have in a healthcare setting, and 75.8% were "completely comfortable" (highest rating on a 5-point Likert scale) having these discussions in this setting. The vast majority (94.1%) identified primary care sites to be an appropriate location for these discussions compared to other health facilities. Most participants (57.4%) noted "every visit" as the preferred frequency for screening about immigration legal needs in primary care. These results indicate that asking about immigration legal needs within a healthcare setting is acceptable among immigrant communities with legal needs. Primary care centers can be an effective site to collocate these services in their ability to establish trust and comprehensive care. Future research could focus on identifying and measuring patient health outcomes resulting from medical-legal partnership support.

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Deployment of the CANDO Smartphone App to Improve Return to Clinic Following Hospital Discharge

There has been an extensive amount of evidence that demonstrates that children born with congenital heart disease (CHD) or those who require cardiac surgery in their first year of life are at risk for developmental or learning difficulties. For this reason, the American Heart Association and the American Academy of Pediatrics have established guidelines for regular neurodevelopmental evaluation across the lifespan for children with CHD. The Cardiac Neurodevelopmental Outcome (CANDO) Program was created to monitor long-term neurodevelopmental progress in this demographic of patients from infancy through young adulthood. The CANDO program implements inpatient developmental care, and regular outpatient assessment that provides treatment planning and recommendations. Although this neurodevelopmental follow-up service has become a component of the standard care pathway for children with CHD, recent research has shown a low rate of return for these appointments, with a return rate of 29% in a multi-site study and 34% at Children's National Hospital. While we work to better understand the complex constellation of barriers to care, we are hoping to improve rate of return for children with CHD who are seen in the Children's National CANDO Program. We have developed an educational smartphone application for families in the CANDO program to help parents monitor neurodevelopmental milestones at home and remind them of services available to them. The objective of this study is to examine how the utility of the app and other medical and sociodemographic factors, such as distance from medical center, type of insurance, race/ethnicity, and parental education levels, affect patient engagement with neurodevelopmental support and ultimately impact rates of return. Understanding what factors particularly related to health disparities impact care can ultimately help to improve the health and wellbeing of all patients.

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Life's Essential 8 is Associated with All-cause and Cardiovascular Disease Mortality Among Community Dwelling Older Men and Women in the InCHIANTI Study of Aging (1998-2020)

Introduction: The population of individuals aged 65 y and older has increased steeply over the past few years. Health factors including obesity, high cholesterol, blood pressure, and blood glucose levels, as well as adverse health behaviors such as smoking, poor diet, insufficient physical activity, and low sleep quality are risk factors for chronic disease development and mortality. Because both health factors and behaviors are critical for reducing the risk of chronic disease and mortality, we examined a score assessing overall cardiovascular health (CVH) based on American Heart Association's (AHA) Life's Essential 8, an update of the AHA's former Life's Simple 7 metric. This metric may provide a tenable framework for chronic disease management and prevention. Hypothesis: We hypothesized that in a cohort of participants aged 65 y and older, higher CVH scores based on Life's Essential 8, indicating better CVH, at baseline, is inversely associated with risk of all-cause and CVD mortality. Methods: Overall cardiovascular health was assessed using 8 health factors and behaviors, scored 0 to 100, among 928 participants (55% female) aged 65 years and older within the InCHIANTI study of aging. Vitality status was ascertained using registry information. For analysis, CVH was modeled as a 1 Standard Deviation (SD) increase in the score. Cox proportional hazards models, adjusted for age and sex, were used to examine the associations between CVH and all-cause and cardiovascular disease mortality over a median follow-up of 14.6 y. Results: A 1 SD increase in the overall CVH score was inversely associated with all-cause (hazard ratio [HR] = 0.80, 95% confidence interval [CI] = [0.738, 0.873]) and CVD mortality (HR = 0.73, 95% CI = [0.632, 0.832]). Conclusion: Among older adults, overall CVH - assessed through the lens of the AHA's Life's Essential 8 - is associated with a lower risk of all-cause and CVD mortality. This relationship lends credence to the importance of prioritizing health factors and behaviors in preventing chronic disease development and promoting healthier lives among older individuals.

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Making the Diagnosis: Utilization of Quality Improvement Methodology to Improve Diagnosis of Obesity and Diet-Related Chronic Disease in an Urban Academic Community Health Center

Background: Obesity is a chronic multifactorial disease affecting 20% of children and adolescents.1 National guidelines recommend a diagnosis of obesity starting at age 2, with body mass index (BMI) greater than the 95th percentile, as well as screening for specific comorbidities based on risk factors.2 However, proper use of diagnosis codes are not always utilized appropriately, and many clinicians lack the knowledge of the recommended labs to order. Objective: The aim of this study was to conduct a quality improvement (QI) initiative to drive practice change in the diagnosis of obesity and its comorbidities through appropriate clinical screening, documentation, and coding. Methods: Two academic primary care clinics in Washington, DC completed a 12-month QI initiative after a clinician needs survey demonstrated the potential for more institutional support to address barriers identified in addressing the diagnosis of obesity and diet-related chronic diseases. A 12-month baseline (02/2020 - 02/2021) of the current clinic documentation practices was identified by reviewing charts of patients between 2-18 years of age and with a BMI greater than the 95th percentile. Four variables were tracked, including documentation of BMI percentiles utilizing Z-codes, documentation of diagnosis codes associated with weight status utilizing E-codes, ordering of appropriate screening labs based on current guidelines, and documentation of diagnoses associated with abnormal lab results(Fig 1). The QI initiative (03/2021-03/2022) incorporated the integration of evidence-based clinical algorithms, monthly educational training, and coaching sessions on appropriate ways to document diagnoses and order labs. Chart reviews were performed throughout the QI initiative and six months afterward to observe how documentation of diagnostic criteria changed during and after interventions. Results: Baseline data showed significant clinician differences in screening. During the intervention, an observable downward trend in extraneous labs was noted in both clinics, with an increase in extraneous labs during the postintervention period (Fig 2, Fig 3). After multiple training sessions, the use of both E & Z obesity codes significantly increased at both clinics, going from a baseline of less than 20% to a sustained >75% of charts through the post-intervention period (Fig 4). Conclusions: Data from both clinics suggest that with a QI program consisting of training and education, pediatricians can improve their clinical decision-making when it comes to diagnosing, billing, and documenting obesity and diet-related chronic diseases.

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COMMUNITY AND URBAN HEALTH

DC SIPS: Decreasing Children's Sugar Intake through Pediatricians and Social Marketing

Background: Childhood obesity increases the risk of cardiometabolic disease and disproportionately affects low income, African American youth. While childhood obesity results from a complex interplay of factors, sugary drink (SD) intake is a wellestablished contributor. Consumption of SD's continues to exceed public health recommendations, with particularly high intakes reported among African American youth. Physician counseling in the primary care setting along with social marketing offers a promising strategy to promote behavior change. Objective: The aim of this study was to obtain feedback from children in the community to develop and refine DC-SIPS: Decreasing Children's Sugar Intake through Pediatricians and Social Marketing, an innovative intervention aiming to reduce SD intake among low income, African American children aged 11-14 years old seen at THEARC, a community based pediatric primary care clinic located in Ward 8 of Washington, DC. Design: This study consisted of qualitative interviews conducted virtually via Zoom. Children (n=3, data collection ongoing) were asked to respond to questions about their attitudes towards SD behavior change, provide feedback on sample interventional materials and their likelihood of engaging with the intervention, as well as their perceptions of the most effective ways to deliver intervention content. Participants and setting: African American children 11-14 years old seen at THEARC, a primary care clinic in Washington, DC who report consumption of >12 ounces of SD's per day and use social media. Data analyses: Interviews were audio-recorded, transcribed verbatim, and coded iteratively by a single coder (SA) using Dedoose. Thematic analysis was used to identify preliminary emergent themes and subthemes, after which, representative quotations were selected. Results: Characteristics of intervention materials perceived as most important included being colorful, catchy, and relatable. Information about the health consequences of consuming SD's was described as particularly impactful. Children indicated that they are receptive to social media and would be most likely to participate if the content included challenges (e.g., drinking water challenge) among peers, with prizes provided for engagement. YouTube and TikTok were cited as optimal social media platforms for delivering intervention content. Children also reported that they would be receptive to pediatrician counseling about reducing SD intake, particularly recommendations about beverages to substitute in place of SD's. Conclusions: The findings of this study will inform the development and refinement of community specific intervention materials to be used in an intervention that leverages pediatricians and social marketing to reduce SD intake among low-income, African American youth.

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COMMUNITY AND URBAN HEALTH

Collaborative Care Can Improve Health Equity for Residents of the District of Columbia

Collaborative Care is a model of health services delivery that supports primary care physicians with an interdisciplinary team focused on treating mental and behavioral health conditions seen in the primary care setting. This poster presents a literature review and policy position statement about Collaborative Care's potential to address health care inequity in Washington, D.C. In a 2019 Community Health Needs Assessment conducted by the D.C. Department of Health, residents identified housing, addiction, and mental health as the top three issues affecting their community's health. Since then, COVID 19 has generated numerous additional stressors for individuals and challenges for organizations. In March of 2022, the CDC released data from a nationwide study reporting that 44% of youth experienced persistent feelings of sadness or hopelessness in the prior year. The demand for mental health services has never been higher. Even before COVID 19, persons with limited financial resources had extremely sparse access to psychiatrists. For much of the population, primary care visits serve as de facto mental health care. Primary care physicians generate half of the prescriptions written in our nation for medicines that treat depression and anxiety. However, primary care practices are rarely structured in a way that enables them to provide comprehensive mental health care. Collaborative Care has the potential to address the needs of D.C. residents and improve health equity by making mental health services as easy to access as going to your primary care doctor. This model increases access to comprehensive mental health services for populations who have historically experienced a disproportionate number of barriers to psychiatric care. A study examining the efficacy of Collaborative Care for treating depression found that African American and Latinx patients showed significantly more improvement than their White counterparts, with positive impacts of the treatment evident at 2, 5, and 10-year follow-up encounters. The D.C. government has an opportunity to improve health equity in the District by expanding D.C. Medicaid coverage to include the Collaborative Care billing codes introduced by CMS in 2017. Additionally, the D.C. government should promote the creation of a Collaborative Care clinic at the new Cedar Hill Regional Medical Center being built in Ward 8, one of the District's most under-resourced jurisdictions. This poster identifies how Collaborative Care meets the health care needs of the D.C. community. It discusses the current core components of the Collaborative Care model, barriers to implementation, as well as strategies to overcome these obstacles.

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COMMUNITY AND URBAN HEALTH

"Engage NYC" HIV Prevention Project

The main question to be tested in this project is, "Can using an online outreach strategy increase linkage-to-care by populations at high priority for HIV prevention?" In the Bronx and many other areas of the country, patients struggle to access the proper healthcare due to other environmental factors such as education or housing and food insecurity. The struggle to access care is even greater for the LGBTQ+ and other marginalized populations in the Bronx that are considered high priority for HIV prevention. Albert Einstein College of Medicine and Montefiore Medical Center have access to a multitude of resources that could help patients that go beyond healthcare. If patients can access these other resources, their access to HIV prevention could increase substantially. The online outreach strategy will include digital health educational content as well as social media posts across multiple social media platforms in order to reach a larger number of patients. The effectiveness of the online outreach will be assessed through patient surveys and intake data.

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COMMUNITY AND URBAN HEALTH

StandStrong: Sensing Technology to Personalize Adolescent Maternal Depression Treatment in Low Resource Settings

Postpartum depression monitoring, screening, and intervention is difficult to conduct in remote settings. StandStrong aims to develop a tool that will utilize a sensor in mobile devices such as a smartwatch to identify and monitor young mothers who suffer from perinatal and postpartum depression. The goal is to research and implement this tool in low-resource settings in Nepal so that personalized psychological treatments can be provided in areas that lack these vital services. The tool consists of a mobile phone and smart watch, for the mother, and a small attachable bluetooth beacon for the baby. It records GPS location, distance to the beacon, and sound. This data from the mobile phone sensor is used to construct reliable models that can associate specific activity with perinatal and postpartum depression such as the length of time spent with the child, the level of vocal interactions, and frequency of outings. The goal of the study is to determine which elements of our passive sending data collection model correlate with postpartum depression, with the vision of creating an intervention that can be used in remote settings using our findings. To do this, we use field interviews and qualitative research methodology to analyze how mothers feel, act, and respond to external variables and how this affects their relationships, specifically their relationship with their child. We will then use this aggregate data to reiterate upon the technology in hopes of creating a positive change intervention for mothers with perinatal and postpartum depression.

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COMMUNITY AND URBAN HEALTH

Evaluation of a Food Truck based After School Meal Program

Food insecurity remains a persistent problem in the United States and has a detrimental impact on a child's developmental, physical, emotional, and learning outcomes. Mobile food venders have shown potential to address food insecurity by increasing availability, accessibility, and affordability of healthy foods while acting as a catalyst for positive social interactions and community building. SevaTruck is a registered 501c3 non-profit organization that provides fresh, hot, vegetarian meals to children, families, and staff members of Title I schools via food truck. This pilot study aims to assess the impact of SevaTruck's After-School Healthy Meals Program to better understand the perceptions, effectiveness, and quality of the program while identifying possible areas of improvement. Evaluation was done through mixed methods using anonymous surveys, smiley face tickets using a visual analogue scale, and semi-structured focus groups. The anonymous survey was administered virtually using a survey software, Qualtrics, to teachers, staff, and administrators. The survey consisted of a combination of open-ended and multiple-choice questions focused on the process, impact, and goals of SevaTruck. The semi-structured focus group were conducted after the surveys with a subset of teachers, staff, and administrators. Smiley-face tickets were used to collect feedback from students receiving meals. Once students received a meal from the truck, they were given the opportunity to fill out a smiley face ticket. The results of this pilot study are promising. Perceptions of SevaTruck's After-School Healthy Meals Program were overwhelmingly positive among faculty, staff, and students. A majority of students liked the meals provided a lot (70.9%, n=78) or a little (21.8%, n=24) with only 8 students stating they did not like the meals (7.3%). Employees of the school believe that student's dietary habits have improved and that SevaTruck helps create opportunities for health and education equity, although most felt unsure if there were differences in school attendance, attention in class, or improved test scores. A minority of teachers reported that meal distribution was disruptive to the learning environment. The favorable feedback about this food truck based program may support its application in other sites, but further research is required.

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GLOBAL HEALTH

"I am not shy anymore": A qualitative study of the role of an interactive mHealth intervention on sexual health knowledge, attitudes, and behaviors of South African adolescents with perinatal HIV

Background South Africa has one of the highest burdens of adolescents with perinatallyacquired HIV (APHIV) in the world. APHIV in South Africa have limited access to sexual and reproductive health (SRH) education and services specific to their HIV status. When lacking comprehensive SRH education, APHIV are prone to sexual risk behaviors that can lead to unintended pregnancy, sexually transmitted infections, and HIV transmission. The use of mHealth interventions has been shown to deliver information, foster social support, and improve decision-making skills. In this study, we evaluate how an mHealth intervention influences sexual health knowledge and behaviors in APHIV. Methods We purposively enrolled adolescents from the intervention arm of a randomized clinical trial assessing a multi-module, moderated WhatsApp-based intervention-Interactive Transition Support for Adolescents Living with HIV (InTSHA)-within a government supported clinic in KwaMashu, an urban township of KwaZulu-Natal, South Africa. We conducted in-depth interviews based on World Health Organization guidelines for asking adolescents about SRH. We thematically analyzed data through an iterative, team-based coding approach combining deductive and inductive elements to contextualize SRH attitudes, knowledge, and behaviors before and after receiving the InTSHA intervention. Results Of the 21 participants, 13 (61.9%) were female and the mean age was 16.6 years. Most participants reported first learning about SRH as young teenagers in school through non-targeted and negative ways, seeking clarification through peers and the internet rather than clinicians or caregivers. Participants reported that InTSHA provided a holistic perspective on relationships, gender, and sexuality specific to growing up with HIV in South Africa. They praised the ability to give and receive information from peers in a moderated setting through the mHealth intervention, building their confidence, decision-making skills, and communication with partners and caregivers throughout their everyday lives. Despite reporting some technological challenges, adolescents agreed that InTSHA was convenient, confidential, and user-friendly. Conclusions South African APHIV receive incomplete and conflicting sexual education from peers, caregivers, teachers, and technology that can be supplemented by mHealth curricula targeted for the unique needs of APHIV. Future, scaled-up mHealth interventions can lower SRH stigma by expanding access to sexual education and peer support, supplementing adolescents' existing SRH education.

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GLOBAL HEALTH

Life Skill Based Sexual and Reproductive Health (SRH) Education for Out-of-school Adolescents and Young People in Ethiopia.

One of the main objectives of this initiative is to build the evidence base on designing and delivering life skill based SRH in out-of-school contexts. Recent reviews and evidence syntheses have identified a relative lack of evidence on LIFE SKILL BASED Sexual and Reproductive Health (SRH) education in out-of-school contexts in Ethiopia. A body of research in Ethiopia indicates that there is a link between dropping out of school and engaging in high-risk behaviours, including using alcohol, having sex with multiple partners, and paying/being paid for sex and not being testing for HIV. Many young women in Ethiopia move into commercial sex work without awareness of the risks attached to it, but poverty, addiction to alcohol, khat and shisha, and pressure from their employers and brokers make it very difficult to leave. Moreover, research in Ethiopia shows that out-of-school adolescents and young people with disabilities (AYPWDs) are often confined at home due to stigma and discrimination. Because of this, they have limited access to a variety of services including education, health, and legal services. They face mobility restrictions due to inaccessible infrastructure and transportation, unaffordable assistive technologies, discriminatory attitudes, and safety concerns. Stigma and discrimination, especially among family and community members, are the main challenges for achieving inclusion of AYDWs. This project focuses on the international technical and programmatic guidance (ITG) on outof-school comprehensive sexuality education (CSE) developed by United Nations Populations Fund (UNFPA). To support the dissemination and uptake of this Guidance, UNFPA headquarters, regional, and country offices are implementing a 3-year initiative titled "Reaching those most left behind through CSE for out-of-school young people" in 5 countries (Colombia, Ethiopia, Ghana, Iran, and Malawi). The project in Ethiopia aims to provide life skill-based sexual and reproductive health (SRH) to young women involved in CSW and both male and female AYPWDs. The role of Gender and Adolescence: Global Evidence (GAGE) Ethiopia research team is to assess the implementation of life skill-based SRH in Ethiopia utilizing the research tools provided by the international technical guidance (ITG) on CSE for out-of-school adolescents.

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GLOBAL HEALTH

Implementing the Screening Tool for Autism in Toddlers and Young Children (STAT) Training and Certification Courses for Healthcare Providers at the National College of Education in Ho Chi Minh City, Vietnam

My project during the summer was to help coordinate and implement Screening Tool for Autism in Toddlers and Young Children (STAT) trainings in June of 2022 at the National College of Education in Ho Chi Minh City. The STAT tool is a screening tool for young children ages 24 to 36 months. STAT is an empirically based assessment administered in 20 minutes that measures social communication and behaviors by evaluating the functional and interactive play behavior of children. This tool is designed to be used by community providers that work directly with children with autism in assessment and intervention settings. STAT will allow providers to identify children who are at risk for an autism diagnosis at a younger age and refer them for further assessments and specific interventions. I also worked to create promotional material and documentation of the STAT trainings in June at the National College of Education in Ho Chi Minh City. These materials will be used to recruit more community experts in autism care in Vietnam to participate in future STAT trainings. Secondly, my project involved conducting research and collecting anecdotal data from families in Vietnam with children with autism in order to gauge the current available resources and major limitations faced by children and individuals with autism in Vietnam.

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GLOBAL HEALTH

Opisthorchis viverrini Health Education Efforts and Reinfection Rates: A Review

Introduction: Opisthorchis viverrini is a food-borne trematode found in the Lower Mekong Region of Southeast Asia, including parts of Thailand, Lao PDR, Cambodia, Myanmar, and Vietnam. Also known as a liver fluke, O. viverrini can live in human bile ducts for decades, causing cholangitis, periductal fibrosis, and cholangiocarcinoma in some patients. Infection is acquired through the consumption of raw or undercooked fish in the Cyprinidae family. In Northeast Thailand, where it is particularly prevalent, vigorous efforts have been made to quantify and reduce infection rates through administration of praziguantel, sanitation methods, and health education programs. However, several dishes containing raw or undercooked fish have deep cultural significance in the region, and reinfection is common. This study aims to review existing literature to determine the impact of health education on Opisthorchis viverrini reinfection rates. Methods: A search was done of all existing studies on PubMed, Scopus, and Cochrane databases, using keywords "Opisthorchis viverrini" and "education." Inclusion criteria were: articles published in English, interventions related to health education, and primary data on infection rates following education. Results: The review identified 95 studies from PubMed, 86 from Scopus, and 6 from Cochrane. Of these 190 studies, 70 were duplicates. The remaining 120 studies were assessed using the inclusion criteria, and 4 were identified that met all criteria. One study measured reinfection rates annually for two years with repeated education efforts and found an initial incidence of 14.3%, followed by reinfection rates of 15.5% and 6.3% in years two and three. A second study looked at incidence rates every 6 months, which averaged 8.3% and 11.7% for two experimental groups and 13.5% for the control. The final two studies compared reinfection rates after praziguantel treatment in groups with and without health education interventions. One showed 0% and 24.1% for the experimental and control groups, and the other showed 36.8% and 54.8%. Due to heterogeneity between studies, data were not pooled. Conclusion: While some health education methods have shown a reduction in reinfection rates of Opisthorchis viverrini, it is difficult to demonstrate conclusive success of these interventions due to limited studies, small sample sizes, and variability in disease incidence. Given the continued prevalence of infections in Southeast Asia, further studies are needed to determine effective interventions to reduce reinfection rates.

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GLOBAL HEALTH

Go Green: A Review of Ethnobotanical Dermatology Practices in Africa

Skin conditions are often overlooked in the study of global diseases. However, skin conditions affect people of all ages, can be difficult to treat, and have significant detrimental impacts on quality of life. Research shows that skin conditions account for approximately 34% of all occupational diseases globally (Abbasi et al., 2010). Thus, this is a major global health concern for both developed and developing countries. Natural skincare products are utilized globally, but little is known about their mechanisms of action, and specific guidelines on botanical products have not yet been elucidated. The aims of this literature review are to collate the research on both the medicinal and cosmetic uses of plants across Africa. This review has implications for global health so that we can better address health concerns and encourage safer dermatologic practices. This review will also empower future researchers and clinicians to identify trends across cultures and potentially integrate those methods into practice. A literature review was performed by searching PubMed for the following keywords: "Traditional dermatology practices in Africa" "Medicinal uses of plants in Africa" "Skin bleaching, Africa" "Medicine, African traditional methods" Traditional medicine has a rich history of addressing skin care conditions. The historical use of plants in treating skin conditions has been largely based on tradition, but there is a lack of controlled trials evaluating the efficacy of ethnobotanical dermatology. The literature across Africa presents insights into the powerful medicinal and cosmetic effects of plants. While there has been an increasing amount of research on the dermatological uses of plants in Africa, most of the research has been conducted with small sample sizes and only in certain countries, such as South Africa. Additional research is needed to understand the effects of plants and other natural ingredients on the skin. Randomized controlled studies, in addition to qualitative research, must also be considered. With increasing globalization and travel, patients present globally with diverse health practices and, thus, it is critical for physicians to be informed about traditional medicine. It is crucial that plant biologists and physicians collaborate in characterizing plants and developing guidelines for their use. Research points to the potential benefits of providing comprehensive patient care incorporating traditional medicine with modern dermatological practices. There is exciting potential to integrate the use of plants into Western medical practice, but we must also be cautious in incorporating ingredients before they are scientifically examined.

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HEALTH POLICY

A Comparative Study of Access to Fetal Echocardiography in Hospital-based versus Ambulatory sites at a Single Cardiac Center

Background Early detection of critical congenital heart disease by fetal echocardiography (FE) improves outcomes and allows families time to plan for delivery. This retrospective comparative effectiveness study evaluates the two primary methods of FE delivery, ambulatory vs. hospital-based, to determine whether differences exist in patient access and demographics. Objectives The primary aim was to compare the socioeconomic status (SES) and geographic characteristics of two distinct patient populations, those receiving FE at 1) a large surgical center, Children's National Hospital (CNH) and 2) community-based outreach maternal-fetal medicine (MFM) clinics. Secondary aims were to assess access patterns of timing and distance to FE. Methods A retrospective chart review was performed on clinic visits between January-February 2022, including visit location, patient addresses, maternal age, and gestational age (GA). Software derived a composite SES score from census block group characteristics using variables representing wealth, income, education, and occupation. We gathered community-level data for individual patients. We examined rurality of patients' addresses using the USDA rurality score. Secondary analysis compared GA and distance to clinic within the cohorts as proxies to evaluate timing of diagnosis and patient costs. Results We assessed 272 patients (CNH, n=178 and MFM, n=94). No significant differences were found in SES composite score between the two cohorts. Additionally, no patients in either cohort lived in a rural census tract. Patients who received FE at a community outreach clinic were older on average than those who received an echo at CNH (35.1 \pm 5.7 vs 33.6 \pm 5.8 years, p=0.02). The MFM clinic cohort lived in areas with a higher percentage of people having completed a bachelors' degree or higher (p=0.03). GA was earlier among the community outreach clinic cohort $(23.7 \pm 3.2 \text{ vs } 25.6 \pm 4.4,$ p=0.001). Furthermore, driving time and public transport time to clinic were lower in the community outreach clinic cohort (p<0.001 and p<0.001, respectively) (Table 1). Conclusion Patients receiving FE by MFM clinics were older, more highly educated and received their FE at an earlier GA as compared to those at CNH. Neither care method was accessed by patients in rural or lowest SES areas, with limitation of sample size. The findings likely reflect practice patterns of MFM specialists that do not reach populations at risk. Novel methods of outreach for FE are needed leveraging the strengths of current community-based methods to improve access for rural populations.

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HEALTH POLICY

Socioeconomic determinants of Prenatal Diagnosis of Tetralogy of Fallot (ToF) and Long-Term Imaging Surveillance of ToF following Repair

Background Children with repaired Tetralogy of Fallot (rTOF) benefit from surveillance with cardiac magnetic resonance (CMR) imaging to identify cardiac dysfunction requiring surgical intervention. Socioeconomic (SES) and geographic factors barriers may prevent timely receipt of CMR; this effect in rTOF patients has not been studied. We aimed to assess an association of SES and race/ethnicity on access to CMR utilization and biventricular function in a retrospective cohort of rTOF patients. We compared SES characteristics between patients with a prenatal versus postnatal ToF diagnosis. Methods rTOF patients >2 years of age referred for CMR from 2010-2021 were compared against concurrent surgical cohort of rTOF patients 1 MRI study lived in areas with a higher median income than those who received 1 MRI study (p=0.019). More white patients and fewer Black patients received >1 MRI study (p=0.023) (Table 2). In the surgical cohort, patients who were diagnosed prenatally lived in areas with more poverty than those diagnosed postnatally (p=0.019). Conclusion CMR utilization and metrics of cardiac function may have SES and racial disparities in rTOF patients. The results have implications in healthcare equity and long-term outcomes for this population of patients. Further study is needed to identify the underlying mechanisms.

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HEALTH POLICY

Reasons for COVID-19 Vaccine Hesitancy Among Adolescent Parents

Introduction: During the first 18 months since the COVID-19 vaccine became available to the public, adolescents and young adults in the District of Columbia were the leading age group with the largest relative percentage of incomplete immunization. Given that the COVID-19 vaccine is known to significantly reduce risk of severe disease and hospitalization, it is important to understand why young people postpone or refuse vaccination. Children's National Hospital is home to the Healthy Generations (HG) program, a clinic for parenting teens and their children. Methods: In this retrospective study, the COVID-19 immunization status of adolescent participants in HG was first ascertained via medical chart review. Participants lacking documentation of COVID-19 vaccination were contacted by telephone and verbally consented for a semi-structured interview. A waiver of parental consent was obtained for this study. During the interview, participants were asked to share their reasons for not receiving the COVID-19 vaccine and to rate to what extent their parents or guardian influenced their decision to decline the vaccine. Knowledge about where to receive the vaccine was also assessed. Interview responses were independently coded by three members of the research staff. Results: Out of n=280 (95.7% female, mean age 19.6y) patients enrolled in HG at time of analysis, 25.4% had received at least one dose of COVID-19 vaccine. Twenty-one (100% female, mean age 19.6y) patients were reached by telephone and verbally consented for interview. 57.1% of respondents reported that familial influence had no impact on their COVID-19 vaccine declination. All interviewees reported knowledge of where to obtain the vaccine. Reasons for COVID-19 vaccine hesitancy included perceived lack of necessity (n=5), mistrust of the vaccine (n=6), and concerns about vaccine reactions (n=3). Six participants did not elaborate their reasons, and another expressed intention to get vaccinated in the future. Conclusion: At this study's initiation, nearly three-guarters of this sample of parenting adolescents in DC had not completed the COVID-19 primary vaccine series. Patients specifically endorsed concerns about the vaccine's necessity and safety, indicating that many young people are weighing risks of immunization against its potential benefit when deciding whether to get vaccinated. This suggests that providers should focus on building trust and dispelling misinformation when discussing COVID-19 vaccination with adolescent patients. Further research is needed to elucidate how the rate of COVID-19 immunization in this age group has evolved over the latter half of the pandemic, particularly in the wake of vaccine mandate policies.

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HEALTH POLICY

Missed visits are an unintended consequence of introducing telemedicine for outpatient follow up among children with spina bifida participating in a large, urban free-standing children's hospital spina bifida program.

Background We aimed to evaluate the association of telemedicine, adopted in 2020, with missed visits among children with spina bifida (SB). Methods We performed a retrospective cohort study of outpatient visits for children with SB and children without (NSB) during FY19 and FY21. Patient characteristics and markers of clinical severity were included. The proportion of missed visits were compared across fiscal years stratifying by patient and clinical factors, including visit modality (in-person vs. telemedicine). Factors independently associated with missed visits were identified. Results A total of 3,953 visits were scheduled for 2,380 children (FY19: 516 SB visits and 1,400 NSB; FY21: 609 SB and 1,428 NSB). In FY21, 38% of SB visits were scheduled for telemedicine. The rate of missed visits was significantly greater for: SB children in FY21 vs. FY19, SB vs. NSB children, and telemedicine among SB children (all p-values <0.01; Figure 1). There was no difference for SB vs. NSB in FY19 or NSB in-person vs. telemedicine. On adjusted analysis, missed visits were associated with a diagnosis of SB (OR 1.3 [1.1 - 1.7], p < 0.01). Private insurance and higher COI levels were protective (OR 0.4 [0.3 - 0.5], p < 0.001 and OR 0.6 [0.5 - 0.8], p < 0.0001). Telemedicine alone was not associated with missed visits, however the interaction between SB and telemedicine was (OR 2.4 (1.5 - 3.9), p<0.001). Conclusions Missed clinic visits were significantly higher in FY21 compared to FY19. This difference appears to be driven primarily by children with SB missing scheduled telemedicine visits.

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HEALTH POLICY

HIV Testing Disparities and Ways to Improve Testing Rates Among Black and Hispanic MSM

In 2019 the United States Department of Health and Human Services (DHHS) began the Ending the HIV Epidemic Initiative (EHE), a new national programmatic strategy to end the HIV epidemic once and for all by the year 2030. The Center for HIV Prevention and Services (CHPS) within the Maryland Department of Health (MDH) is taking steps to achieve this national goal by reducing the prevalence of the virus among the state's highest risk populations which are Black and Latino men that have sex with men (MSM). HIV testing is an important aspect of the HIV care continuum because it is estimated that 13% of HIV positive individuals in the United States are unaware of their status and they play a role in 40% of all new infections annually. Awareness of serostatus is shown to reduce behaviors that contribute to spread of the virus. Given the importance of HIV testing in combating the HIV epidemic we conducted a review of the literature on the barriers Black and Latino MSM face to seeking HIV testing. Barriers to HIV testing among Black and Latino MSM were identified by conducting a literature search of Cochrane, Embase, PubMed and Google Scholar between June 14 and July 9th, 2022. The search term "HIV Testing Barriers for Black and Latino Men' was used. This generated 24 articles that were published between 2009 and 2022 for evaluation. The most frequent barriers across the selected articles were HIV stigma (17), perceived risk (13), cultural competence (9) and confidentiality (8). HIV stigma contributes to the other HIV testing barriers and has a significant effect on the lives of MSM. It also contributes to HIV exceptionalism, the concept that HIV is an especially devastating disease and requires an extreme response. Confidentiality during testing is important as people do not want to be tested in settings where they may be recognized by people that they know. Perceived risk is not an effective method to encourage HIV testing and can lead to incorrect assumptions about one's health. Lastly, cultural competence is an important way for providers to foster an environment where marginalized populations will feel supported. HIV testing recommendations that can reduce the impact of the four barriers include standardizing routine HIV testing, disseminating testing information through relevant forms of media, educating patients on the differences between HIV tests and testing locations and promoting the delivery of compassionate among HIV providers.

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HEALTH POLICY

Covid-19 Drive-Through Testing Facilities: What Have We Learned and What Can Be Improved?

Abstract: Background: After COVID-19 was declared a global pandemic in March of 2020, emergency public health operations aimed at mitigating, testing, treating this virus were activated. During the initial stages of the pandemic, countries that implemented proactive screening were able to control the spread of Covid-19 more effectively. In the United States of America, numerous strategies for mass testing of Covid-19 were implemented, but, the drive-through model proved to be both a popular and effective method. Study Design: We reviewed the scholarly literature as well as news articles and public and private websites for information regarding the layout and operating protocol of drive though testing facilities. From these sources, we explored how other entities established and conducted their drive through testing operations and highlight areas for improvement. Results: We identified public health planning documents and test cases from operations taking place both years before and during the Covid-19 pandemic which demonstrated how drive though viral testing as well as mass vaccination sites were effective in improving both the quantity of patients seen as well as the rate at which they were able to receive care. Moreover, drive-through testing operations require minimal staffing, allows for self-isolation of patients presenting for testing, and reduced the time needed to prepare by facility staff between patient interactions. Issues that became apparent included challenges to efficient and safe vehicle flow through the testing facilities, equipment shortages due to chokepoints in the supply chain, and issues of access for those without a motor vehicle. Areas of improvement included a need for better planning of traffic flow, the need for more user-friendly online screening forms with virtual check-in and follow-up and maintaining the perception of professionalism that is lost when moving the delivery of healthcare from the hospital or clinic to the field. Discussion: Drive through testing is employed in cases when there is an emergent need for large numbers of people to be screened. Stemming from this acute need, issues regarding supply availability and traffic flow logistics emerged. The epidemiological principles utilized in the drive through model of mass testing have shown its utility as a high-throughput tool and a critical public health measure. With proper preparation and disaster planning utilizing lessons learned from the Covid-19 pandemic, an effective mass testing strategy can be rapidly and successfully implemented for the next public health crisis.

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HEALTH POLICY

Provider Understanding and Perceptions of Mental Health and Substance Use Services in England's Sexual Assault Referral Centres: a Qualitative Analysis

Introduction: There is a strong association between sexual assault (SA) and mental health and substance use (MH/SU) disorders. In the UK, SA survivors can present to one-stop Sexual Assault Referral Centres (SARC) offering medico-forensic care, emotional support, and legal/social advocacy. Around 40% of SARC attendees in England have significant MH/SU needs. Despite this, SARCs vary widely in the MH/SU treatments they offer and in referral pathways to behavioral health specialists. There is limited research examining the provider experience of addressing MH/SU disorders in English SARCs, which may help elucidate supply-side barriers and facilitators to creating a holistic care pathway for survivors. Methods: Secondary qualitative analysis of 18 semi-structured individual interviews and 4 focus groups, conducted with 28 providers working in SARCs and partner organizations across England. Participants were purposively sampled to represent distinct geographical regions and professional roles in the SA care pathway (e.g., forensic examiners, crisis workers, mental health providers, sexual/domestic violence advocates). Reflexive thematic analysis with a constructivist theoretical framework was used for coding and theme generation in NVivo12. Generated themes/subthemes were then transformed into a thematic map. Results: Analysis yielded four main themes, illustrating: providers' perception of MH/SU care as a disjointed pathway for survivors in England (Fragmentation); various provider- and systems-level efforts to close these gaps between services (Holding); participants' understanding and perceptions of the role of SARCs in MH/ SU provision (Roles and Remits); and their perspectives on SARCs' integration with local community agencies (Knitting In). Perspectives varied widely by participants' role in the SA care pathway and local variations in service structures. Findings highlighted the potential benefits of having SARC-based counseling/therapy or commissioned referral pathways to external behavioral health specialists. However, there is a need for improved relations between SARCs and non-statutory organizations, particularly substance use and sexual/domestic violence advocacy groups. Conclusions: Systemslevel, not just provider-level, efforts are needed to create a holistic system of MH/SU support for SARC attendees. While SARCs could offer their own counseling/therapy, local governance structures and resources (e.g., commissioned referral pathways) would facilitate better relationships between SARCs and partner organizations ultimately improving handoffs, care quality, and provider burden. Clearer policy guidance on the role of SARCs in MH/SU provision could also improve their collaboration with existing organizations by recognizing their respective strengths and remits. Finally, as no organization functions in a silo, there needs to be broader mental health systems strengthening to support survivors' long-term recovery.

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Policing, Sanitation, and the Fragmented Response to Homelessness in Cities

Housing is a critical social determinant of health, and many American cities are in the midst of a homelessness crisis. People experiencing homelessness have a higher risk of mortality, mental illness, and chronic conditions. Additionally, higher rates of unsheltered homelessness may also generate public safety and public health concerns. Homelessness - especially unsheltered homelessness - generates pressure to immediately and punitively remove visibly unhoused people and their belongings from public spaces. "Order maintenance" police strategies focus explicitly on policing behaviors of persons experiencing unsheltered homelessness, including loitering, sleeping in public, and visible symptoms of mental illness. Furthermore, exposure to visible homelessness reduces public support for redistribution policies and increases support for the removal of unhoused people from public spaces. In this study, we explore the extent to which cities emphasize punitive policies in their approaches to homelessness. We study the two bureaucracies most likely to be involved in such punitive approaches: policing and sanitation. The police - as the central public safety bureaucracy - are on the frontlines of dealing with any "order maintenance" concerns generated by local unhoused people. Additionally, Sanitation is regularly tasked with the removal and confiscation of homeless people's belongings. We take advantage of a variety of different data sources to explore cities' punitive policymaking. These data include a nationally representative survey of mayors, as well as administrative data on police and sanitation agencies gleaned from their websites and policy documents. Results from the Menino Survey of Mayors indicate that city mayors believe the police to have a greater impact on their cities' homeless policies than people at risk of experiencing homelessness, public housing authorities, and local departments of public health, among others. Analysis of Homeless Outreach Team (HOT) data suggests that 59% of HOTs explicitly include enforcement of civil or criminal infractions or quality of life crimes, and 41% include encampment removal (including removal of persons and belongings), as a goal or mission. Finally, analysis of Sanitation department data found that 72% of municipalities enlist sanitation institutions as a part of their response to homelessness. Our findings show a deeply fragmented bureaucracy, with an orientation towards punitive policy. The police exert strong influence over homelessness policy and their involvement comes with strong enforcement potential. Similarly, sanitation bureaucracies have well-developed homelessness policies; these policies, like the police, underscore the removal of visible reminders of unhoused people in the form of encampment abatement policies.

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